

Society of Arts.



# The Builder

AN

## ILLUSTRATED WEEKLY MAGAZINE

FOR THE

## ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR, SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—Sir Henry Wotton.

"Our English word To Build is the Anglo-Saxon Byldan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—Diversions of Purley.

"Always be ready to speak your mind, and a base man will avoid you."—William Blake.

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# The Builder

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## *Hospital Construction and Management.**

IT is exactly a twelvemonth since we commented upon the first volume of a work on the above subject, published under the joint authorship of F. J. Mouat, M.D., &c., and H. Saxon Snell, F.R.I.B.A., &c. We had occasion to point out the fragmentary and somewhat confused arrangement, or want of arrangement, which characterised it as a literary effort, and deprecated the difficulty which was thus gratuitously added to the understanding of a complicated problem by unnecessary complication in its treatment.

The second part of the work just issued by the same authors is not free from the defects of the first, but, like the first, it contains much scattered information, which will repay a careful search. It is true that a general index is now added, and, so far, the reader has reason to be thankful; but, beyond this, he is left pretty much to his own resources in deducing any conclusions from the mass of miscellaneous and unrelated matter which goes to make up the book.

The authors modestly abstain from directly "formulating their own views and opinions on the questions treated" because they "demand a more profound study of the whole question than the time at our disposal admits of," and the omission will only, it appears, be supplied "if another edition of the work be called for."

Surely this is an unusual position for professional writers to take, who are presumably experts in their respective spheres. Their work amounts, practically, to this. "We give you plans and descriptions of a great many home and Continental hospitals, some criticisms thereon, and a few extracts from the reports of various Commissions who have from time to time looked into the subject: make what you can of them, and form your own conclusions. We are too busy building and managing hospitals to have time for the profound study which should precede the formulating of opinions on so serious a matter. If, however, you ask us for a new edition of our book we will throw you an opinion into the bargain; meanwhile, we hurl at you a miscellaneous assortment of modern plans and leave you to your own devices."

The late Mr. Street once, in the heat of discussion, called a learned professor's book on domestic architecture "an illustrated shop list," and it is a pity that something of this flavour does attach to so many of the works of professional men upon technical subjects, that they leave a sort of general impression that their object is to show there is only one man who does really understand this or that particular subject, and that man is the writer of the book.

As we have more than once pointed out, the hospital architect is dependent almost entirely upon the experience of the medical profession, and he can scarcely hope to do more than give effect, in the most perfect and economical way, to the recommendations which experience in the practical treatment of disease suggests.

Unfortunately, however, medical experts are by no means agreed as to hospital requirements. The aggregation of some hundreds of patients under one roof, or their segregation in huts of small capacity; the accumulation of story upon story, or the limitation of the hospital ward to a single floor; the shape of the ward, and the disposition of the beds; natural *versus* artificial means of ventilation, or the union of the two; and many similar matters, are open questions debated with more or less energy of advocacy and deprecation.

Perhaps the most exhaustive and valuable amongst the several published contributions to the literature of the subject is the joint official report of Drs. Holmes and Bristowe; and thus they deliver themselves on one fundamental principle of hospital planning, after a close study of the whole question of hospital construction, and personal examination of almost every example in the United Kingdom and on the Continent:—

"If all the subordinate parts of a hospital have been well constructed, the *size* of a hospital is a matter of absolute indifference; whether it contains 100 or 1,000 patients does not appear to exercise the least influence on the health of any individual in the hospital. At St. Bartholomew's Hospital four floors are used as wards, and no difference is perceptible between the healthiness of the different stories. Allowing that each ward is healthy, and that, say, thirty patients may be placed in each ward, we see no reason to doubt that it is safe to put 100 wards together, and accommodate 3,000 patients in the same hospital."

"No more permanent hospitals," says Sir James Simpson; and his view is supported by the opinion of many authorities. "They must be replaced by hut hospitals. The permanent hospital is the Sepulchre Hospital,—*nothing* can render it wholesome. The hut hospital, wholly or partially renewed every ten or fifteen years, *alone* possesses the hygienic conditions necessary for the abodes of disease."

And the problem receives another element of complexity in the fact that the statistics of some of the most perfectly constructed modern hospitals contrast unfavourably with others "full of every fault which can be united in the same building." Whence some writers on the subject have too hastily deduced that the construction of the hospital goes for nothing, and

* By F. J. Mouat, M.D., &c., and H. Saxon Snell, F.R.I.B.A., &c. London: Churchill & Co.

that *all* depends upon the administration; the records of the new Lariboisière, and others of its type, being quoted against the cleaner health bill shown by the outrageously faulty old Leeds Infirmary.

Another instance of the divergence of medical opinion is provided by the opposite recommendations of the English and Belgian Commissions on the orientation of hospital wards, the former recommending an axial line running north and south, the latter being quite clear in favour of a line running east and west.

In view of such important differences in skilled opinion the outsider can only keep cool, weigh the several reasons adduced on either side, and draw what lessons he may from such historical facts, and such clear statistics of results as lie within his reach.

The history of hospital construction and management is a sad one. The earliest hospitals were simply big houses, haphazard conglomerations of rooms without special fitness of arrangement, into which the sick were crowded indiscriminately. Such refinements as the separation of infectious from non-infectious cases, the limitation of the number of the sick to the capacity of the room, or the provision in any special way for the sick as such, were undreamt of. The pictures of neglect and suffering which rise up before us in perusing the history of the Hôtel Dieu, for example, are not only terrible, but sickening. It is almost incredible, though unfortunately but too true, that a century ago "the extraordinary spectacle was to be seen of two or three small-pox patients and several surgical cases, and sometimes even four parturient women lying in one bed." The writer's feelings get a little the better of his grammar, and he does not altogether mean what he writes; but, when due correction is made, his statement is sufficiently startling. It is known, moreover, from the official records of the time, that the unfortunate wretches were turned out of their miserable beds periodically to allow those still more unfortunate sufferers who had been waiting their turn on a ledge at the bed's foot to take their short interval of rest (?). In 1515 each of the 303 beds of this particular hospital held eight, ten, or twelve sick poor "so crowded that it was pitiable to see them." Modern civilisation has no doubt sins of its own to answer for; but the horrors of the casual ward are elegance and comfort compared to this hideous refuge of disease and destitution. So bad was the condition of nearly all similar institutions that the chances of recovery in them were less than if the patients were left untended in the public streets! And so uniformly fatal were certain surgical operations which are now performed with perfect safety that the surgeons abandoned the practice and simply left the sufferers to die.

The Rev. W. K. R. Bedford, reported in the *Lancet* of November 19th, 1881, concerning the hospital built at Malta in 1575, by the Knights of St. John of Jerusalem, says:—

"It was situated on the south-east side of Valetta; the site is the lowest on that side of the town, and all the ground falls towards it. The drains of the town were, and still are, discharged into the sea close to the building The hospital was exposed to the sirocco, and protected from the healthy north and north-west winds. The windows in the wards were small and high, and along the seaward sides niches were arranged, one to every two beds, which were used as latrines. Some later buildings shut out both light and air from the wards. So that the hospital builders of that day were ignorant or careless of the deleterious effects of sewage emanations, a low situation, bad ventilation, gloom, and the depressing influence of the relaxing sirocco."

Some of the older hospitals in this country were scarcely more intelligently planned, and many still remain in which the arrangements are almost as bad as they can be.

The abominable old Hôtel Dieu has been replaced, as every one knows, by a palatial structure, at a cost of a million and a half,—each bed costing the prodigious sum of 1,215*l.* in building alone,—and, with the cost of the land, more than double that sum. Unfortunately the money has been ill-spent. The defects of the well-known but unfortunate Lariboisière have been repeated and exaggerated, and the new building is, by the unanimous verdict of the medical faculty, "a magnificent structure, but a detestable hospital, absolutely contrary to the fundamental principles of hospital sanitary law."

We are not without similar examples of the mistaken application of large sums of money in the endeavour to provide for our sick, and the best way of avoiding similar mistakes in future is a full discussion in the press and elsewhere of the whole subject in its multifarious bearings.

Setting aside matters of detail, it is pretty well agreed that the following points are of primary importance, to wit:—

1. A dry, open, healthy, and ample site.
2. The proper classification of cases.
3. The provision of ample lateral space in the immediate region of each patient.
4. The provision of a sufficient cubic space or air volume about the patient.
5. The rapid and complete removal of all morbid emanations from the sick.
6. Sufficient sun-light.
7. An agreeable and steady temperature.
8. Facilities for nursing in each ward.
9. General facility of supervision and administration of the whole.

It must never be lost sight of that the one object to be attained is the speedy recovery of the sick, and that to this all other considerations should give way. And there is a preponderance of skilled opinion in favour of Sir James Simpson's dictum, that of all forms of hospital, the isolated hut is the most favourable for the end in view.

Accordingly, the practice of hospital building which abandoned the corridor type for the pavilion of many stories, although the former was not without professional defenders, is in turn abandoning that type for the hut.

In towns hospitals will no doubt continue to be built on the pavilion plan,—reducing the number of stories and increasing the intervals between the blocks as much as possible; but the hospital of the future will probably be an assemblage of one-storied huts raised upon hollow basements, quite isolated, and built either of impermeable materials or of such as may be periodically destroyed or renewed.

The new hospital at Genoa is lined with a thin brick wall for subsequent removal, and the Moabite Hospital at Berlin has been built expressly with a view to the successive destruction of the huts of which it consists when the termination of the healthy life of each shall have been reached. It is now a well-established fact that buildings, like human beings, may be "miasmatically poisoned," and that by the absorption of the emanations from the bodies of the patients, hospital wards become positively a danger instead of an assistance towards the recovery of their occupants.

We have not, as yet, had sufficient experience to fix the average duration of such a hut as above alluded to; but it is probable that on merely economical grounds the change will be justified, for the least expensive of permanent hospitals costs 200*l.* or so per bed, whereas there are examples to prove that the hut hospital and its accessories, including the administration, can be suitably erected at a cost only slightly exceeding 80*l.* per bed.

The remarkable success of the Tollet form of hospital plan and construction, which we have several times adverted to in the *Builder*, has directed attention to this form of hospital building, and the daily increasing list of impervious vitrified building materials will, in all probability, enable architects to combine permanence with the other advantages of the hut type.

The last new thing in hospital building is the circular form of ward simultaneously invented in Belgium and England, although like many inventions pre-invented, advocated by Dr. Sanderson, Professor Marshall, and others, and carried into execution on a large scale at Antwerp, and on a small one in a few cases in this country.

It may be found easy to ventilate such a ward by a central "aspirator," and there is no doubt something to be said for the facility afforded for destroying in a central fire, or otherwise, the disease germs which are exhausted with the effete air of the ward; but it is quite easy to ventilate the rectangular ward, and, as stated by us in our previous notice, we shall be surprised if this form of ward eventually makes its way. It is, however, a fair subject for discussion, and a profitable discussion of the matter will be helped by the experimental hospitals now being erected on this system, and we may treat the subject in greater detail hereafter. As to the Antwerp Hospital, we expressed our opinion in noticing the first portion of the present publication.*

Although the Continental architects have in some matters bettered the instruction they have received from us, and we have much to learn from their latest works, they in turn are still far behind us in all sanitary arrangements, and even the new model Hospital at Baltimore, the result of an examination of the best modern hospitals of Europe, is far from perfect in this respect.

The principal value of the book before us consists in the careful record of what other nations are doing in hospital construction, as shown in the numerous plans and sections. Especially useful for practical men are the tables of the cost, accommodation, floor space per bed, and other particulars of the principal European hospitals. All who are engaged in hospital design and construction may learn much from the labours of the authors, and will find that it is a veritable mine of information for those who have the courage to work it.

## STRUCTURAL AND PICTORIAL BEAUTY.

IN any inquiry into the question of the identity, or otherwise, of structural and pictorial beauty, it must be observed, in the first instance, that neither adjective is adequate to cover, and exclusively to cover, the group of phenomena that rank under the title. It may at first be thought that there can be little doubt as to what is meant by beautiful structure. Even as to that, however, there is something to be said. But by the term pictorial may be meant something far wider than the elements usually called picturesque,—such as beauty of landscape, of colour, or of studied adornment. In the most subtle meaning of the expressions there may, indeed, be an underlying unity. But it is rather to illustration than to definition that we must have recourse in attempting to trace a comparsion or a contrast.

What we understand, then, by beauty in structure is something which appeals to the intelligence and to the judgment, as affording the most perfect appliance for carrying out a definite purpose. It is, so far as our powers of discrimination go, the evidence of design,—of the application of perfect skill to carry out a distinct object. It admits of no error, whether in excess or in defect. It displays the true method of the production, or the counterbalance, of force. If we grasp this idea, it will enable us to bring forward instances of structural beauty in which what we usually regard as structure,—that is to say, rigid structure,—is wholly absent. In the ever-varying curves of a freely-springing fountain, we trace the constant play and balance of natural forces. For no two seconds of time do the graceful forms remain the same. Yet at all times (pressure and other conditions being alike) there is a certain amount of identity. The most abstruse mathematics (we may cite the recent work of a learned French hydraulist, M. Gräeff, in support of the assertion) fail to trace the behaviour of a single filament of water. And yet the eye and the mind are at once completely satisfied by the perfect manner in which nature, under such conditions, asserts the never-failing certitude of mechanical law. The same remark will apply to the grander forms of the like action, as seen in the mighty wave of the incoming tide, or in the leap of a mountain cataract. In each of these cases it is the perfect and truthful form, ever changing but ever the same,

* *Builder*, July 7, 1883, p. 4.

that charms the eye. Let the sun come from behind a cloud, and span the foam of the cascade with a rainbow arch, and in the addition of colour to form we have the perfection of pictorial beauty.

We speak of the ever-varied forms of moving water, evincing, as they do, the unfailing action of mechanical law, as an illustration of structural beauty, for the reason that this excellence is not often very easily to be detected by our powers of observation in the inorganic world. It may almost be said that it is only when motion, of a kind readily to be grasped by our senses, is present, that the term applies. It is to the organic kingdoms of nature that we must turn for the most apt illustrations of beauty of structure; and the instances that there occur are chiefly notable as being contrivances for resisting or producing motion.

The most perfect examples of structural beauty are to be found in the animal kingdom, and notably, from the mechanical point of view, among the birds. The skeleton, or rigid structure, of a swift, of an eagle, of a stork, or of an auk, — different as one type is from another,—is in each case a perfect mechanical provision for the special motion habitual to the bird. But, taking that rigid structure alone, there is a total absence of pictorial beauty. There is no waste of unseen finish or ornament. The roughness, useful for the attachment of the muscles, the inelegant but perfectly mechanical swelling at the joints, the hollow shafts of the columnar bones,—all structurally admirable, — are not agreeable objects in themselves. In the human form, of which we,—perhaps not the best judges,—speak as the most beautiful of all forms in nature, the bones are a subject of undisguised terror to a child. Even when they peep too prominently from under the skin they are ever regarded as unsightly. Of all the osseous parts of the human structure but one group has any pictorial beauty. The teeth are beautiful, sometimes very beautiful, but the teeth are intended to be seen.

In the animal organisation, therefore, while the whole mechanical structure of skeleton, tendon, and muscle is admirably adapted for locomotion, there is no attempt at pictorial beauty in detail or in sum. The beauty which enchants the eye in the animal is, as it were, draped around the mechanical structure, as unnecessary to it,—for mechanical reasons,—as is the iris to the waterfall,—but yet, when produced, essentially aiding the perfection of imaginative excellence. It is thus with the texture and colour of the human skin, with the plumes of birds, even with the scales of fishes. Work,—or the power of work,—seems to have been first regarded; and when the dynamical problem has been exactly solved, the creative power of nature may be said to have indulged itself in the addition of wonderfully-varied exterior beauty.

It is one thing to trace a subsidiary utility in a beautiful form, and another to attempt to attribute all that we consider beautiful to teleological or to self-acting causes. To those who will, perforce, adopt no other than a rigidly utilitarian point of view, let us offer the compromise of physiognomic truth. That certain combinations of form or of colour suggest certain ideas to the human mind there can be, we think, no doubt. Where beauty is imperfect, admiration may be matter of individual taste. But not so where beauty is perfect. From the time when the verse of Homer glowed with the reflection of the grace of Helen, there has been no more doubt as to the charms of that fatal cause of war, or of those of Cleopatra, than there is as to the melodious quality of the notes of the nightingale.

Akin to this instinctive perception of beauty is that equally instinctive physiognomic perception which appears to be much more highly developed in children, and in animals familiar with man, than it is in the civilised adult. It is easy to understand why such should be the case. On the other hand, it is held by those who are admirers of Lavater that a truly scientific study of physiognomy is possible, the outcome of which shall unite the keen impressional sense of the child or of the savage with the orderly conceptions of the philosopher. However this may be, let us regard such a detail as what has been called "the actor's feature," the eyebrow. Nothing in the face, of which the will can control the expression, is more expressive than the eyebrow. The change which emotion can give to its form, slight as it is, is in the highest degree significant. The eyebrow has been spoken of as a contrivance for keeping dust out of the eyes. That in some infinitesimal manner it may so act may be allowed. But a keen ridge of bone, shading the eye like the poke of a cap, would probably, for optical purposes alone, be a far better arrangement. Again, for those who believe that there is no such thing as species in nature, but that each existing living type is only a chance item in the course of continued self-evolution, the explanation that the eyebrow is a *remanet* of the original hairy covering of the faces of our bestial progenitors labours under the disadvantage that the bony orbit of the brow would have been one of the first parts of the frame from which the hair would have been rubbed off by the destructive friction of daily habit, and mutual intercourse. Neither utility nor "survival" can account for the existence, the constancy, and the wonderful variety of what we may call this capricious feature. It may be regarded from the artist's point of view alone; but if it be required to add a reason beyond that of the production of pictorial beauty, it is only to be furnished by physiognomy.

One peculiarity of architecture, to which that fascinating study may probably owe no small portion of its charm, is the mode in which it combines structural and pictorial beauty. Examples of this may be taken from various styles, schools, and periods of architecture, but the most conspicuous illustration of the remark is to be found in the Classic orders. Thus we trace, first structural purpose, and then a gradually increasing mastery over durable and beautiful material, which adds all the charm of what may be called skin beauty to structural proportions that gratify the perception of weight (if that be the faculty by which we judge of stability). We may hesitate to admit the descent of Helen from a gorilla; but we instinctively recognise the filiation of the Corinthian column, perfect in the maiden graces of its proportions, from the humble timber "upright." Indeed, that idea of *remanet*, survival, or homologue, which we are wont to consider as special to organic life, may be traced in such architectural features as the triglyph; pictorially beautiful, no doubt, in the form which had become conventionally fixed by the age of Pericles, but none the less bearing the unmistakable stamp of its constructive and wooden origin. The structural beauty of a Greek temple may be said to result from the truthful skill with which the nobler material of marble has been substituted for the humbler material of wood, in carrying out what we may call the apotheosis of the hut. In the process of architectural change the surface beauty of which the nobler material is susceptible has been added to the grace of outline. But it has not been added as "decoration," or "*appliqué* work." It sits as close to the structure as does the blush to the human cheek or the iridescent plumage to the sunbird or the bird of paradise. There is a union, or rather unity, in the two elements or kinds of beauty in such a building as was the Parthenon, that holds almost more nearly to the handiwork of nature than to its feeble imitation by man.

To draw the line between the work of the engineer and that of the architect has long been a matter of delicacy, not to say of dispute. Nor must we forget, in this case, the truthful dictum of Linnæus, "*Natura non facit saltum.*" Thus there is one group, and that a most important group, of buildings, of which it may be difficult to determine the character as appertaining to the province of the architect or of the engineer. We mean, of course, the lighthouse. But, as a general rule, we think the remark may be ventured that the province of the engineer is to deal with structural beauty alone, and that he may, in fact, have been wonderfully successful in the production of a hideous, but truly mechanical, structure, such as the hollow beams of the Menai bridge. But an ugly structure, however scientifically or economically perfect, is not a credit to an architect. To the attainment, therefore, of high rank in his profession there is necessary an element with which it is not needful that his brother,—son of Vulcan as he may be,—should be endowed, — the gift of artistic taste.

## NOTES.

THE case of Barlow *v.* The Kensington Vestry, which came before the Court of Appeal on the 26th ult., alters the law in regard to the frontage of corner-houses as laid down by Vice-Chancellor Bacon in the Court below. As we pointed out (vol. xliv., p. 374) in commenting on the decision of the Vice-Chancellor, this case was of the utmost importance, because it practically laid down the law in regard to corner houses. This was, in fact, a house in Kensington-road with its front door in that thoroughfare, but it had its side not only in De Vere-gardens but also a part of the building projecting beyond the line of frontage as laid down for that street by the Superintending Architect of the Metropolitan Board of Works. Shortly put, the Vice-Chancellor's decision was that the house was not within the terms of Section 75 of the Metropolis Management Amendment Act, 1862, because it was in Kensington-road and not in De Vere-gardens, and, therefore, so long as it did not extend beyond the line of frontage in the road it was immaterial if its side extended beyond the line of frontage in De Vere-gardens. On the other hand, the Court of Appeal decided that a corner house could be in two streets, and, therefore, the fact that it was nominally in one only did not prevent it being also in another. Unless we are greatly mistaken, the effect of this decision would be, if strictly observed, to make a number of corner houses liable to be pulled down, since many appear to be built in the same manner as the house in the Kensington-road. We regard the general result of this decision with satisfaction because any judgment which increases our open space, by however small an extent, does a service to the community. On the other hand, we think the owner of this house is really to be pitied as having been the unfortunate *corpus vile* on which this useful experiment was tried, and also because the Kensington Vestry should never have allowed the house to get so far on as it did before taking legal steps. We may also commend to the notice of local authorities the remarks of the Court, that these provisions of the Act are so strict that they should be watched by judges and magistrates with great jealousy.

THE Hellenic Society held their annual meeting on Thursday of last week, the Bishop of Durham, president of the Society, in the chair. While glancing at the attractiveness to scholars of Hellas proper as a field of investigation, he suggested that the ground which had actually fallen to the lot of the Society in Asia Minor was possibly even richer in matter of archæological and historical interest. He made two special suggestions,—first, the thorough investigation by competent persons of the monastic and other libraries of the East; secondly, the mapping out by the Society of subjects to be worked upon by competent young scholars, who would devote time and labour to their solution. Mr. Newton, in a subsequent speech, spoke strongly in deprecation of the apathy of the English Government and of Englishmen generally in regard to archæological investigation of this class; observing that when the German Government grant for the excavations at Olympia was exhausted, a sufficient sum was at once raised by private means to continue the work. We heartily echo the spirit of Mr. Newton's criticism, and hope that the labours of such a body as the Hellenic Society will not be without their influence on the general tone of English feeling on the subject, sooner or later. The next number of the "Journal of Hellenic Studies" will not appear till the autumn.

THE Metropolitan Board of Works have wisely determined to appeal against the magistrate's decision dismissing a summons taken out by the Board, as we mentioned a fortnight since, against a builder who proposes to build upon a disused burial-ground in Peel-grove, Bethnal-green, in which, it is stated, upwards of 20,000 interments have been made. The summons was taken out for an infringement of the By-law made by the Board under the powers conferred by the Metropolis Management and Building Act Amendment Act, 1878, which provides that no house shall be built upon a site covered with animal, vegetable, or fœcal matter. The magistrate, in dismissing the summons, stated that in his opinion the Board had mistaken their remedy. In the case of the disused graveyard attached to Whitefield's Chapel, Tottenham-court-road, which was proposed to be built upon a few years ago, the parish indicted the builder for a misdemeanour; he was tried at the Old Bailey and convicted, and the building scheme was abandoned.

IN effecting certain alterations on the premises of Messrs. Tylor, at Warwick-square, near Newgate, some interesting Roman remains were discovered, which form the subject of a recent communication to the Society of Antiquaries. Mr. Alfred Tylor, the writer, is not content with describing the objects brought to light, the chief of which were a handsome stone vase, 2 ft. 3 in. high, with solid stone (porphyry or serpentine) handles and four leaden *ossuaria*, but has made them the text of a discussion upon certain points connected with the Roman occupation. He maintains that it was the metallurgical wealth of Britain which gave the island importance in the eyes of the Romans, and that the Britons had acquired considerable skill in the working of metals long before the Roman invasion. From a very early date the export of tin was a prominent branch of British commerce; steel scythes, home-made, were used, and iron was largely employed in the construction of chariots, and for other purposes. These are well-known facts; but Mr. Tylor also asserts that working in lead or plumbing is a native industry, and that it is more likely that the Romans learned the art in Britain, where the metal is plentiful, than that they taught it to the conquered nation. The *ossuaria* found in Warwick-square (about 18 ft. below the surface) are, however, specimens of Roman leadwork, and the ornamentation upon two of them is remarkable. One coffin bears a representation of Sol in his four-horsed chariot,—symbolising the passage from light to darkness,—and another has upon the inside a star of eight points, which, in the opinion of Mr. A. Tylor, has reference to the worship of Mithras. The eight-rayed star has, indeed, been claimed as a Christian emblem, and as a modification of the common symbol, Chi-Rho (X. P.); but Mr. Tylor contends that it is just the other way, and that the eight-rayed star,—Assyrian in origin,—was, with other emblems, adopted from Paganism by the early Church, and thenceforth invested with a new meaning.

IT is much to be desired that the authorities would consider the question of the ventilation of some parts of the Law Courts. During the present hot weather the windows on each side of the First Court of Appeal are open, and thus a very pleasant but very dangerous draught is caused. If the windows are kept shut, the atmosphere of the Court becomes intolerably close, so that those whose business it is to be present must run the risk of being stifled or having a sharp attack of cold or neuralgia. Again, the atmosphere of the corridors is exceedingly close and disagreeable; they rival in bad smells the worst of the old Westminster Courts, and, so far from relieving the atmosphere of the adjoining Courts, they make it worse. This state of things is quite to be expected, because these corridors are crowded with persons, the seats in the windows being the scene of many consultations and conversations; they are very low and entirely unventilated, even the small windows in them are never open. These corridors are, in fact, one of the most unsatisfactory features of the building,—they are quite dark in winter, and in summer their atmosphere is quite poisonous. Alterations to the windows, and some method of ventilation, are absolutely necessary.

THE advance of public feeling with respect to the Manchester Ship Canal was signally displayed in the House of Commons, in the short debate that preceded the second reading of that measure, on the 26th ult. One or two members, who represented the interests which have been the chief opponents of the canal, admitted that they could no longer oppose the second reading, and confined their efforts to demanding a "strong committee," a point as to which the promoters of the canal are fully in accord with the speakers in question. The probability, or otherwise, of damaging the navigable character of the Mersey by the attempt to improve it, is the sole *locus standi* to which the opponents of the Canal are now reduced,—a fact which renders the more valuable that citation of the unbiassed opinions of the profession, when no scheme of improvement was on the *tapis*, to which we called attention in our last number.

THE London and Middlesex Archæological Society's Excursion to Rochester and Strood, on the 26th ult., was very numerously attended, owing, no doubt to the favourable weather, and was a decided success. The Cathedral and Castle were described by Mr. W. H. St. John Hope, of The Vines, Rochester, Assistant-Master of Rochester Grammar School, who has recently made some interesting discoveries of the foundations of portions of the conventual buildings beyond the present cathedral precincts. The same gentleman described the Corporation regalia, and Mr. Ferguson, of Carlisle, gave an impromptu sketch of the history of civic regalia. Restoration House, the residence of Mr. Stephen Aveling, was visited, as were also the building known as Watts's Charity and Eastgate House, High-street, formerly a ladies' school, and the supposed scene of Mr. Pickwick's escapade, but now converted into a Working Men's Club. At Strood the local antiquities collected by Mr. Humphrey Wickham were described by Mr. C. Roach Smith. The company dined together in the evening at the King's Head Hotel, Rochester.

AT the approaching Church Congress at Carlisle one of the important features will be an ecclesiastical art exhibition, part of which will be a Loan Collection, intended to afford special opportunity of comparing modern with ancient work. The collection is intended to comprise ecclesiastical metal work, embroidery, wood and ivory carving, paintings, drawings, photographs, books, and MSS.; and the clergy are particularly appealed to for the loan of communion plate and any movable articles of archæological interest belonging to their churches. Mr. William Nanson is the Local Secretary for the Loan Collection.

TWO months ago we called attention (*Builder*, April 19, p. 537) to an intended exhibition of works of decorative art in precious stones, ceramic, glass, and other wares, to be held in Paris in August next, giving the classification of objects to be exhibited. In a circular letter we have received from the Department of Science and Art we are asked to call attention to the subject again in relation to some communications which have taken place between the French Government and our own Foreign Office in regard to English co-operation in this exhibition. On the 2nd of May last M. Waddington sent a note to the Foreign Office requesting that English workers in the industries included, viz., "art objects in stone and wood, pottery, ceramic wares, enamels, glass, crystal, and mosaics" should be invited to contribute to the Exhibition. This note was enclosed by the Foreign Office to the Science and Art Department, who wish it to be made known that the French Government are desirous of specially inviting English workers to exhibit,—an invitation which we have no doubt will be amply responded to. Those who wish for the precise statement of the classes of objects to be exhibited will find it, as before observed, in our last volume on the page given above.

AN interesting demonstration of some of the manifold purposes for which electrical energy can be utilised was given on Friday evening last, at 6, De Vere-gardens, the residence of Sir Daniel Cooper, who had invited a number of gentlemen interested in the subject to see what could be done by means of accumulators or storage-batteries. The reception-rooms were brilliantly illuminated by one hundred and fifty 50-volt Swan lamps of 20-candle-power arranged in two circuits, each worked by a storage-battery of twenty-four cells, of the Faure-Sellon-Volckmar type, which have been previously described in this journal. Each cell contained sixteen pairs of lead plates, measuring 10 in. by 9 in., and they were supplied by the Electrical Power Storage Company. The lamps had been running for several hours on the previous evening, and the accumulators had not been recharged, but there was no symptom of diminished brilliancy in the lights, which were, if anything, rather too bright, particularly in the dining-room, and all were burning with that absolute steadiness which the use of accumulators ensures. As the installation was only of a temporary character, no attempt had been made to conceal the cables or to provide special fittings for the lamps, which were attached to existing brackets and gaseliers, and, with excellent effect, to three armed candelabra in the dining-room. In addition to the lighting, several applications of the energy stored in these batteries to motive power were shown; for instance, a small fountain was worked, a lathe was driven, and a miniature tramcar made Liliputian journeys in the library with regularity and despatch. There were also exhibited an incubator in which the proper temperature was maintained by the electric current, and two forms of *calorifères*, invented by Mr. Sellon, of which one was in the shape of a foot-warmer. The fact of no engine whatever being required ought to make these accumulators in great request for temporary installations at balls and banquets, as the batteries can be placed in any out-of-the-way corner; but for general purposes the weight of the cells is undoubtedly a drawback, as the cost of carriage for any distance to or from a dynamo-machine for the purpose of recharging must be heavy.

THE House of Commons having thrown out the Thames Crossings Bill, so far as it related to the proposed subway between Nightingale-lane and Bermondsey, the Board at their meeting last week received a report from their Parliamentary Committee recommending that the portion of the Bill relating to steam ferries at Greenwich and Woolwich should be abandoned for the present. The logic of this decision (for the report was adopted) it is not easy to understand. Most people would see in the circumstance an additional reason for proceeding with the ferries scheme, which is the most rational and practical portion of the whole.

THE case of "Wright *v.* The Midland Railway Company" occasioned some remarks from Mr. Justice Field the other day, which railway travellers would do well to make a note of. The case was one arising out of a fatal accident from the deceased person having apparently walked over the line in front of the train he was waiting for, and which it was admitted he knew was coming, as he crossed the line because he heard it approaching, and was on the wrong side for it. The Judge observed that while railway companies were bound to take all proper steps for securing the safety of their passengers, the latter were "not expected to part with their common sense and care upon a railway." This is a side of the relation between railways and the public which is apt

to be forgotten. From the evidence in the case referred to we should say that the unfortunate man met his death through want of the most ordinary common sense in walking straight before a train without looking how far off it was or how fast it was coming; and the fact is that the travelling public on railways are, in these matters, "mostly fools." We hinted one day to a porter who had twice drawn our attention to the fact that a train was coming (while waiting to cross the line), that we could see a train as well as he could. He replied, "There's a many of 'em that can't, sir!" and that is about the truth of it. But it is hardly reasonable that grown-up persons should expect to be taken care of on a railway as if they were babies.

THE "Cathedral of St. Finn Barr, Cork, has not much appearance of architectural antiquity. It was mainly rebuilt between the years 1725 and 1735. The choir is lighted by *a fine Venetian window*. The interior, 97 ft. by 57 ft., has a richly-panelled ceiling which rests upon ranges of Ionic pillars of scagliola. The north and south *galleries* are supported by Doric columns." A usually well-informed illustrated contemporary has the assurance to print the above for the edification of the Philistine, under date June 28th, 1884. Shade of Burges! Shall the hard measure dealt out to thee during life pursue thee beyond the grave?

IN our usual list of meetings for the week will be found the announcement of a remarkably interesting course of papers which are to be read next week at a Conference at the Health Exhibition under the auspices of the Royal Institute of British Architects, on the 10th, 11th, and 12th of the month (Thursday to Saturday next week). On each day there will be two short papers and a discussion, commencing at 2 p.m., and a further paper and discussion commencing at 4 p.m. The names of the presidents and the readers of the papers include, as will be seen from our list, some of the most eminent and able of the members who take an active part in the proceedings of the Institute. The subjects to be treated of include sanitary arrangement of houses past and present, drainage, impermeable construction of roofs and walls, collection and storage of water, &c. We hope there will be a good attendance both of professional and non-professional hearers, who will certainly learn something of value from the papers and discussions.

## THE SUAKIM-BERBER RAILWAY.

IT is difficult to reconcile the conflicting statements put forward in regard to this proposed railway. Early last week it was announced in the House of Commons that no decision had yet been arrived at as to its construction, while a few days after it was said that the first ship-load of railway plant for Suakim had sailed from Woolwich. While the matter remains thus avowedly unsettled it may be useful to reconsider the expediency of selecting this particular route even for the purpose for which it is ostensibly to be undertaken. The expressed intention seems undoubtedly to be the construction of a purely military line for a temporary purpose, and without any ulterior prospect of allowing it to become a permanent line of communication suitable for either strategic or commercial purposes. It has been described as a light narrow-gauge railway provided with correspondingly light rolling-stock and engines, while its construction is to be entrusted to men of the Royal Engineers, supervising whatever native labourers can be found or transported to the locality, and it is anticipated that the whole will be finished within six weeks, or at a rate of four miles per day. In face of the physical difficulties to be encountered in regard to climate, want of water, sparseness of population, and hostility of the tribes through whose territory much of the line must pass, the expectation of such a speedy rate of construction appears to be somewhat sanguine. But assuming that all possible contingencies have been thoroughly considered, and effectually provided against, it is still open to doubt whether, after all, the route from Suakim to Berber is the best that could be selected for even the immediate object in view, that of facilitating the transport of an expeditionary force for the relief of Khartoum. Leaving aside, however, the military aspect of the question as not within the province of the *Builder* to discuss, the possibility, if not the certainty of the construction of a trade route with the Soudan becoming an absolute necessity, ought to have an important bearing in the selection of a line of communication which probably will involve an expenditure of two millions of the public money. Commercial requirements must in the end override political interests, and an interchange of mercantile operations, following a development of its resources, will be better calculated to effect the desired end of pacification and to consolidate the future government of the Soudan, than a maintenance of military demonstrations after the present disturbances have been quelled. If this view be correct, then the country to be benefited by the outlay, and on whom its burden will ultimately fall, being Egypt, that route which will most effectually assist the transport of its produce and develop its trade should unquestionably be preferred. It can scarcely be gainsaid that the valley of the Nile is the route which the trade will take. Produce from the Soudan and territories through which the White and Blue Nile run is now carried on these rivers to Khartoum and Berber, whence, if there must needs be a transhipment, it should at all events take the direction of Korosko rather than Suakim. The length of land carriage in either case is the same, but the route to Suakim lies through utterly unproductive country, whereas either terminus of the Korosko line abutting on the Nile would be useful for its entire valley, and all down-produce shipped at Korosko would be carried without breaking bulk, either to the warehouses in Alexandria, or direct to the ships' sides in the harbour. All the important towns between Cairo and Korosko would then be opened to trade with the Upper Soudan, Kordofan, Darfour, and the countries bordering the great lakes; but they would derive no benefit whatever from the Berber-Suakim line. The mere fact, too, of access to the splendid harbour of Alexandria, with its temperate climate, ought, in itself, to be sufficient to decide the question, for before Suakim could be converted into a useful harbour, a very large outlay would be necessary; and even if practicable at a moderate cost, its excessively trying climate, unendurable for several months of the year, renders it unfit as a place of permanent habitation for Europeans.

As, notwithstanding all existing obstacles and argument to the contrary, the Nile must and will remain the great highway from the interior to the coast, just as the great rivers in India and America still are, in spite of all the railways which have been, or ever will be, constructed, the attention of all those concerned in the welfare of Egypt should be directed to removing or overcoming the existing impediments to its effective navigation.

Pending the carrying out of works for that purpose, nothing could better serve intermediately as an auxiliary than a railway from Korosko to Berber, unless it be a temporary line carried along the river as far as "old Dongola," and thence across to Khartoum or Berber, distant 180 to 200 miles respectively. One advantage of the parallel line would be to facilitate the construction of the works for overcoming the present obstacles between the first rapid at Assuan, and the last between Shendy and Khartoum, while it would meanwhile carry not only the traffic arriving at the latter place for the coast, but also the produce of the country between Khartoum and Assuan. If, therefore, a temporary railway has under any circumstances to be constructed for military purposes, and the advantage of being in close proximity to not only water but to a tract of country from which inexhaustible supplies could be drawn will not be questioned, ought not the likelihood of its being ultimately required for commercial purposes to aid in determining its direction? There can be no question but that, if it is to be undertaken in the interests of Egypt alone, the Government of that country would pronounce in favour of the line which would serve as a trade route after it had fulfilled its military purposes. If Egypt is unable to pay the cost of construction, there would probably be little difficulty in getting a syndicate of capitalists in this country to take it over and work it. It would be well, therefore, that whatever route be selected, our Government should bear in mind the important fact that however useful and necessary their proposed railway may be for military operations, it will be still more useful afterwards for commercial purposes, and that it should therefore be so constructed to meet that end as far as is consistent with its primary object.

## A FRENCH ARCHITECT ON THE COMPETITION QUESTION.

THE following is a part of the paper on Competitions, read by M. Paul Wallon at the recent Congress of French architects. Some of his remarks will be found suggestive by our readers:—

"Having given a brief summary of some long and serious disquisitions, we have now before us the views, many times expressed, on the subject of public competitions.

After this enumeration of the principal items in the grand total what, in my turn, shall I say?

People have spoken to you of resolutions, of decrees even, to obtain for the future a uniform regulation of competitions over the whole of France. Well, gentlemen, I venture to say, in regard to this official regulation of public competitions, these resolutions and decrees, and so on, I do not believe in them and do not wish to see them at all.

Every one must be master in his own house, whether an administration, a commune, or a constituted society, and I cannot imagine a Minister or a President of the Republic consenting to intervene between competitors and organisers in a competition.

It is by persuasion and appeal to the public that one must work, by interesting them in our cause and showing them that it is at the same time their own and that it is by advising them as well as in defending ourselves that we hope to obtain better results.

Declarations of principles have had their day, official inquiries and communications have done their work. Leave on one side, if you please, vague forms, Platonic views, and mere theory, and enter more strictly on the real question; put our finger on the sore, and, by example, counsel, and energetic action when needed, let us write day by day the history of public competition up to the point when no scandal can be possible, and when a corrupt municipality will recoil before public opinion.

Do not suppose that I deny the influence of statements of principles, or of those lengthy debates which we have just passed in review. I hear people say, 'Oh, the competition question. They have been discussing that backwards and forwards for years, and what comes of it all?' But all these discussions have not been useless, we may be sure. They have not resulted in '*arrêtes*' or '*décrets*,' certainly, but in something more important,—the formation of public opinion. The principle of competition is firmly established now, without any movement of great administrative machinery; it has entered into our life by the mere force of circumstances. I would even venture to say, and it will be my sole criticism against the institution, that there is a certain exaggerated desire for competition, on every hand. Every village wishes to play 'la grande ville,' and each little building is immediately thrown open to public competition. It is often an electoral question. The situation of the 'architecte de département' is not improved by it. For him, public competition is a source of perpetual danger, and, in case of failure, of humiliation before his fellow-townsmen, especially if the building in question should chance to be one of small importance, which he could, perhaps, have carried through far better than his unknown competitor, a stranger to the district, and simply either more fortunate or backed by stronger interest.

Now, it is of considerable importance that the position of 'architecte de département' should be sought after and occupied by those members of the profession who have spent their youth in studying at the École des Beaux Arts and under our greatest masters, and who are anxious to return to the provinces and to place their talent and knowledge at the service of their department. If the position is to be acceptable, it must be protected.

The 'architecte de département' must win his post by competition, and then it may fairly be conceded that he possesses the knowledge

necessary for the construction of schools, town-halls, and other municipal buildings without having recourse to competition at all.

The present, gentlemen, is no longer a time when (as M. César Daly wrote in 1861) the number of public competitions may be reckoned by that of the reigning dynasties in France; on the contrary, we may be said to suffer from a surfeit of them.

It is true, and the fact is to be deplored, that great public institutions still escape the salutary impulse given by competition; but this is an exception which will become more and more rare as time goes on. The question for us is not now whether competition will prevail, but by what guarantees it can be protected from injustice.

The morality of public competition,—that is the gist of the whole subject. I must allow at the outset that the phrase has been greatly abused. Every decision must create some malcontents, and the anathemas and accusations hurled at the judges by those against whom the decision has gone are often not merely exaggerated, but altogether unjust. It is but human to cherish illusions with respect to a work that one has begotten, nourished, and caressed through long months of application, and the rude awakening of an adverse judgment is often very hard upon this paternal fondness.

Nevertheless, instances of injustice do not seldom occur, and in accordance with the plan I have laid down for myself in this address, I will now venture to draw your attention to some that have come under my own observation."

M. Wallon then proceeded to narrate, with considerable irony, and amid signs of approbation from his hearers, the particulars of a somewhat recent scandal *à propos* of the election of an "architecte de département," and the curious fact, to say the least of it, of an architect who, on applying at the Mairie for the particulars of a certain building put up for competition, received instead an offer of collaboration, *not gratuitous, but obligatory*, from an "agent-voyer" (trustee of roads), who, upon this condition, promised his powerful interest to gain acceptance of the candidate's designs. M. Wallon also reminded his hearers of the open competition in 1880 for the construction of a police barracks at Oran; and, on the other hand, of the case in which, first the Conseil de Préfecture of the department, and then the Conseil d'État, condemned the town of Charleville (Ardennes) to pay the competitor whose designs for the construction of a college and library had been classed first, but not chosen for erection, his fees at a deduction of five per cent. from a certain sum for the cost of superintendence.

A similar decision was given in 1883 on the occasion of the construction of a group of school buildings at Puteaux (Seine).

M. Wallon continued, "It must not be imagined that similar abuses accompany competitions for such buildings as the Opera, or the Hôtel de Ville; the judges in such cases are men of the nicest conscience, of the most absolute impartiality, and the competitors find themselves face to face with a public opinion which it would be dangerous to displease." M. Wallon then drew attention to some erroneous ideas on the subject of public competitions, and discussed those recently set forth in a pamphlet by M. Charles Morin, architect of the department of the Bas-Rhin and of the town of Strasbourg before the German invasion; he amused his hearers by two anecdotes; one of a country mayor who mistook a Louis XVI. design for a toilet-table, all over Cupids and nymphs, for a church altar, and another of a "Conseiller Général" who took a tracing of some drainage tiles on a plan of a basement for the elevation of a clock-tower.

Drawing attention to what he believed himself entitled to demand and to obtain, M. Wallon continued:—

"Gentlemen, the State has far too many subjects in hand, far too many general interests to defend, to be able to occupy itself with a question so special, so variable, so difficult to formulate as that which we are considering. One may almost say that for every fresh competition there is a fresh way of organising its conditions, either in the details of the programme or in the composition of the jury. Do you intend to appeal to the Government on every occasion of difference? Who will blame it for turning a deaf ear to your appeal? If you have a grievance, there are the courts of law; we have just seen that they are not appealed to in vain. But, you will say, it is not every one who can engage in a law-suit, a hundred objections of time, of expense, &c., may arise to prevent it. During next Friday's session, gentlemen, you will have an opportunity of listening to a remarkable report, drawn up by M. Hermant, in the name of a special Committee, assisted by the Judicial Council of the Society, for the creation, under the auspices of the Central Society of Architects, of a mutual defence fund in cases of liability. The proposition emanates from the International Congress held at Nice at the beginning of this year.

Does not the question of public competition naturally fall within this scheme? By this means we can provide for our own defence, and for the repression of abuses and illegal proceedings.

Together with this federation for defence you must form a centre for information and advice. Here, again, it seems to me the *rôle* of the Société Centrale is pointed out.

It must be made known to all municipalities, public bodies, and committees that competitions will not be undertaken under certain inadmissible conditions; they must be convinced that these conditions will deprive them of the assistance of many architects of merit, of every architect who is desirous not to have his reputation placed in incapable hands. Those who are organising competitions must themselves come to us frankly, and say, We have full confidence in your powers, in your good sense, in your independence, and in your justice: give us your advice. Here is our programme in its main features; we rely absolutely on you to settle its details, to appoint the jury, to award the premiums. All our decisions accepted beforehand, we shall only appear to put them into execution. Do you believe, gentlemen, that any society, whatever it might be, consulted in this way, would not consider itself bound in honour to do its duty, and nothing but its duty? Do you think that a public authority could place its interests in safer hands than these?

And do not imagine that I am over-credulous or over-bold in speaking thus! Public authorities will be found only too ready to receive advice by which they will be the first to profit."

Here followed two instances that we shall content ourselves with quoting on the authority of M. Paul Wallon: one, of the good influences exerted in 1877 by the "Conseil Général des Bâtiments Civils," with regard to the open competition for the construction of an Hôtel de Ville at Rodez, and the other the influence exerted recently by the Société régionale of the architects of Northern France with regard to the competition for the construction of the Palais des Beaux Arts at Lille.

"Well, gentlemen," continued M. Wallon, "let all provincial societies imitate upon occasion their valiant sisters of the North. Let the central Society of Architects in Paris, in accordance with its principles of joint responsibility and co-operative union, create in its midst a centre of information, of publicity, of defence. Let there be a permanent, renewable Commission, bound to follow every phase of the question, to give every information, to receive all protests, and to refer all cases of interest to the members of the Mutual Defence Committee of the Society.

This protective province of the Society has already been recognised on more than one occasion under the direction of its president, Victor Baltard. A letter was written to the Mayor of Bagnères de Luchon on the subject of the open competition for the erection of a Casino in that town; and another to the Prefect of the Department of the Morbihan on the competition for the post of architect to the department.

I should like to see this assistance of the Central Society continued and extended; its wide reputation, its well-deserved influence would enable it to repair many errors, and to render great service to the general good, more especially in this question of public competition."

After further arguments, winding up with a moving appeal to national feeling, M. Wallon concluded, amid general applause, in these words:—

"Gentlemen! the discussion in which you are now to take part should be made known to all, to administrative bodies, to the public in general, as one that has a higher aim than the interests of any individual, of any school, of any corporation; its aim is the triumph of the artistic pre-eminence of France, the greatness of our nation!"

## GEOLOGY AT THE HEALTH EXHIBITION.

ON Saturday, the 28th June, several members of the Geologists' Association, with their president, Dr. Hicks, F.G.S., &c., and secretary, Dr. Foulerton, F.G.S., visited the International Health Exhibition, for the purpose of seeing the various objects relating to their especial study. They were met in the Water Companies' Pavilion, at 4 p.m., by Colonel Sir Francis Bolton, C.E., Water Examiner to the Local Government Board, who conducted the party round the Pavilion, outer corridor, and the outside annexe, pointing out and explaining many of the principal exhibits. Amongst these were noticed the modes of filtering the water obtained from rivers in the vicinity of London, for which purpose glass cases have been erected showing in descending order:—1, Very fine sand; 2, coarser sand; 3, pea grit; 4, small subangular flints; and 5, larger flints. When water is poured on the top of such a filter as this, it percolates through, leaving the impurities behind on the uppermost layer of sand, whilst a pipe inserted in the lowest stratum carries off the filtered water.

In the outer corridor, to the left of the main entrance to the pavilion, is a unique exhibit, being a case lent by the Aqueous Works and Diamond Rock-boring Company, Limited, of London, containing a collection of cores of different strata, obtained in artesian and other borings by the diamond drill. In the following, which were particularly observed, the geological formation is mentioned, giving the depth at which the specimen was procured and the locality of the bore-hole. Chalk marl, 780 ft., Meux's Brewery, Tottenham Court-road; upper greensand, 860 ft., Albion Brewery, London; upper greensand, 610 ft., New River Company's boring at Ware; new red sandstone, 550 ft., from bore-hole for salt at Middlesbrough.

Other cores in the corridor are, gault, with impressions of pecten, ammonites, and pieces of lignite, 966 ft., Turnford, Herts; three examples from Devonian, 993 ft., 985 ft., and 1,000 ft. respectively, Turnford. In the core from 985 ft., spirifer, with other fossils, were seen. Upper greensand, 585 ft., Ware; two specimens of Wenlock shale, 800 ft. and 827 ft. respectively, Ware. Borings for water and other economics in the south-east of England show that a ridge or chain of Palæozoic rocks runs under London to the Continent. These borings are of considerable interest, both commercially and scientifically, for they indicate to a certain extent the position of building-stones, &c., which, it might be added, are too deep-seated to be profitably worked in the London area. At Messrs. Meux's brewery, at 1,064 ft., Devonian purple and green shales were met with. At Crossness, new boring, after passing through river drift, 39 ft.; Woolwich beds, 47 ft.; Thanet sand, 51 ft.; chalk, 631 ft.; upper greensand, 65 ft.; and Gault, 170 ft. Red sandstones and marls are met with, which may probably be of Triassic age. At Burford, Oxon, the boring shows:—Surface blue clay, 38 ft.; lower oolites, 110 ft.; lias, 598 ft.; rhaetic, 10 ft.; new red marls, 291 ft.; red sandstone, 137 ft.; coal measures, 225 ft. In the Carboniferous beds a coal seam of some thickness was passed through. A boring at Richmond, Surrey, recently described by Prof. Judd, proved the presence of oolites, and at the base of the hole red-rocks occurred which he thinks might be of Poikolitic age. The celebrated sub-Wealden boring at Netherfield, near Battle, clearly demonstrated that Jurassic rocks are of great thickness in that region, as nearly 2,000 ft. of them were bored through, and Palæozoic rocks were not reached. In this experiment valuable beds of gypsum were found which have since been turned to commercial advantage.

The outer corridor also contains many boring tools. There is a diamond drill boring-crown, 22 in. in diameter, showing five diamonds ready for use. The rough black diamond or carbonado, which is a peculiar form of carbon, is used for this purpose. It was discovered in the diamond gravels of Brazil in 1842, and appears to furnish a transition from the ordinary diamond to graphite. A diamond-drill core-extractor, used for breaking off and raising the cores, and a hand iron chisel, are also exhibited.

In the outside annexe are large mains, from 13 in. to 48 in., used by the water companies, with water meters and hydrants. Examples of stone, wooden and concrete pipes, of olden times, were particularly noticed, side by side with iron mains of modern times.

At this point the President, Dr. Hicks, thanked Sir Francis Bolton for the great trouble and pains he had taken during the afternoon in explaining the various objects to the members of the Association, and the party then proceeded to the Belgian Court under the direction of Mr. C. E. De Rance, Assoc. Inst. C.E., F.G.S., of H.M. Geological Survey of England and Wales.

There, various rock specimens, maps, and charts are exhibited, to show the manner in which geology and geography are taught in the elementary Belgian schools.

The following are amongst the principal objects which claimed attention:—Tin, which is almost exclusively obtained from Cassiterite, or tin-stone, a peroxide of tin containing nearly 80 per cent. of metal; antimonite, a tersulphide of antimony; a fine collection of calamine,—carbonate of zinc,—from the celebrated Vieille Montagne, or Altenberg deposits. These mines are situate in the Belgian, Prussian, and neutral territories, between the towns of Aix-la-Chapelle and Verviers. The calamine there has been worked since 1435 as an earth to make brass; but it was not until the beginning of the present century that it was found to contain any metal. Zinc-blende or sulphide of zinc. Galena,—sulphide of lead,—a most important ore, which usually contains various other metals, and it is probable that neither silver nor gold is ever absent from galena. Iron pyrites,—a bisulphide of iron,—is not so much a source of iron as of sulphur. Limonite or brown iron ore. Quartz crystals, chalcedony, agate, melaphyre, &c. Pebbles, and bottles containing sand, such as quartzose glauconitic sand, &c.

Amongst the rock specimens may be mentioned porphyries, granites, anthracites, ordinary bituminous coals, lignites, peats, limestones, sandstones, clays, shales, a series of slates, marbles of various descriptions, Cambrian schists, &c.

Calamites, lepidodendron, sigillaria, neuropteris, and pecopteris are some of the fossil plants from the coal-measure shales, and productus, atrypa, belemnites, lima, pecten, sharks' teeth (lamna, &c.) are examples of the very few other fossils exhibited.

It is noteworthy that in many instances in the case of metals the raw material was placed with the manufactured article, and the name of the specimen, the locality whence it was obtained, with its "usage," were written on small labels, attached to the majority of examples in cases.

Many maps are seen on the wall, on some of which the contour of the mountains, abysses of the sea, with ocean currents, are beautifully shown.

Mr. De Rance gave a short account of the Belgian coal-measures.

The party then adjourned to the fountain display, and finally broke up in the grounds.

## MASON & SWANN'S AIR-HEATING APPARATUS.

AN improved air-heating apparatus for warming buildings is being introduced by Messrs. George Swann & Co., of Portobello-road, North Kensington. The apparatus (which is the subject of Patent No. 3,846 of the present year, 1884) appears to be well adapted for warming churches and other public buildings with economy and without the unpleasant sensation of the air having been burned, which is but too often apparent where hot-air apparatus is used. Messrs. Swann & Co. claim for their apparatus that it supplies *fresh* hot air; that it presents greater heating surface with less consumption of fuel and attention; that a hot-water apparatus can be fixed and worked from the one fire of the apparatus for warming any building adjoining, or for supplying hot water to baths, lavatories, &c.; and that it is simple in construction, having few flues, these being ascending and easy of access. The furnace-chamber is constructed of fire-lumps and is closely embraced at the top and two sides by series of inverted U-shaped air-heating pipes, which serve to hold the fire-lumps together. These pipes (B, B¹) can be made square in section as well as circular (the method shown in the engravings). We quote further description from the complete specification:

Figure 1 is a transverse section of the apparatus. Figure 2 is a horizontal section of the same. The furnace-chamber A is constructed of fire-lumps *a*, and is closely embraced at the top and two sides by series of air-heating pipes, B, which serve to hold the fire-lumps together. These pipes are each composed of two vertical pipes B at either side of the furnace-chamber, united by a transverse pipe B¹. The vertical pipes B rise from chambers or passages C below, with which they communicate for the admission of air to the air-heating pipes B, the entrance to said chambers being at C¹ at the opposite end of the apparatus to that at which the furnace-chamber is situate. The furnace-chamber A is provided with a suitable grate, and communicates by a flue A¹ with a series of large horizontal flues D D¹ D² at the upper part of the apparatus immediately above the horizontal or transverse portions of the air-heating pipes B, the products of combustion passing through these flues D D¹ D² successively in the order named on their way to the chimney. For this purpose the flue A¹ leads into the rear end of the flue D which communicates by a chamber *e* at the front end with the middle flue D¹, which communicates by a similar chamber at the rear end with flue D², which communicates at the front end with the chimney.

A partition in chamber *e* prevents communication between flues D¹ and D² at their front end. The air-heating pipes B open out at B² immediately beneath the flues D, D¹, D², and they are placed closely together side by side, and to allow for expansion and contraction, their adjacent sides are fitted together by tongue and groove joints formed in ribs *b* cast on the sides of the pipes, and the whole series of pipes are tied together by tie-bolts *b*¹, passing through flanges *b*² cast on the outer sides of the pipes.

The horizontal flues D, D¹, D², are constructed in short sections, tongue and groove-jointed together at *d*, and cast with flanges *d*¹, through which tie-bolts *d*² pass from end to end to hold the sections together. By this sectional construction of the air-heating pipes B and flues D, the furnace and apparatus may be readily constructed of any required dimensions and air-heating capacity by employing a greater or less number of the said sections.

The apparatus is enclosed between front and back settings of brickwork or iron F, which leave the pipes B and flues D exposed to permit the free radiation of heat. The apparatus is provided at one end with a furnace front, having fire-doors and cleaning out doors.

The air to be heated enters the air-flues C at C¹, and rises in the series of air-heating pipes B, wherein it is heated by conduction and radiation from the walls of the furnace chamber, and is brought out under the horizontal flues D, D¹, D², where it is still further heated by radiation therefrom.

It will be observed that the air to be warmed is kept from contact with highly-heated surfaces of iron.

## ART-EDUCATION IN BELGIUM.

A SERIES of two conferences on primary education in Belgium was held at the International Health Exhibition, on June 27th and 28th, under the presidency of Lord Reay, chairman of the Educational Committee of the Exhibition. The first was given by M. Sluys, Director of the Normal School at Brussels, on the subject of "The Reform of School Methods," introduced into Belgium in 1879 by M. Germain, the Director-General of Education.

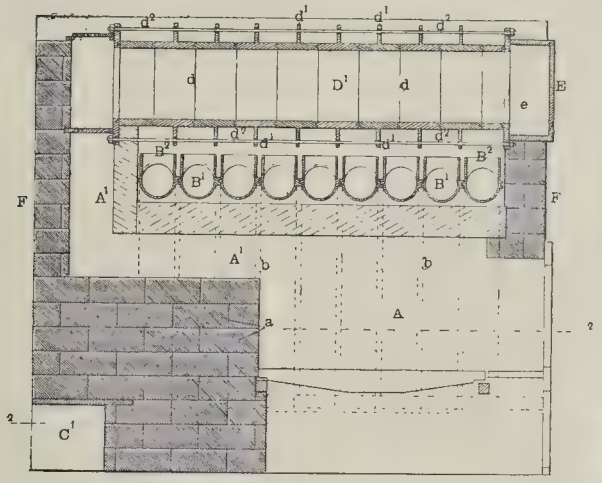



FIG. 2.

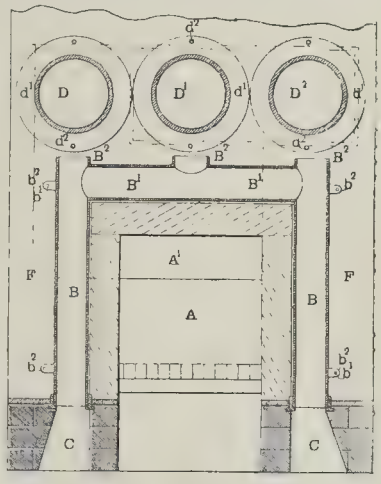



FIG. 1.

*Mason & Swann's Fresh Hot-Air Apparatus.*

At the second of these Conferences (both of which were held in the Lecture-hall of the Central Institution of the City and Guilds of London) a lecture was delivered by M. de Taeye, Director of the Academy of Fine Arts of Louvain, his subject being "Artistic Teaching in Belgium and its Application to Industry." Among those present or taking part in the proceedings were Sir P. Cunliffe Owen, M. Couvreur, ex-vice-president of the Belgian Chamber of Representatives, M. Lenders (Belgian Consul), Mr. Ablett, and other English and foreign educationists.

M. de Taeye, who spoke in French, commenced his lecture by expressing his regret that he could not have at his side the collection of teaching exhibits in the Belgian Section of the Exhibition, for by reference to the various objects it contained it would have been much more easy to illustrate his lecture. The subject of art-teaching was excessively subtle, but it was also of the greatest importance for the workman,—the population *ouvrière*. The education of the artistic sense was not only a necessity for the due development of a pupil's powers, but was an important element in the wealth of nations. To conceive an idea was nothing, but to put it into practice,—there was the difficulty. Industry had been long travelling in a path absolutely false. All countries taking their cue from England,—especially two leading industrial nations of Europe,—had followed England in the pursuit of that

which was cheap. A man of profound perspicacity was the first to perceive the falsity of the situation. It was a prince of England (the late Prince Consort). He had a true inspiration. He created the Great Universal Exhibition of 1851, which brought all the different nations of the earth together Then it was revealed to the world for the first time that cheapness was not the most important thing. England astonished the nations by her extraordinary wealth of machinery and tools, and another country impressed every beholder with the fine æsthetic sense of the beautiful which pervaded her productions,—it was France. There followed Persia, Japan, and China with their products, which were the admiration of all. It was before these that the crowds gathered and stopped to gaze. Why? It was the artistic sentiment, the feeling of the beautiful, governing all other sentiments. It was determined that the unfortunate direction which industrial art had taken should be abandoned, and the leader in this movement was again Prince Albert. He was followed by others. A report of the Exhibition held in England in 1851 was drawn up by Count Laborde, who enunciated a truer sentiment,—"L'art!" said he, "c'est la plus puissante machine de l'industrie." ("Art is the most powerful engine of industry.") The true path was now entered, for the love of the beautiful was natural to man. It existed among some semi-civilised races perhaps in a purer form than among the nations that stand at the head of civilisation. We saw the wilder peoples imbued with the sentiment of the beautiful when they had not the wherewith to cover themselves. It was now clearly apprehended that it was by the development of the beautiful that we must emancipate ourselves, but the question came, How was it to be done? It was to answer that question that he (the lecturer) was there that day. None but a few rich persons occupied themselves seriously with the matter, and it was necessary for each seeker to search within himself to find the true solution. Three countries appeared to have entered upon the search, following parallel lines. England, it was natural to remember in that place, led the way by the creation of the Museum of South Kensington,—a model for Belgium to follow, as it was for France. There art found a shelter where it could popularise itself to the eyes of the nation. France, possessed with a sense of the beautiful, sought further to develop that fine æsthetic sentiment which already belonged to the race in a richer degree than to the rest of Europe. In Belgium, with its love of family life, love of the practical, love of method, the efforts made in the common direction had to encounter almost insurmountable obstacles. The chief obstacle arose out of a vicious principle of teaching then in favour,—a method detestable,—he referred to the "drawing copy." The wretched thing was put before the pupil with the command, "reproduce what you see before you." The copy was, so to speak, thrown at the pupil's nose. Guillaume, in Belgium, proclaimed the doctrine that all drawing should start from a basis of science, but not being a very practical man, he did not show how it was to be done. Under what form was it to be founded upon science? There were two distinct kinds of drawing,—picture-drawings and (what were called in English) "designs." The real question was, under what form was the teaching of drawing to be put within the reach of all in our primary schools? The denunciation of the evil of copying was set forth, and an answer to this question at the same time suggested, by Herr Von Muller, Minister of Public Instruction in Prussia,—a man of real erudition,—in a letter of instructions on the organisation of professional schools. "The teaching of drawing," says the Minister, "must remain within school limits. Its purpose is not to produce artists, but much rather to exercise the pupils in the elementary practice of art; to enable them to acquire the knowledge of form, the rapidity of a sure eye, accuracy of measure, and firmness and lightness of hand. It is of less import that what is drawn should be picturesque than that it should be exact." And the Minister adds impressively "The method must be organised in such a manner that every capable teacher may be in a position to successfully teach, according to it, the elements of drawing; and that from it should be rejected every copy lacking in idea, and above all those mechanically executed productions of images which are so well known to everybody." Herr Hellart, a famous Austrian educationist,—a veritable Frœbel in his way,—also demanded that an immediate remedy should be found to overcome the same difficulty. The remedy consisted in the rejection of the "copy" and the flat outline from the early lessons, and the substitution of objects from nature or forms in relief. This substitution brought drawing at once into the category of subjects to be taught in the primary schools by the logical process of developing the intelligence. It only remained to put it into the hands of the teachers, but the question then arose at what age the child's instruction in drawing should be commenced. M. Couvreur was of opinion that it should commence at the same period as reading and writing. In that way could best be secured the development of the hand. Thus the hand would be rendered supple and the eye sure. It was thus that the famous Horace Vernet, trained by an intelligent father, became able to answer more readily with his pencil than his tongue. When asked to tell the name of a person he had seen, young Vernet, to save himself the trouble of remembering names, would take a piece of paper, and, after making a few rapid lines, would hold it up, and say, "That is the man." The lecturer then described the programme in detail, which had been incorporated into the reformed system of primary education in Belgium in force since 1879. The instruction was given in four stages,—I. (the first year's course), for children aged from six to seven; II. (second year's course), for children of seven, eight, and nine; III. (third year), for children of eight, nine, and ten; IV. (fourth year), for children of ten, eleven, and twelve years, and in some cases to thirteen and fourteen years. In the first year's course, after the child's intuitive notions in regard to points had been developed by dots placed in all positions with regard to each other, they were combined in denser and denser formations to develop the notion of intensity of tones. The intuitive notions of colour were then exercised, with a view to discover as early as possible the existence of "Daltonism." Before proceeding to straight lines, which were regarded by M. de Taeye as far from simple things, when combined in certain ways, certain common objects in solid and natural forms were treated, the instruction forming in all cases the foundation on which further instruction at each step was based. The first year's course finished with the combinations of straight lines and drawing from memory. All the exercises at this stage were done on paper ruled in squares, or on slates or black boards marked in the same way. They were, of course, freehand drawings. The second year's course commenced with the study of curved and mixed lines, followed by exercises in shading and colours, the complementary principle in colours being now introduced. Gothic letters and figures, and the drawing of common objects from nature, followed, lines interlaced, and the application of lines to ornament and drawing from memory concluding the second year's course. The third year's course was directed particularly to quickening the eye of the pupil, and to developing firmness of hand; geometrical figures were now introduced, but no instruments were used, and the exercise-paper was plain, except that on the sides a scale in divisions of the mètre was figured. In the fourth year, projection and perspective were treated, geometric drawing with instruments was taught, and in freehand drawing natural objects were selected as models, offering all possible complexities of form. The exercise-paper was quite plain, no help of any kind being supposed to be necessary. M. de Taeye concluded his lecture with a few general observations, couched in earnest and eloquent language. The Belgian system of teaching drawing, as well as other subjects, was founded upon the maxim of Herbert Spencer, "The intuition to learn ought to precede the instruction." The details of the system resembled the German models from which they were adopted, and it might be hoped that they would be found equally worthy. Their youths on leaving school were fitted for noble toil, and, without indulging in the language of exaggeration, he declared that to give the workman a knowledge of graphic form was of greater necessity than to teach him to read. We were very far from having assimilated our conditions as regarded artistic knowledge with those which existed in the Middle Ages. All our true workmen were in the past, but we were at last ready to follow in their footsteps. What would be the result? Naturally the workman would have acquired a correct taste, and insensibly they would be able to draw him more and more out of the workman to turn him into the artist. Each individual would receive the instruction which best befitted him for his work, and the sentiment of the beautiful would necessarily generate the sentiment of morality, and we should, therefore, possess in him an element of moral, material, and intellectual progress.

Sir P. Cunliffe Owen (speaking in French) proposed a vote of thanks to M. de Taeye for what he described as "the splendid, the admirable, lecture," they had just listened to. With regard to the question of "art applied to industry," it was one which had been agitated in many other countries, and it concerned every country, but in none had it been more persistently considered than in Belgium. It was very remarkable to see a young country pursuing with such ardour a subject so large, and it had astonished many. But Belgium wanted something more than to secure for herself the advantage of a good system; she was willing to show everything to those who might be adverse. In 1879, drawing became a compulsory part of the primary education in Belgium. That step set a great example which would be followed by all countries. But to what purpose would they have taught drawing if they had no models to put before the workman? In the South Kensington Museum here we had a million visitors annually, and the loan collections distributed from the Museum in different parts of the country attracted from two millions and a half to three millions of visitors in the provinces. It was in that direction he wished to see Belgium, and even France, rise to the level of the occasion. But the possession of a museum of art models would not be sufficient unless it was open in the evening. The people would say that such institutions were not for them. They would say the museums were not made for them, but that they (the people) were made for the museums. They would not succeed in propagating science unless they had good models, and until they put those models within the reach of the people. The Belgians were a social race. They could always find plenty of amusement. If they saw three Belgians together they were sure to be a merry company. They must direct this characteristic to the advantage of the people. That was what he asked of them above all. The King of the Belgians, in 1873, and again in 1877, expressed to him his desire to establish a museum on the model of that of South Kensington. He expressed his conviction that a museum could not succeed if it were not open in the evenings.

Mr. Ablett, in seconding the proposition, said he did not quite agree with setting up a knowledge of form in primary schools as the most important matter. Other subjects had a claim to be studied before drawing. He quite agreed as to the necessity that for teaching drawing satisfactorily it should be done in a room specially adapted for the purpose.

Lord Reay said he had listened with much pleasure to M. de Taeye's admirable address. It was an excellent thing for Belgium to have organised such a method of teaching drawing. As M. Couvreur had pointed out, the improved methods in teaching drawing improved the chances of getting higher places for the children taught in their schools. While listening to the lecture it seemed to him that we were trying to find our way again after having lost it. It was not the dark Middle Ages that were dark, but the modern times, and it was re-assuring to find that we were trying to regain the light of the Middle Ages. The same thing appeared to be going on in all countries. He spoke not only of Holland, but of Germany, and those who would pay a visit to the exhibits from the school of Carlsruhe in the German section would see what the Germans were doing. The French were now importing from Germany certain classes of goods of which France had formerly almost the monopoly. That was a fact, and not simply an oratorical statement. He hoped the lecture would be published and sold in the Exhibition in order that it might address itself to a much larger audience than they could expect to get at these conferences. He thanked M. de Taeye and also M. Couvreur for the valuable assistance they had rendered in making the conference successful.

The vote of thanks was carried by acclamation, as was also a vote of thanks to Lord Reay and the Educational Committee, on the motion of M. Couvreur.

## CAN THE NEW GOVERNMENT OFFICES BE DURABLE?

SIR,—This, at the present moment, is such an important question for Her Majesty's tax-paying subjects that I do not doubt its consideration, ere it is too late, will be generally welcome should you be able to grant a little space for it. It will not be the first time you have allowed me to urge it in your columns; but, as you are well aware, all innovations,—even the best,—require much reiteration before they are adopted.

When the late Dr. Ansted, some years ago, was delivering some Cantor lectures at the Society of Arts he remarked,—after lamenting the rapid decay of the public buildings of London, whether constructed of limestone or sandstone, —that quartz rock was the only material to be relied upon. It is true that he added the words, "too hard to be chiselled," which, at that time, was a fact, but is now no longer so. The ingenuity of our countrymen has overcome all difficulty in this respect, so that the hardest volcanic stones can be surfaced at the speed of a square foot in about five minutes, and as the patent has just lapsed, there are no royalty charges to pay. Hence a great step in economy. And burnishing, by which process alone the natural and characteristic beauty of porphyry, serpentine, and granite can be developed, is now so simple a matter that it may be done by boys.

In the face, then, of these facts,—the rapid decay of all freestone buildings, the absolute and proved durability in London of volcanic stone, and the facility and economy with which it can now be converted into useful building material,—is it too much to hope that the First Commissioner of Works and the architect of the above important national structure, whoever he may prove to be, may find it possible to abandon the use of the perishable freestones hitherto in favour,—for no better reason than that as they are so easily carved and moulded a building may be enriched with abundant meretricious ornamentation at little cost? Surely, Sir, we have had enough of this. A purer and simpler style, with better construction, would be a welcome innovation. A highly-ornamental façade of Bath or Portland stone may, of course, be the most beautiful product of architectural art; but, *cui bono*, if it fall to pieces, like the east front of Buckingham Palace, before the workmen depart, or be changed from white to nearly black by soot absorption, like the Royal Courts of Justice, before the contractor delivers up the keys?

There are good reasons for believing that it would be economical to make the change I venture to propose; for what can be more costly than to be compelled, as we are, to be constantly repairing the soft porous stone of our public buildings? Twenty years ago the elaborate sculptured exterior of our grandest national edifice, that was to last for ages, and the stone of which had been selected by a Royal Commission costing nearly 20,000*l.*, was showing signs of crumbling to dust. Since then it has been necessary for the Government to invest about 70,000*l.* sterling to provide a yearly sum of 2,500*l.* for the constant renovation of the stonework of the Houses of Parliament. At the present moment the façade of the Treasury is in the hands of the masons, at a cost of 8,000*l.* at least. Lambeth Palace has been restored at the earnest appeal of the late Archbishop. The Dean and Chapter of Westminster, the Ecclesiastical Commissioners, and the Government are now anxiously discussing the ways and means for a thorough restoration of the Abbey, the decayed, if not dangerous, condition of which has been fully reported upon by Mr. Pearson. This, although hundreds of thousands have been spent in restorations since Wren's time. At St. Paul's a column of one of the portices gave way and has been replaced with new stone, and other repairs are much needed, but must wait for want of funds. The Travellers' Club in Pall Mall, and Buckingham Palace, are painted annually to preserve the stone.

But enough, Sir, of examples that might be multiplied indefinitely. I think it will be admitted that they sufficiently prove that building with freestone in London,—and this is entirely and emphatically a London or town question,—is a very costly proceeding indeed.

The materials I have referred to are mostly very common. As we pave our streets and form the edges of our footpaths with them it cannot be a very great step in advance to construct the fronts of our more important buildings with them.

Aberdeen may be called "a granite city." The inhabitants allow no meaner material to be used. It is true that it is upon the spot, and, therefore, comparatively cheap, but why, for Government work for which we all have to pay, should not an Admiralty transport be employed to reduce carriage? Nearly all the ancient churches of Cornwall and Brittany are of granite. It was the constant use of these enduring materials that has saved to our times all that conquerors have spared of the edifices of ancient Egypt, Greece, and Rome.

Of course, in constructing a modern building of granite and other volcanic materials neither an economical nor a beautiful result would be secured without an intelligent study of their nature and capabilities. Like precious stones, their beauty is only revealed by burnishing, but this process is just that which renders them supremely suitable in the fuliginous climate of London. The hard impenetrable surface is cleaned down by every shower. I have passed the Crimean monument, Westminster, frequently during past years, and I perceive no change whatever in its polished granite shaft,—no decay, no dirt. Not so the freestone canopy, which is black with absorbed soot and other defiling *débris*.

An experience of twenty years gives me great confidence in asserting that a building constructed with the simplicity of detail necessary to exhibit the natural beauty of these materials would entail little if any extra cost. There need be no elaborate mouldings or deeply-cut carvings. As we all know, some of the noblest structures of ancient times are strikingly simple in their details. Their architectural effect would be utterly ruined by increased richness. A few splays of larger or smaller size were all-sufficient for perfect work in those days. The old buildings of Burgundy show what excellent architectural effect may be obtained by simply applying two or more materials in masonic construction.

Working upon these lines, a careful comparative estimate by a well-known surveyor, prepared from detail drawings of the front of a bank,—one of richly carved Portland stone, the other of burnished granite, porphyry, and serpentine,—gives three per cent. only in favour of the former, which as we have seen would require much subsequent outlay in repairs, while the latter would entail none.

The too common use of polished granite in combination with dull freestone is, to my mind, an inartistic proceeding. As well put new cloth into an old garment. But I will here try to describe a new edifice. Comparatively small stones should be used, so that decoration may be almost entirely dependent upon construction. The bulk of the building should, I think, be of white, or nearly white, granite from Cheesewring, Gunnislake, Par, Okehampton, or Kemnay, with the lines of construction emphasised with dark grey Dalbeattie, green Poltesco serpentine, rose syenite from Mountsorrel, and black basalt from Clee Hill or Rowley Regis.

These colours are all of subdued character. Indeed, they are tints rather than colours. As none of the primaries exist, a gaudy effect would be impossible. Thus treated, the façades would require little additional ornament. A little mosaic of the choicest of the materials in spandrels, panels, and strings would probably satisfy the most refined taste.

A simpler treatment would be to have one colour only for the ornament on the white ground of the general surface, similar to the exterior of the duomo of Monreale in Sicily.

It would be departing from the simplicity of this proposal to hint at such a mosaic frieze as that to the exterior of the New Museum, Berlin.

I have said nothing of architectural style, because this is mainly a question of construction, and is more or less applicable to any style.

If such an edifice as I have ventured to suggest could be realised for the New Government Offices, it would not only be truly economical from its extraordinary durablity, characteristic of this scientific age, and, doubtless, of sufficient architectural beauty; but it would at once and for ever do away with the reproach of the foreigner that Englishmen,—practical Englishmen,—are unable to cope successfully with a practical difficulty,—the erection in London of a really durable building. Surely such a national benefit is well worthy of the administrative powers of the First Commissioner of Works.

H. TRAVIS.

## INTERNATIONAL HEALTH EXHIBITION.

### VENTILATING APPARATUS FOR DWELLINGS, WORKSHOPS, AND MINES.

IN the Western Gallery, along with various other mechanical appliances, are to be seen some ventilating apparatus, the exhibitors of each claiming some speciality in connexion therewith. With rival schools of ventilation, and claimants asserting priority of invention in regard to certain principles, it is difficult, perhaps, to steer a safe course; but we will endeavour to be just without being invidious in our criticisms. We must be candid at once in saying to all, or nearly all, the exhibitors of ventilating appliances, that though improvements in details are manifest, and though useful modifications have been introduced, ventilation, as a system, has not made such rapid progress within this century as many persons imagine. We will first describe a few of the appliances on view, and further on we will allude to what was accomplished long years ago, but which seems to be ignored by our rival schools of the present day. It may be possible that exhibitors, save an odd one or two, are not posted up in the history of modern ventilation, or are in ignorance of what was attempted and accomplished many years before they were born.

Messrs. R. W. Hale & Co., Chalton-street, N.W. (Stand 1,125), exhibit registered air-pump ventilators designed for the inlet of fresh-air and the exhaustion of vitiated air. We are told that these are applicable to all classes of buildings, hospitals, schools, factories, ships, sewers, &c. The ventilator on this stand comprises a series of cones fixed at an angle of forty-five, divided by what are termed baffle-plates. The ventilator is not still in calm weather, but keeps in motion as if there was a stiff breeze, though not, perhaps, with such quick action. Down-blow is prevented by the arrangement of the baffle-plates. The inlet ventilator is constructed with a sleeve acting in telescope manner, to suit the thickness of any wall. The air, before it enters the room, has to traverse a conical tube, where the stream or current is converged to a focus. It then impinges on the air contained within a second cone, thus acting as a "cushion," so called. The current of air becomes broken up, as it were, and is then distributed through a perforated grating into the room "without impact and without draught." As far as we could test these ventilators and examine them by the light of experience in regard to similar appliances, we were favourably impressed by their construction. The exhibits include inlet chimney-breast and extraction ventilation. Chimneys have often been capped, but if the exhibitors' "chimney caps" do their work effectively from all points of the wind, they will indeed be a blessing to perplexed householders, who have more sad experience of draughts than pleasing ventilation. Messrs. Robert Boyle & Son, Holborn Viaduct and Glasgow (Stand 1,126), exhibit, among other appliances, patent air-pump ventilators, chimney-cowls, and soil-pipe ventilators. The well-manufactured appliances of this firm have been more than once described in these pages. We may briefly say the action of these ventilators is continuous, the hot vitiated air is extracted, the fresh air being admitted through louvre openings. The current is scarcely perceptible, and down-draught is prevented. It was well understood long since that hot air naturally ascends, being the lighter body, but some of our recent exhibitors, though apparently knowing this, allowed the current of cold air entering the room from above to force down again the foul air to be rebreathed, by not adapting their system to meet admitted wants. The chimney-cowl is composed of a cylinder set into, and in prolongation of, the brickwork of top of flue. This cylinder has a varying diameter according to different circumstances, being made to enlarge or swell into a large circular box formed of two truncated cones inversely joined, the aperture of the upper one being of a diameter equal to that of the cylinder. Surmounting this construction is another truncated cone held up a certain height from the lower structure by suitable uprights, and finally the whole is crested or crowned with a hollow conical cap, also supported a few inches higher by uprights. The action is as follows:—The smoke ascending the flue strikes before escaping from the inside of the top cap, then passes into the conical box, which is at once heated

by connexion, so that a comparative vacuum is formed there, sucking up and creating the desired continuous draught. Mr. B. B. Stirrat, Newcastle-on-Tyne (Stand 1,129), shows steam radiators, steam heating combined fresh-air warmer and ventilator, indirect steam-heating coil, return water feeder, and plans of buildings heated by steam. The radiators are simple in their action, taking the water from the coils and returning it without waste of heat. There is economy of fuel and ease in attendance. The appliances are applicable to breweries, sugar refineries, paper-mills, &c. Mr. James Howarth, Victoria Works, Farnworth, near Bolton, shows a large assortment of ventilators of all kinds, suitable for rooms, public buildings, and workshops. In point of manufacture the exhibits are good. The patent chimney-breast ventilator for ventilating rooms by means of the flue from the fireplace appears to be a very serviceable appliance. Mr. George Segrave, Wellington Buildings, Chelsea, S.W. (Stand 1,133), displays his hot wind generators for ventilating hospitals, houses, and heating the same, also for disinfecting, deodorising, flushing, and drying. Stewart's patent high-pressure blower, shown on this stand, for accomplishing the ventilating and drying process, is a differential blower, its action being derived from two blades, within a cylinder, revolving with varying velocities around a central shaft, concentric with the axis of cylinder. The velocity is controlled by the eccentric cross-head acting upon the crank arms outside the cylinder. The advantages are double-action, the charge of air (or other fluid) being delivered twice each revolution; there is no gearing, no valves, no dubbing composition needed, and finally the action is positive and in no way dependent on high speed. Driven in the opposite direction the outlet becomes the inlet port, and *vice versâ*, the action being reversible, applicable alike to exhausting and blowing. Messrs. J. L. Bacon & Co., Gloucester-place, N.W. (Stand 1,137), have on view several excellent exhibits in relation to heating and ventilating, but the chief of these we have recently described. It is needless to say that the manufactnre is good, and, judged by present standards, the articles merit adoption from their suitability. The hot-water heating apparatus of this firm has met a public want, as is shown by the number of public buildings into which it has been introduced. Messrs. Hill & Hey, Halifax (Stand 1,168), present models of their patent Excelsior Syphon, or double-current ventilators, for buildings and workshops, &c., without other means of inlet, wall ventilators, and others for roofs, and dining, drawing, and bed rooms. The double-current ventilators are intended for outlet or exhaust, "enabling the arrangement of inlets below to be dispensed with." Fresh air is here stated to be brought in, and vitiated air extracted efficiently. An excellent induction mine and colliery exhaust ventilating fan is shown by Messrs. Henry Aland & Son, Commercial-road, E. (Stand 1,171). In fans generally the blade travels double the speed of the air, hence a great vacuum takes place behind the blades. Here, however, the vacuum is filled with air by openings in the side plates or cones of the revolving propeller. The intake of the fan is increased to nearly the diameter of the revolving impeller itself. The fan can be used for a large volume at low pressure or a restricted volume at high pressure. These ventilators are applicable to buildings and factories as well as to mines, and can be fixed in any position. We consider the triplicate mine and colliery exhausting fan a very efficient apparatus. The single and double geared hand ventilating fans are also very serviceable ventilating appliances. The first-named fans are made in sizes from 3 ft. to 12 ft. in diameter, the latter being of sufficient capacity for the largest coal-pit worked. The Blackman Air Propeller Ventilating Company, Fore-street, E.C. (Stand 1,173), display a number of their appreciated propellers. The special feature consists in the construction of the blades towards the periphery, so arranged to prevent the radial escape of the air, but causing a directly increased current over the large area created. The propeller is adapted for the removal of heated or foul air, or dust, and in drying processes.

If the reader keeps in mind some of the principles put forward in connexion with the ventilating systems and apparatus above described, and compares them with what we state presently, he may be inclined to say that in our grandfathers' days, or even previously, men knew something more of ventilation than we give them credit for. In the last quarter of the eighteenth century, M. Le Roy, member of the Royal Academy of Sciences, Paris, in his observations on the construction of hospitals, which were accompanied with plans, made some very pertinent suggestions on the subject of ventilation. The general construction of hospitals in his day was objectionable, because the majority of the wards did not admit of perfect ventilation, the air passing from one patient over another, as it does still in several of our British hospitals. M. Le Roy held that a large hospital should consist of distinct and separate buildings, each forming one ward, erected upon arches or columns, at a considerable height from the ground, and ranged at a distance from each other like the tents of an encampment. The ceiling or roof of each ward was directed to be formed with a number of spherical arches, according to its size, the crown of each arch being in the middle of the breadth of the ward, and opening into a funnel like a common chimney, which should be supplied with a vane [or cowl], so that it might be always open to leeward. In each floor, midway as to breadth, there was to be a row of holes at suitable distances from each other, to admit air from below, so constructed that the quantity of it might be regulated at pleasure. In consequence of this structure M. Le Roy says,—"There must be a constant change of air; for that which is in the lower part of the ward, being warmed by the patients and nurses and the necessary fires, will ascend, and in consequence of the spherical construction of the roof will be directed to the openings in it, and flow through them, while the holes in the floor will afford a constant supply of fresh air, which will move rapidly as it enters the room so low." Then follow directions for placing grates or stoves over the holes in the floor, for warming purposes, and other arrangements for quickening the circulation of the air. Verily some of the representatives of our rival schools of ventilation must have been filching the brains of dead men, or is it that congeniality of thought produces similarity of expression? Let us appeal to history again. Up to 1782, of 17,650 infants born alive in the Lying-in Hospital, Dublin, 2,940 had died within the first fortnight,—nearly every sixth child, or 17 in the 100. The disease was known then as the *black fits*, another form was known as the *white fits*,—forms of convulsions and wasting respectively. Dr. Clarke, the master of the hospital, came to the conclusion that the disease was owing to the following causes:—(1), Foul air; (2), neglect of keeping the children dry and clean; (3) the irregularity in the manner of living of their mothers, more especially in the abuse of spirituous liquors. The first cause appeared to be the principal one; for there was lack of proper ventilation in the hospital. To remedy the serious defect, Dr. Clarke carried out a number of alterations for the better ventilation of the hospital. Apertures of considerable size were made in the ceiling of each ward, which were after some trial changed for air-pipes of 6 in. diameter. Three holes, of 1 in. diameter, were bored in an oblique direction through each window-frame at the top. The upper part of the doors entering the gallery were also perforated with a large number of holes. By these means an easy inlet was given to the air through the wards at all times, and so executed as to put it out of the power of the nurses or patients to control. The beds were reduced in number in the large wards, and more cleanly and airy arrangements were made. The result of this simple method of ventilation a century ago was shown daily in the fits of the children becoming less frequent. By 1789, of 8,033 children born after the new system of ventilation was adopted, only 419 died, or a little over one in nineteen. See what ventilation did in the saving of human life even in days when men were scarcely credited with knowing anything practically about it. Our advance, after all, is not very great in the principle of ventilation or the science thereof, though it must be admitted our appliances have largely increased for admitting fresh air to our dwellings, workshops, and mines, and extracting the foul air therefrom. There is growing a manifest tendency in our midst to ignore the labours of our social and sanitary pioneers and reformers, which should be combated. Water, said the poet Pindar, is the best gift of Heaven, but what would it be in the absence of pure air in our workshops and dwellings?

## HEALTH EXHIBITION LECTURES.

### HEALTHY HOUSES.

ON the 24th ult. Mr. T. Pridgin Teale, F.R.C.S., delivered a lecture at the International Health Exhibition on "Healthy Houses."

Mr. F. S. Powell, in the absence of Captain Douglas Galton, C.B., through indisposition, presided, and in the course of his remarks observed that the lecturer held high rank in his profession, but his industry had not been confined to the duties of his profession, strictly so-called. He had given great attention to the application of science to the domestic arrangements of a home.

Mr. T. Pridgin Teale said that there were 24,000 medical men in the United Kingdom whose lives, abilities, and energies were devoted to the preservation of health and the cure of disease, and yet until the last few years there was scarcely a house in the kingdom which was not at times a source of illness, and there were very few householders who knew, or appeared to care, whether their houses were not manufactories of disease. When, some years ago, he expressed his conviction, in the course of a lecture he delivered before the Leeds Philosophical Society, that very few houses were safe to live in, he was looked upon as an enthusiast; but now such a statement would be looked upon as a truism, so great had been the progress in the diffusion of sanitary knowledge and in the identification of sanitary facts. Sir James Paget had lately spoken of the diminution of preventible diseases during the last ten years, and this progress had been more the result of greater knowledge of sanitary matters on the part of the public than of legislative interference. Much remained to be done, but a great deal could be effected by the carrying out of the sanitary laws we possessed. The basis of all true sanitary progress must be the spread of sanitary principles among the people. Every old house in the kingdom should have its sanitary arrangements revised on the principles adopted in recent years, and every new house could be made perfectly healthy, which would be done if those interested in its construction made themselves acquainted with improvements in sanitation. Proper arrangements were more simple and economical than faulty ones. The lecturer described the horrid state of the kitchen of his father's house when he, a little boy, saw the floor taken up in consequence of the place being overrun with rats, a foul drain running beneath the house. The scullery-sink was some distance from the outside of the house, and the contents of the sink went into an old-fashioned drain, which emitted a very foul smell. Perhaps the simplest and most universal of our sanitary arrangements was the sink, and if people knew what a sink really ought to be they would have made considerable progress in sanitary education. The sink carried away the refuse of a house, but as long as it was connected with drains carried under the house so long would there be risk of disease. A true sanitary maxim to be followed in building a house was to let no drain be under any part of it, to disconnect all waste-pipes and all overflow-pipes from the drain, and to place the soil-pipes outside the house and ventilate them. It was a great thing to get the refuse as quickly out of the house as possible. The principles he had just mentioned any one might make himself acquainted with and carry out. The lecturer referred to baths, lavatories, and closets generally in connexion with the principles he had laid down, insisting strongly on the importance of disconnecting the houses from the drains. He also alluded to the fact that some of the faults of construction of the houses were due to ignorance, while in other cases they were to be attributed to rascality. There was a very reprehensible practice of putting in "seconds" pipes,—the effect of which was to make faulty drains, merely because the builder found these "seconds" pipes cheaper than sound ones. The lecturer illustrated his meaning by reference to diagrams arranged on the walls. He was afraid there were thousands of houses which had untrapped sink-pipes passing into the drains. The lecturer proceeded to make some practical remarks in regard to the necessity of the isolation of the sick in the cases of infectious diseases, and dilated on the importance of keeping out dust and dirt from the larder. He also insisted on the necessity of a good water-supply, of good


DIGNUS EST AGNVS
QUI OCCISVS EST



ST. PAUL'S CATHEDRAL.

Copy of full-sized Cartoon for proposed Mosaic Decoration of the Dome. Designed by Mr. E. J. Poynter, R.A
The central circular compartment by Sir F. Leighton, P.R.A.

tilation, and on economy and cleanliness in use of fuel, quoting the following passage n a leading article in the *Times*: "Sir ury Acland took a very proper tone when reminded the Conference of the necessity of nomy and simplicity. Common sense would st upon striking a rough balance of risks and . It was important, therefore, to keep down cost whether in money or trouble, and Sir ury Acland said it was astonishing how e was often required to make a house decent safe without imposing on the owner or upier costly things which it was difficult to cure, and complicated things which it was icult to maintain."

A vote of thanks to the lecturer and the irman terminated the proceedings.

### ANGLO-SAXON FOOD AND DRESS.

THIS was the subject of a lecture delivered at International Health Exhibition on the h ult., by Mr. J. Frederick Hodgetts.

The lecturer commenced by observing that intended to bring before his audience a brief tch of what was known in reference to the d, dress, and dwellings of their own proper cestors. In dealing with questions having social and historical bearing we were often led by the absurd bias of writers to ce the origin of all that was great and good what was foreign to ourselves and to our ogress as a nation. Our true ancestors, from om we derived everything English, were mehow shuffled off. The history of England, erefore, according to many authorities, com-enced with the appearance of the foreign nqueror, who was called erroneously the first ng of England. One glowing writer began s history with another foreigner, the third illiam. The advent of the first William had en too much dwelt upon. The English never came Norman. The few hundred Normans, e self-styled rulers of this land, never fected the English language nor modes of ought, although eight centuries ago there were obs who copied those in power and spoke rench. But that died out. The Norman sounds id nothing in common with the English nguage. Professor Max Müller, of Oxford, had inted out that language could not be mixed. Vords might be introduced, but the true spirit a language could not be affected by them. ur early ancestors came from Scandinavia in ie fifth century, and they remained Pagans ntil Rome sent missionaries to these shores and nverted them to Christianity. They never were nquered by Rome; they took her Christianity, ot her. Then came the monasteries. The onks wrote their books in Latin, but left our nglish pure. The English speech was a plant f Northern growth. This language and our arly history should teach us, when a question rose as to English thought and style, the ab-urdity of the Latin school. The freedom of peech, the customs and modes of thought which ve cherished, were all of Scandinavian origin. The Romans were never our ancestors, but he Romans tried to stamp us out. He came o say something which would sound un-amiliar. Our early home was Scandinavian; we were from the South of Scandinavia roper. Therefore some of the roots of our words would be found more like those of the Germans than if we had dwelt farther north. Of course, in tracing the early history of a people, the effects of climate and religion in forming habits of life had to be borne in mind. The people of Scandinavia were accustomed to cold and hunger and thirst, and they had to contend with wolves and bears and other wild animals. The first requirement of man was food, and accordingly our ancestors manufactured rude weapons with which to slay the animals, the flesh of which was to yield them food. In the far north there was a preference for the flesh of boars, but in the south and far east the swine was an abomination. Our forefathers had soups of the most appetising and nutritious kind, made from the flesh of birds, rabbits, venison, &c. They were also in possession of the knife and the perforated spoon, a refinement that showed them to advantage. In Scandinavian homes of the fourth century, halls for the refection of warriors by great chieftians were numerous, and in early representations of a meal, we found the knife, the spoon, and plate laid on the table. Our forefathers came to Britain as people now went to New Zealand, and no nation was more rich than the Anglo-Saxons in tales of the past. In the centre of the hall stood the hearth, which was never absent from the great houses of our ancestors of the sixth century. They had smoked meats and beaten fish, puddings, oyster patties, loaves large and small of various kinds of bread, eggs, cheese, and butter. From very early times the table-cloth was in common use. Our ancestors had various kinds of drinks, and wine was imported from Italy. They had the swan, duck, water-fowl, salmon, eels, pilchards. All food that required it was sweetened with honey. There were pears, peaches, melons, plums, cherries, and altogether the Anglo-Saxons were well provided in the matter of food. The lecturer made copious extracts from Sharon Turner's "History of the Anglo-Saxons," which, he said, had never been approached for accuracy by any other work on the subject. From the almost innumerable articles of food and drink mentioned by him, it was evident that the Anglo-Saxons by no means fared badly. Friar Tuck, although a portraiture of a later age, was alluded to as not being a bad sample of the Anglo-Saxon of the tenth and eleventh centuries, as far as good living was concerned. The lady of the house had her special seat when she was present. On some occasions the ladies sat side by side with the warriors. Coming to the next branch of his subject, Mr. Hodgetts observed that of course in the matter of dress woman reigned supreme. The Anglo-Saxon ladies were distinguished by the wimple or hood. Their dresses were very long, covering the feet; they were loose, the sleeves being tight at the wrist. There was no attempt at distortion of the body in order to make a waist. The mantle was also a part of their attire. The costume of the females in those days was characterised by greater simplicity than that of the males. The true Englishwoman was in the sixth century as she was now, modest, proud, and good. The warrior was certainly rather "loud" in his attire. Woman's dignity supplied that attraction which men had to borrow from dress. Let us be proud of our English mothers and honour them in their descendants. The Normans were not English, so his remarks did not apply to them. The lecturer proceeded to say that dyes of various colours were in common use, and alluded to a variety of specimens of ornaments worn in Pagan times; these ornaments could be inspected in the British Museum, and would be found interesting. Ladies had bracelets, necklaces of amber, exquisite beads, &c. The hair was worn plaited behind or round the head like a coronet. The mantle was richly edged with gold. There was one mantle worn for ornament, and a larger one well lined with fur to keep out the cold. The boots were neatly made. It did not appear that since the introduction of Christianity very great progress had been made in the matter of female costume. After some further remarks, Mr. Hodgetts said that he found he had not time to enter upon the history of Anglo-Saxon houses, as he had intended, but on a future occasion he might have an opportunity of going fully into the subject.

The Chairman (Mr. Morgan) expressed regret that Professor Hodgetts had been compelled to leave out the third part of his lecture, but he had given them a very interesting account of the language, food, and costume of the Anglo-Saxons, and he was sure the ladies would join him in cordially thanking the lecturer. No doubt many of them would take an opportunity of inspecting the specimens of ornaments which had been referred to as being in the British Museum.

Captain F. S. Dumaresq de Carteret-Bissou agreed with the lecturer that for beauty there was nothing to compare with the pure English language. As regarded the female dress in early periods of history being a loose one, he happened to have been at a lecture given on English dress by Mr. Lewis Wingfield, at which a breast-plate like a piece of armour was exhibited as worn by Queen Boadicea.

The lecturer, in acknowledging the vote of thanks, remarked that there never was a breast-plate worn by a lady or anybody else in the fourth century. Again, Boadicea was not an English woman. If she had a tight-fitting dress *our* female ancestors had none.

The proceedings terminated with a vote of thanks to the chairman, moved by Mr. Trendell.

**The Proposed New Battersea Bridge.**—It is stated that the Metropolitan Board of Works have decided to construct a temporary foot-bridge across the Thames during the building of the new Battersea Bridge.

## Illustrations.

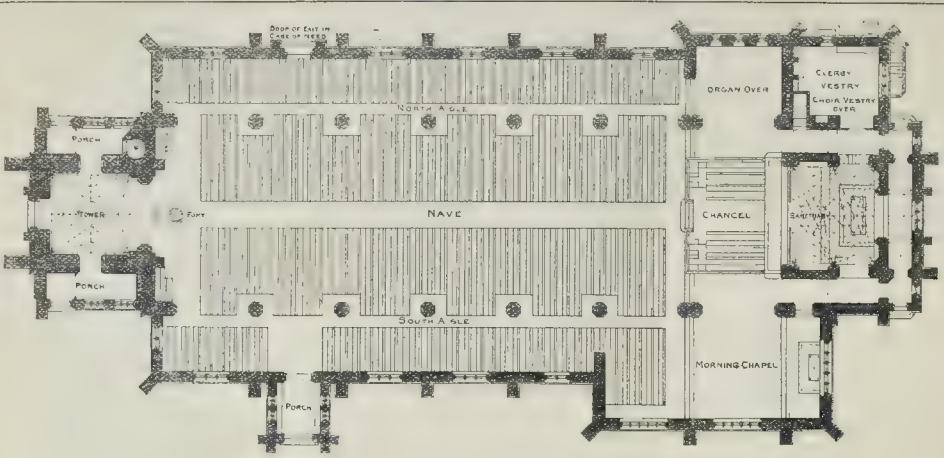
### DESIGN FOR THE DECORATION OF THE DOME OF ST. PAUL'S.

WE publish this week a small copy of the coloured cartoon of the proposed mosaic decoration for the dome of St. Paul's, designed and executed by Mr. E. J. Poynter, R.A.; with the exception of the larger circular panel, which has been designed and executed by Sir F. Leighton, P.R.A. The illustration is from a coloured drawing specially made for us at Mr. Poynter's studio, and with his permission, by Mr. Raimbach. We add also larger illustrations in monochrome of the two subjects in the large circular panels, "Christ in Judgment," by Mr. Poynter, and "The Sea gave up her Dead," by Sir F. Leighton. These are reproduced by the "ink-photo" process, from photographs taken by Mr. Bedford Lemere, and are therefore absolutely correct, as far as drawing and design.* We have thought that many of our readers, professional and non-professional alike, would be glad to have a carefully-executed representation of a work which is of national interest, and which is likely to excite much attention at present.

It was expected that by this date the cartoon would be fixed in its place in the dome and exposed to public view; and we had not intended, in fact, that our publication of the design should anticipate the exhibition of the original; but we understand that unforeseen difficulties in fixing the cartoon, as well as other causes, have retarded the preparations longer than was expected, and it will probably not be open to public inspection for a few days yet.

From a memorandum furnished to us by Mr. Poynter we collect the following statements as to his ideas in regard to the design. When he was first consulted on the subject the idea was that Alfred Stevens's design should be carried out, the subjects in the large circular panels and the seated figures below alone being changed. Stevens's design illustrated the Old Testament; he only designed half the dome, and it is not clear what his intentions were in regard to the other half. The work he actually did covers about the same ground as the ceiling of the Sistine Chapel. The Committee thought these subjects unsuitable for that part of the cathedral, and preferred that the subject should be taken from the Book of Revelations, and that the figures of prophets below should be replaced by the figure of St. John the Evangelist and those of the bishops of the Seven Churches of Asia,—not, to our thinking, a very happy idea, as the eight figures in the eight compartments of the dome certainly should all be of equal importance; the architectural conditions offer no suggestion for making one figure predominate over the rest, as St. John certainly should predominate over the bishops. However, this was the idea: the general lines of Stevens's design were to be followed. Sir F. Leighton was commissioned to paint the subjects of the eight large circles, and Mr. Poynter was commissioned to draw out the whole design, and to design the subjects of the smaller circular compartments above. Stevens's design divided the dome into eight compartments, by what might, for want of a better name, be termed ribs, answering to the eight blocked-up windows or solid piers of the drum, each compartment containing two circles, the upper one necessarily smaller than the lower. The "ribs" are built up of figures and architecture; above each pedestal which forms the base are three magnificent nude figures, an imitation of Michelangelo in style, but of which Mr. Poynter observes that Michelangelo himself perhaps never did anything finer. The reasons for putting aside this fine work were twofold. Some of the committee thought nude figures unsuitable,—an objection which, considering the entirely abstract and ideal character of the figures, we should call merely a truckling to the Philistine; but a more logical objection was that these living figures supporting a mass of architecture were performing a perpetual acrobatic feat, and it was impossible to avoid the feeling that if one of them made the slightest movement the whole thing would come toppling down. It was obvious that it was necessary to give to the whole "rib" a truly architectural character, and that the retaining of Stevens's figures would render this

* We are indebted to the courtesy of the Dean and Chapter for the opportunity of photographing Sir F. Leighton's painting, which had been for some time completed and under their charge.




*Church of St. Mary, Portsea.—Plan. Scale, 32 ft. to 1 inch.*

an impossibility, so that there was no alternative but to abandon them. Accordingly the ribs were designed as an architectural framework, as seen in the present illustration, with figures niched in them; and it occurred to Mr. Poynter that these figures should be brought into relation with the Apocalyptic subjects in the main compartments. The most suitable way of doing this seemed to be to represent in these figures the chorus of praise, "Worthy is the Lamb" (Rev. iv., 12, 13), and thus give to these otherwise merely decorative figures a distinct meaning. He therefore replaced Stevens's upper groups of three struggling figures by three angels singing, and who are supported by the architecture instead of supporting it; and with these it is proposed to alternate groups of martyrs who also surrounded the throne. Above, instead of the single angel who supports the cornice in Stevens's scheme, are placed two youthful cherubs, seated singing (in the style of the old Italian pictures), and for the group of nude figures (finally and regretfully set aside), Mr. Poynter has substituted groups representing saints on earth, each accompanied by an angel, these groups being also designed to illustrate some appropriate text from one of the Psalms of Praise. In a circle above all, which was run round under the lantern, will be the "Four-and-twenty Elders," and it is proposed to continue the illustration in the lantern with "the four beasts" (as the word is quaintly translated in our Bible), and the Agnus Dei in the centre at the top of all.* There will be thus a consistent scheme for all the figures external to the panel subjects, beginning at the top with the Lamb to whom praise is sung, and continuing downwards in proper order of progression through the four beasts, the four-and-twenty elders, and the angels and martyrs, to the saints on earth receiving inspiration from angels, and lowest of all to the seven churches, who are the embodiment of Christ's church, with St. John as the central figure. The portion now designed includes the figure of St. John hearing the voice saying "What thou seest write in a book"; the voice being symbolised by the angel descending and putting a pen in his hand; a cherub holds the book. The lower group on the rib illustrates the verse "Ye holy and humble men of heart, bless ye the Lord"; and appropriate texts in the same spirit will be found for all the others which are to be executed hereafter. The subjects of the panels are prescribed by the Committee, and are sufficiently noted in the titles to the illustrations. The upper one Mr. Poynter has kept as simple as possible, owing to the great height at which it will be seen, and the same feeling seems to have influenced Sir F. Leighton in the composition of his panel.

Thus the general disposition of Stevens's design is retained; the panels and the ribs remain where they were, and the groups of figures remain in the same places; but the meaning and detail of the whole is changed. Indeed, it may be said that Stevens's design in many of its features, grand as it is, has little or no meaning, which is certainly a serious critical objection to it.

We have confined ourselves to description at present; when the actual cartoon is visible *in situ*, so that its effect as seen from below can be judged of, we may have further remarks to make. We may add here that a good deal of gold will be introduced into the mosaic design, but it has not been thought advisable to use actual gold in our small illustration, as the effect would be quite different on a small scale. The two circular panels in our larger illustrations are shown the same size; their actual relative dimensions can be seen from the general illustration.

*The drawing of these so as to have an intelligible appearance to the eye from below will be, we should say, a curious and rather tough problem in perspective.

## NEW PARISH CHURCH OF ST. MARY, PORTSEA.

THIS church is designed to take the place of the present one, which is an unsightly and inconvenient structure.

The new church will be built in sections, of which it is proposed first to undertake the nave and aisles, affording accommodation for 1,400 adults on the floor. It is intended that the completion of the church should, if necessary, be spread over several years, and that nothing should be done to curtail or mutilate the original design permanently. The tower will probably be the last section to be built.

The walls of the church will be constructed with an outer casing of flints, stone ashlar within, and between these a filling in of Portland cement concrete. A dado of red terra-cotta will be carried round the walls internally. Doulting stone will be used for the external stonework and Bath stone within.

The roofs will be of open timber, except that over the sanctuary, where there will be a ceiling of groined stone covered externally with leaded roof of flat pitch.

The view of the church is reproduced from the drawing which is at present in the Architectural Room at the Royal Academy. We propose to give the sections of the church in a subsequent number, as the interior design presents some details that are unusual and interesting. The whole church promises to be an exceptionally fine one when completed.

## PRAYER-DESK, HOARWITHY CHURCH, HEREFORDSHIRE.

THE prayer-desk which we illustrate this week has been executed by Mr. Harry Hems from the designs of Mr. J. P. Seddon, for Hoarwithy Church, near Ross, Herefordshire, of which Mr. Seddon is the architect. The prayer-desk is devoted, as far as its sculpture subjects are concerned, to the illustration of the legend of St. Dubricius, who is traditionally supposed to have had a large monastery almost upon the site where stands the present church. The right panel of the front of the desk represents the birth of the Saint, whose mother was condemned to be burned alive, and was found the next morning sitting on the funeral pile with a new-born babe in her arms, the future St. Dubricius, who is represented in full canonicals in the adjoining panel. The side panel on the right in our illustration shows the Saint casting out the Devil from a woman (an achievement which has tasked the efforts of saints in various ages), and on the panel seen on the left he is setting to rights an unfortunate monk who was accused of having stolen wine from the cellar of the fraternity, a charge which was satisfactorily but rather illogically disposed of by the Saint, who blessed the barrels and caused wine to flow from them again. It is to be hoped the brother was really wrongfully accused, and that the Saint was not *particeps criminis*.

Whether it is worth while, or even in every sense suitable, to decorate a modern church with these rather foolish legends, to which, it will be observed, no moral whatever attaches, is a question we do not discuss, and which we should, perhaps, be told was out of our province. We give the desk merely as a good piece of work in design and execution, rather inclining to wish that both architect and carver may on another occasion light upon an historical subject better worth treating.

## THE MURRAY TOMB, ST. ANDREW'S, WELLS-STREET.

As something special was said at the recent Conference of Architects about the late W. Burges and his works, we need not apologise for illustrating a very pleasing design of his, executed a good many years ago, but which, we believe, has not been published hitherto. It is a monument in St. Andrew's, Wells-street, and is a remarkable example of Burges's large and bold treatment of Gothic detail. It is photo-lithographed from a pencil drawing by Mr. J. Attwood Slater, which has its interest also as a good example of architectural sketching.

By an unfortunate oversight, this was named in an advertisement last week as from an original sketch by Burges himself; a mistake arising out of the fact that we were arranging for the publication of some original pencil sketches by the late G. E. Street, and a phrase intended for the one item in the advertisement was inadvertently applied to another. The publication of the Street sketches was not announced, as their reproduction in lithograph presented some difficulty, and rendered their immediate publication doubtful. This has been surmounted, however; and in place of one original sketch by Burges which was promised, we are able to give two by Street which were not promised, which we hope will be regarded as restoring the balance of accounts between ourselves and our readers.

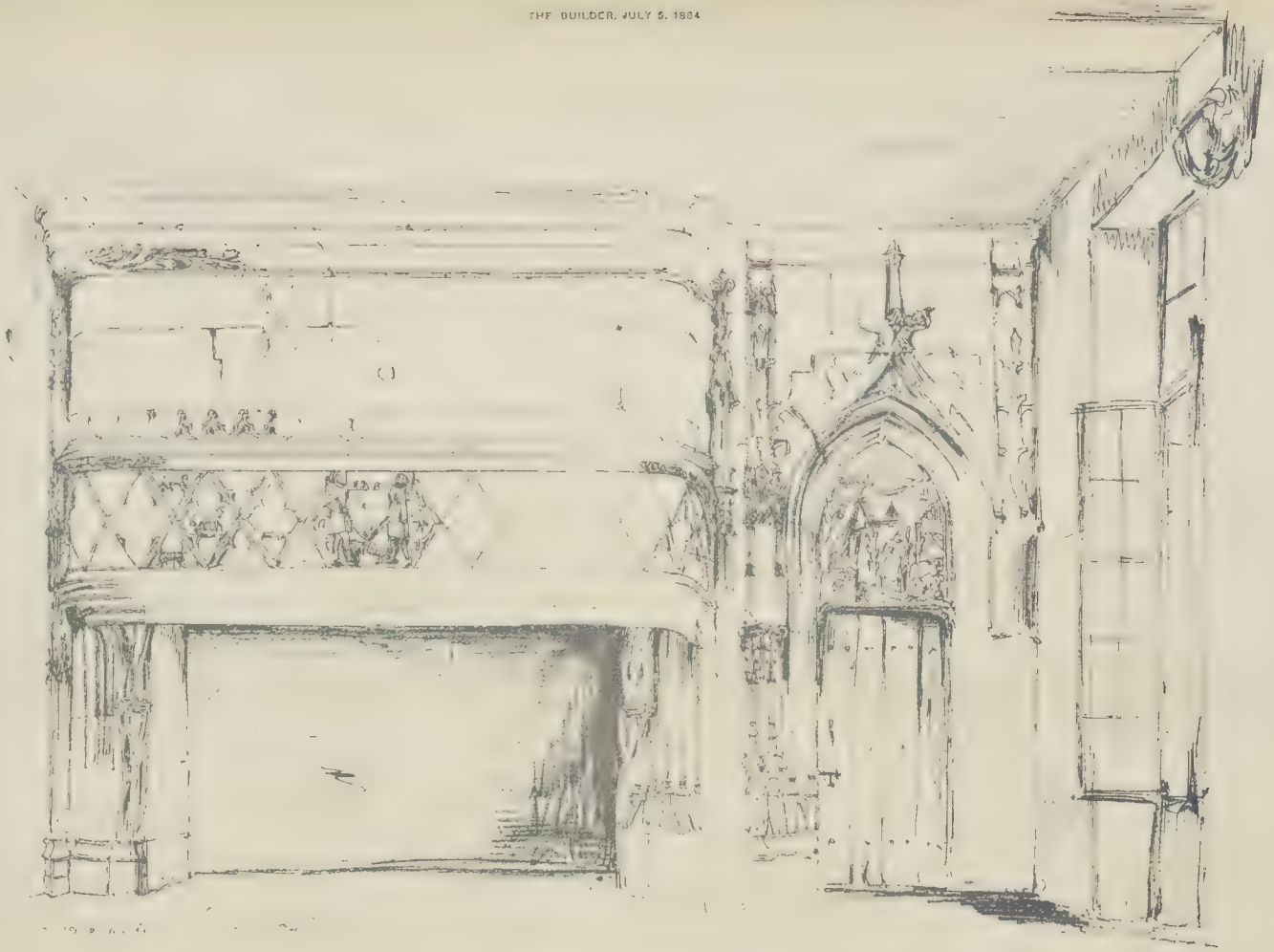









NK PHOTO. SPRAGUE & Co LONDON



IN CHARLES VIIth's HOUSE, BOURGES.

From an Original Sketch by the late G. E. Street, R.A.



NK PHOTO SPRAGUE & Cº LONDON

'DECORATION FOR THE DOME, ST. PAUL'S.

*The Upper Circular Panel: "Christ in Judgment."*

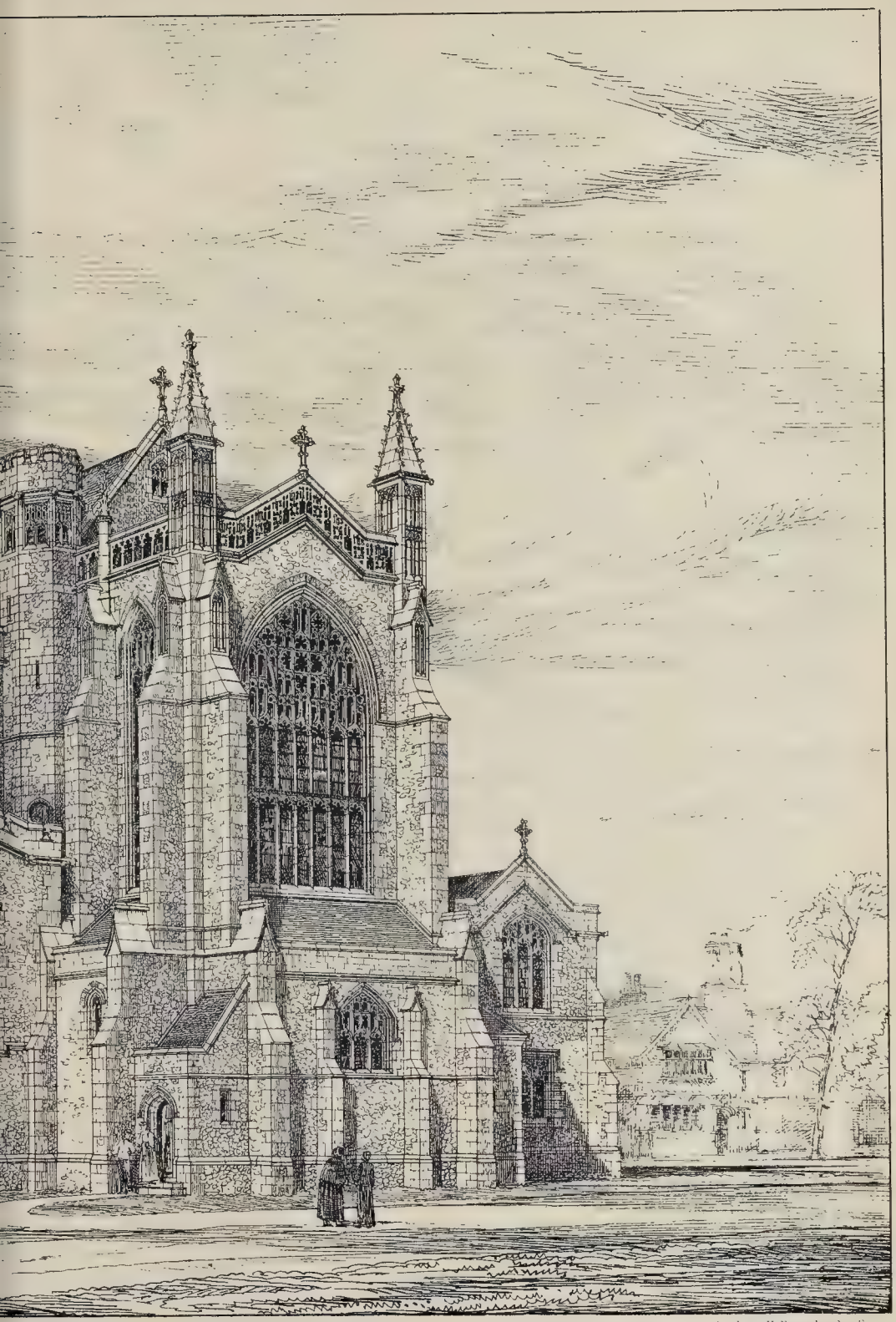
Designed by Mr. E. J. Poynter, R.A.



C. E. Ke... Photo-Lith. Co., Limited.

NEW PARISH CHURC

Mr. A. W. Blom



5 Castle .' Holborn London E

F ST. MARY, PORTSEA.

, M.A., ARCHITECT.



INK PHOTO SPRAGUE & Co LONDON

DECORATION FOR THE DOME, ST. PAUL'S.

*The Lower Circular Panel: "The Resurrection."*

("The sea gave up the dead which were in it.")

Designed by Sir F. Leighton, P.R.A.



BOURGES CATHEDRAL

FROM AN ORIGINAL SKETCH BY THE LATE G. E. STREET, R.A



"INK-PHOTO," SPRAGUE & Co., LONDON

J. ATWOOD SLATER, DELT.

THE MURRAY TOMB. ST. ANDREW'S CHURCH, WELLS STREET, W.

THE LATE WM. BURGES, A.R.A., ARCHITECT.

## TWO SKETCHES BY THE LATE G. E. STREET, R.A.

THESE two sketches at Bourges are two out of half a dozen pencil sketches by Street which his representatives have placed in our hands for publication. They show at once what they are; the rapid sketches of an architect, seizing the main outline and effect in a few comprehensive lines, and filling in as much of the detail as was necessary as a memorandum. The others of the series we hope will follow, but it depends somewhat on fate and sunshine: pencil being a doubtful and capricious medium for reproduction by photo-lithography.

## THE WORK OF MEDIÆVAL AND MODERN CRAFTSMEN.

### THE SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS.

THE seventh annual meeting of this society was held on Tuesday afternoon in the Hall of the Society of Arts. The Hon. R. C. Grosvenor, presided, and, in moving the adoption of the report, observed that the committee had been much assisted in their work by their secretary, Mr. Thackeray Turner, who was a gentleman thoroughly competent to look at a building and see at a glance whether it was worthy of being preserved; and since they had had the advantage of his services the committee had been able to act with greater vigour and success than previously.

Mr. H. W. Brewer seconded the motion, and the report was adopted unanimously.

Mr. William Morris then read a paper on "The Essential Difference between the Work of the Mediæval and the Modern Craftsman." He commenced by observing that the members of that society, at least, knew the beauty of the weathered and time-worn surface of an ancient building, and they had all felt the grief of seeing that surface disappear under the hand of the restorer, but though they all felt that deeply enough, some of them might perhaps be puzzled to explain to the outside world the full value of that ancient surface. He was sure that, as members of that society, they could not doubt that in one way or another the surface of an ancient building,—that was, the handling of the old handicraftsman,—was most valuable and worthy of preservation, and he was sure also that they felt instinctively that it could not be reproduced at the present day. The attempt at reproduction not only deprived them of a monument of history, but also of a work of art, and he had to attempt the task of showing that this impossibility was not accidental, but was essential to the conditions of life at the present day,—that it was caused by the results of all past history, and not by a passing taste or fashion of the time. Consequently no man or body of men, however learned they might be in ancient art, whatever skill in design or love of beauty they might have, could persuade, or bribe, or force the workmen of to-day to do their work in the same way as the workmen of the time of King Edward I. did theirs. It must be admitted that every architectural work was a work of co-operation. The very designer, be he ever so original, paid his debt to this necessity in being in some form or other under the influence of tradition. Dead men guided his hand even when he forgot that they ever existed. But, furthermore, he must get his ideas carried out by other men; no man could erect a building with his own hands. In all co-operative work, the kind and quality of that work,—the work of the ordinary handicraftsman,—was determined by the social conditions under which he lived, which differed very much from age to age. Let them try to see how they differed, and glance at the results to art of that difference, during which inquiry they would have much more to do with the developed Middle Ages, with which the work of their Society was chiefly concerned, than with any other period. In the Classical period, industrial production was chiefly carried on by slaves, whose persons and work alike belonged to their employer. It was natural that, under such circumstances, industrialism should be despised; but under Greek civilisation at least, ordinary life for the free citizens,—the aristocracy, in fact,—was simple. The climate was not exacting of elaborate work for the purposes of clothing and shelter; the race was yet young, vigorous, and physically beautiful. The aristocracy, therefore, freed from the necessity of rough and exhausting work by the possession of chattel slaves, and little oppressed by anxieties for their livelihood, had both inclination and leisure to cultivate the higher intellectual arts. Well, the ideal of art established by the intellect of the Greeks with such splendid success lasted throughout the whole Roman period also, in spite of the invention of the arch in architecture, or rather in building. The open-mouthed contempt for the results of industrial production expressed by the pedant Pliny, whether it were genuine, or artistically deduced from the conventionalities of philosophy, well illustrated the condition of the slave-produced lesser arts of the later classical period. Meantime, and while Pliny was alive, the intellectual arts of classical times had long fallen from their zenith, and had to wade through weary centuries of academicalism, from which they were at last redeemed by the break-up of classical society itself, which involved the change of chattel slavery, the foundation of classical society, into serfdom or villeinage, on which the feudal system was based. The serf in the earlier Middle Ages was, however, in a very different condition from the chattel slave, for certain definite duties being performed for his lord he was (in theory at least) at liberty to earn his living as he best could within the limits of his manor; the chattel slave, as an individual, had the hope of manumission, but, collectively, there was no hope for him except in the complete and mechanical overturn of the society which was founded on his subjection. The serf, on the other hand, was, by the conditions of his labours, forced to strive to better himself as an individual, and collectively soon began to acquire rights amidst the clashing rights of king, lord, and burgher. Also quite early in the Middle Ages, a new and mighty force began to germinate for the help of labour,—the first signs of secular combination among freemen, producers, and distributors. The guilds, whose first beginning in England dated from before the Norman Conquest in all probability, had their roots in that portion of the European race who had not known of Rome and her institutions in the days of her temporal domination. England and Denmark were the foremost countries in the development of the guilds, which took root latest and most feebly in the Latinised countries. The spirit of combination spread, and the guilds, which had at first been rather benefit societies or clubs than anything else, soon developed into bodies for the protection and freedom of commerce, and rapidly became powerful merchant guilds. In the height of their power there was formed under them another set of guilds whose object was the regulation and practice of crafts in freedom from feudal exactions. By the beginning of the fourteenth century the supremacy of the craft guilds was complete. At that period their constitution was thoroughly democratic. Pure journeymen there were none; the apprentices, as a matter of course, took their places as masters of their craft when they had learned it. The craftsman of that day lived far easier than his successor now. He made his wares himself and sold them himself to the man who was going to use them. Some of the rarer goods, such as silk cloth, did come into the chaffering market, but even these were made primarily for home consumption, and only the overplus came into the hands of the merchant, who was not a mere gambler in the haphazard of supply and demand, but an indispensable distributor of goods. The people were good judges of manufactured wares, and consequently adulteration was scarcely known. The freemen of the guilds had their share in the pasture lands of the country. Port Meadow, at Oxford, for instance, was the commonal pasture of the freemen of that city. The English craftsman of the fourteenth century was not a priest-ridden or down-trodden savage, but a thoughtful and vigorous man, and in some sense free. He worked not for the profit of a master, but for his own livelihood, which he did not find difficult to earn. He had a good deal of leisure, and being master of his time, his tools, and his material, he could afford to amuse himself by giving artistic finish to his work. That artistic finish was not venal,—it was given freely to the public, who paid for it by interest in, and sympathy for, the work itself. What is called in modern slang the wages of genius were much neglected by the builders of ancient buildings; for art, as Mr. Thorold Rogers justly said, was wide-spread; the possession of some skill in it was the rule, and not the exception. As a rule, those who could afford to pay for a building were able to do the necessary planning and designing, obviously because they would naturally find help and harmonious intelligence among the men they had to employ. For instance, the tower of Merton College, Oxford, was carried out by ordinary masons under the superintendence of the Fellows of the College. Judging from the wretched tinkering that the present Fellows had allowed to be perpetrated on their beautiful little house at St. Alban's Hall, he would not venture to trust them with such a work now. When they heard it said that extra money payment was necessary under all circumstances to produce great works of art, they could appeal to the witness of those lovely works still left to them, whose unknown, unnamed creators were content to give their talents to the world with little more extra wages than their pleasure in the work and their sense of usefulness in it. Well, it seemed to him that a body of artificers so living and so working with simple machines, of which they were complete masters, had very great advantages for the production of architectural art. But as the towns grew bigger, and population flowed to them from the enfranchised field-serfs and other sources, the old craftsmen began to form a separate and privileged class in the guilds, with their privileged apprentices, and the journeyman at last made his appearance. After a while the journeymen attempted to form guilds under the master crafts, as the latter had done under the merchant guilds, but the economic conditions of the time, tending towards manufacturing for a profit, beat them, and they failed. Nevertheless the conditions of work did not change much, until the first quarter of the sixteenth century, during which England, from being a country of tillage, cultivated for a livelihood, became a grazing country farmed for a profit. This had a very direct influence upon the conditions of life and manner of work of the artisans, for the crafts were now flooded by the crowds of landless men who had nothing but the force of their bodies to live upon, and were obliged to sell that force day by day for what those would give them who certainly would not buy the article labour unless they could make a profit by it. The Reformation itself was but one of the aspects of the new spirit of the time produced by great economical changes which dealt with Art and its creator Labour far more completely than any series of accidents could do. Though there was still a good deal of what might be called domestic manufacture, the workmen in the towns became more dependent on their employers,—more and more mere journeymen,—and a great change was coming over the manner of their work. Division of labour now began, and speedily gained head. Almost all goods, except those made in the most domestic way, had now to go through the market before they reached the user's hands; they were made for sale, not primarily for use. The division of labour had so worked that instead of all workmen being artists as they once were, they were divided into workmen who were not artists and artists who were not workmen. This change was complete, or nearly so, by the middle of the eighteenth century. The gradual degradation of the arts from the fifteenth century to this point was steady and certain. The picture-painters, what few of them were aught else than mere pretentious daubers, were turned into courtly flatterers of ill-favoured fine ladies and stupid supercilious lords. As for the architectural arts, what could be expected from a set of human machines,—co-operating, indeed, but only for speed and precision of production, and designed for, at best, by pedants who despised the life of men, and, at worst, by mechanical drudges little better in any way than the luckless workmen? Whatever might be expected, nothing was got but that mass of foolish toys and costly ministrations to luxury and ostentation which had since those days been worthily continued under the name of upholstery. But that was not the end of the degradation of the arts. At the close of the eighteenth century the manufactures in England were still secondary to her merely country life, and mixed with it. In fifty years more England became the manufacturing country of the world; the "workshop of the world," often so called with much pride by her patriotic sons. This strange and most momen-

tous revolution was brought about by the machinery which the chances and changes of the world forced on the population. Whereas under the eighteenth-century division of labour system a man was compelled to work for ever at a trifling piece of work in a base mechanical way, under the system of the factory and the almost automatic machines of the present day, he might change his work often enough. He might be shifted from machine to machine, and scarcely know that he was producing anything at all. In other words, under the eighteenth-century system he was reduced to a machine; under that of the present day he was the slave to the machine. The machine workman had to be well skilled, at least, in his contemptible task; the slave to the machine needed but little skill, and, as a matter of fact, his place had been taken by women and children, and what skill was needed in the work was in the overlooking of the labours of these latter. In short, the present system of the factory and its dominating machine tended to do away with skilled labour altogether. They set their slave to the machine to do the work of the free Mediæval workman, or of the man of the Transition period, indifferently. They had learned the trick of masquerading in other men's clothes, and carried on a strange hypocritical theatrical performance, rather with timid stolidity than with haughty confidence, determined to shut their eyes to everything seriously disagreeable, nor heeding the silent movement of real history which was going on around and underneath their raree show. Surely such a state of things was a token of change,—speedy perhaps, complete certainly,—of the visible end of one cycle and the beginning of another. The society of to-day, anarchical as it was, was nevertheless forming a new order, of which the members of the Society he was addressing, in common with all those who had the courage to accept realities, were and must form a part. They were contending for the reality of art; that was to say, the pleasure of the human race. The tendency of the commercial or competitive society which had been developing for more than 300 years had been towards the destruction of the pleasure of life. But that competitive society had at last developed itself so far that its death was approaching. When society was so reconstituted that all citizens would have a chance of leading a life made up of due leisure and reasonable work, then would all society resolve to protect ancient buildings from all damage, wanton or accidental; for they would begin to understand that these were a part of their present lives, —a part of themselves. That would come when the time was ripe for it; for at present if people knew of their loss they could not prevent it, since they were living in a state of war,—that was to say, of blind waste. Surely the members of that society had had this truth driven home practically often enough. They had often had to confess that if the destruction of an ancient monument of art and history was a matter of money it was hopeless striving. Let them admit that they were living in a time of barbarism, betwixt two periods of order, —the order of the past and the order of the future,—and then, though there might be some of those who thought, as he did, that the end of that barbarism was drawing near, and others that it was far distant, yet they could work together to preserve what relics of the old order were yet left them for the instruction, the pleasure, the hope of the new.

A vote of thanks was given to Mr. Morris for his address.

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**City of London Society of Artists.**—On the evening of the 27th ult., on the invitation of the Lord Mayor, a large number of ladies and gentlemen assembled at a *conversazione* in the Library of the Guildhall, to meet the members of the City of London Society of Artists, which was established four years ago. The object of the Society was to form a permanent Gallery and an Academy for the instruction in the higher grades of the Fine Arts, as well as to sell or otherwise dispose of pictures, sculpture, or other works of art exhibited from time to time by its members. So successful has the project proved that the Society now consists of 67 members of the Royal Academy and other eminent artists, 167 Fellows and Guarantors, and many members of the Corporation.

## SANITARY LEGISLATION.

CONFERENCES AT THE HEALTH EXHIBITION.

On Thursday and Friday, the 26th and 27th of June (as mentioned in our last, p. 953), conferences were held on the above subject under the auspices of the National Association for the Promotion of Social Science. Sir Richard Temple, bart., the President, occupied the chair, and opened the proceedings by calling upon Mr. Francis S. Powell to read an introductory address.

Mr. Powell, in the course of his paper, stated that the Statute-Book bore record that during many centuries the nation was in some measure, according to the knowledge of those times, alive to the necessity of protection against nuisances and other conditions dangerous to health. It was, only, however, since the commencement of the present century that Parliament had passed Acts of wide range. This country, indeed, must always be remarkable for the rapidly-increasing density of the population; for the insanitary conditions incident thereto; for the energy and knowledge applied to the diminution and removal of those conditions; and, lastly, for the stringency of the statutes dealing with this class of evil. The visitations of Asiatic cholera were, no doubt, a principal cause of the mind of the country being aroused to the necessity, as well as the duty, of thoroughly investigating and legislating upon matters relating to public health. The General Board of Health, the first central authority, was established in 1847, and this was followed by a series of general statutes and by Lord Norton's Sanitary Commission, which recommended various valuable reforms. These reforms were sanctioned by Parliament, and in 1875 Mr. Sclater-Booth's Public Health Act was passed. Few statutes had so long and so well stood the test of public criticism. Under that Act much that was permissive was made compulsory, and there was but one authority for public health purposes in every place, whilst one central authority presided over both the Sanitary and the Poor Law Authorities throughout the country. Complaints had been made of want of powers, but it was by no means certain that this was well founded, if the 340 sections of the Act were well enforced. Experience had taught him that powers which were necessary in dense populations would be intolerable in rural districts. The statute contained a provision for conferring urban powers on rural authorities, thus enabling districts to obtain the advantages without experiencing the inconvenience of urban powers. It was a satisfaction to him (Mr. F. S. Powell), as the author of this provision, to observe the results. Before May, 1833, 444 orders conferring those urban powers had been issued, and those districts had thus obtained by a simple procedure the benefit of any urban power which the circumstances required. The sections of the Public Health Act which would first demand reconsideration were probably those which related to offensive trades. Meanwhile, the Alkali &c. Works Regulation Act of 1881 imposed severe restrictions on the conduct of alkali works, and what might, in general terms, be described as chemical works. By the operation of this Act 976 works were registered up to the close of 1882, and there was good reason to hope that the sections of this Act, and the action of the inspectors under it, would restore vegetation to wide districts which were blighted by noxious emanations, and render them once more such that the inhabitants might dwell therein without suffering inconveniences destructive to comfort and the enjoyment of life. Mr. Powell next referred to the Act for the Prevention of the Pollution of Rivers, passed in 1876, remarking that the most difficult problem,—that of the Thames Valley,—was still not satisfactorily or finally solved. Although the question of water-supply had occupied much of the attention of the Legislature for ten years past, it could not be regarded as certain that the people of this country were duly impressed with the necessity of obtaining an ample supply of wholesome water, or of guarding from contamination the water when supplied to each house. He thought there was much reason to regret that the Legislature had not made general the principle embodied in many local Acts which enforced the notification of infectious disease. Public attention was at length aroused, and was fully directed to the most complicated question of the homes of the people, but it was premature to further remark upon this matter until the issue of the Report by the Royal Commission. It should not be forgotten, however, that the homes of the people depended upon the people themselves, and that neither cubic space, nor sound construction, nor sanitary arrangements, would attain their end if indolence suffered dirt to remain; if neglect failed to make due use of the best appliances; if reckless, almost savage, violence destroyed that which was provided for the comfort, nay, even the safety of life. Education itself, unless due regard were paid to the conditions of youthful life, was proved to be a danger.

Mr. H. H. Collins, F.R.I.B.A., then read a paper entitled "What Conditions are essential for a Healthy Dwelling, whether in an Urban or in a Rural Locality; and how far is it desirable that they should be rendered Compulsory by Legislation?" The substance of this paper was printed by us last week (see p. 953, vol. xlvi.).

After a few remarks from Mr. F. S. Powell, in which he expressed grave apprehensions as to the system adopted in the building of lodging-houses in London,

Mr. Boord, steward to the Duke of Bedford, moved a vote of thanks to Mr. Collins for his very able paper. The question of housing the people was one of great importance to the inhabitants of the metropolis, and every effort should be made to get rid of unsanitary dwellings, and to put a stop to the practice of overcrowding. As regarded lofty houses he agreed with the observations of Mr. Collins, and he must say he had viewed with much concern the disposition to raise such buildings without sufficient areas around them. Instead of being a benefit to the working-classes he was afraid these lofty buildings were likely to prove a curse. He doubted the necessity of crowding particular neighbourhoods with artisans' dwellings, because he thought that many of the trades carried on in London could be as well removed into the country, or, at least, into the suburbs. If they ensured workmen and workwomen employment in their trades they would readily follow their employers into the country. Until we could educate the people properly in sanitary matters we must compel them to act up to the law.

Mr. Stanley Bird mentioned instances in which cesspools had been found under houses in excavating for the foundations, and urged that there was a great necessity for compulsory legislation. While speaking with all respect of sanitary engineers, he thought there was too strong a tendency amongst some of them to expend their energies in the invention of traps and such like appliances which should be connected with their names as the inventors.

Mr. Arnold spoke of the deficiency of powers to provide for efficient ventilation.

Mr. Craig thought it was very desirable that Parliament should appoint a Minister of Health.

Mr. J. H. Bridges, M.B., was then called upon to read a paper, the subject of which was, "What, if any, restrictions in the interests of health should be enforced in connexion with the employment of girls and women in workshops and factories?" He pointed out that the most important extensions of factory legislation that had been proposed were:—1. Restriction on the employment of mothers, namely, that it should be illegal to employ them for a period of six weeks after childbirth. 2. Extension of the Workshops Act to domestic occupations. 3. Extensions of it to various wandering occupations; as to chimney-sweepers (already under special, but possibly insufficient control), errand boys, street performers and musicians, newsboys, match-sellers, &c. 4. Restriction of hours of labour in retail shops. It was evident that a strong case might be made out in favour of each of these proposals. The arguments in favour of the first was obvious. It was admitted that women in Lancashire frequently returned to work within a few days of their confinement. When they remembered that work with these women meant incessant watching of four looms, through each of which the shuttle passed three times a second for ten hours a day, and that during those ten hours they could never once sit down, every one might imagine, though no one but a medical man could fully appreciate, the enormous, the atrocious, imprudence of such an act as this. In view of the inevitable miserable consequences, the question was, should women be protected in this matter from the pressure put upon them, sometimes by brutal and drunken husbands, sometimes by stupid and greedy overlookers? Should their freedom of returning to work be curtailed by

law? Should it be an offence knowingly to employ any woman within six weeks of childbirth? This prohibition had been enacted in Austria, and, he believed, in Switzerland. After considering the arguments for and against, he had come to the conclusion that a case was made out for legal prohibition. The second change he would advocate was the assimilation of factories, so far as sanitary inspection was concerned to workshops,—that was to say, their subjection to the Health Authority of the district, whose officer should be instructed to visit them, in the ordinary discharge of his duty, and not, as at present, on the special invitation of the Inspector of Factories. Those two changes excepted, he had but little hope for the remedy of the grievous evils connected with the condition of women in workshops, and above all the domestic workshops, from a further extension of minute inspectorial supervision. The real and practical remedy for the evils complained of would seem to be an organised concentration of public opinion on the condition of low-paid labouresses, such as would lead a skilled workman to refrain from ordering his clothes at a slop-shop, or a fashionable lady from changing her fashion rapidly, or ordering her dress in a hurry. He did not despair of a time arriving when through the wide diffusion of sound principles on this matter, the skilled mechanic and the rich lady, and every one of them rich and poor, would be restrained by the unwritten law of conscience from purchasing any article for which there was reason to believe that the maker of it had not been duly paid, or had been unduly worked.

The Chairman having invited discussion,

Mr. John Arnold wished to remark, on behalf of the very unfortunate class of girls who worked in drapers' shops, whose case had not been touched upon by Mr. Bridges, that the hours these girls were employed, frequently in close and unhealthy shops, were excessive, and the girls were on their feet all day long.

Mr. Edwin Chadwick said it had been proved that there was nothing gained by the long hours of work in the factories of Lancashire, and he thought workshops should be visited once a week by medical officers of health.

Professor de Chaumont observed that it appeared to be thought by some that legislation was the panacea for all evils. He sympathised with the overworked girls and women in shops whose hardships had been referred to by Mr. Arnold, but the difficulty of applying legislation to their cases was very great.

After a few words from the Chairman the meeting adjourned.

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At the second meeting of the Conference, held on Friday, the 27th, Sir Richard Temple again presiding, papers were read by Mr. G. W. Hastings, M.P., entitled, "Is it desirable that Notification of Infectious Disease should be Obligatory?"; and by Mr. A. H. Brown, M.P., on "Is it desirable to Legislate further respecting the Duties of Medical Officers of Health?"

Mr. Hastings, M.P., in the course of his paper, observed that the question of making notification of infectious diseases was first brought forward in a paper read at Brighton in the year 1875, and since that time, in thirty-eight towns, some system of compulsory notification had been adopted, while during the present session several others would receive similar powers. It was, therefore, too late to say that notification should not be made obligatory because the results could not be foreseen. The real question was whether notification should be made universal, and if so, under what conditions? He might mention the case of Edinburgh, where the system was in force, and had been attended with the most satisfactory results. The duty of giving notice of the existence of infectious disease there devolved on the medical attendant, and no objection had been raised to it. Dr. Littlejohn, the Medical Officer of Health of Edinburgh, had reported that from the year 1879, when the system was introduced, up to the end of 1883, he had received notifications to the number of 21,710, of the existence of typhus, typhoid, diphtheria, scarlatina, and small-pox. Notification had been attended with the happiest consequences in checking the spread of those diseases. Similar testimony had been given by medical officers in other towns, and as applications for compulsory powers were constantly coming forward, it seemed desirable that a general Act should be passed enabling every town or district to apply such measures without having to go to the expense of a special Act of Parliament.

Mr. James Bailey and Mr. William Young both protested against compulsory notification as an interference with the liberty of the subject.

Alderman Pollard, of Halifax, remarked that compulsory legislation in the matter of infectious diseases had been in force in that town for two years, and he was convinced that it had been the means of saving many lives. He believed the death-rate arising from zymotic diseases was lower in Halifax than in any of the large towns the returns of which had been published by the Registrar-General.

Dr. Dudfield also strongly advocated the adoption of compulsory notification of infectious diseases.

Dr. Wallace, of Greenock, expressed the opinion that without compulsory notification they would not be able to do very much in the way of preventing the spread of infectious diseases. He had not the slightest doubt that the mortality of all towns or districts would be greatly diminished by the adoption of compulsory notification by medical men.

Prof. de Chaumont thought the objections urged against compulsory legislation on this question were not well founded. There was no doubt that such legislation was necessary, but great care and tact must be exercised in bringing compulsory notification into general practice. He was as great an advocate of the liberty of the subject as any one, but he could not understand how opposition to a measure having for its object the prevention of the spread of infectious diseases, could be maintained on that ground. He wished to get rid of the idea that this movement for official notification was got up for the aggrandisement of the medical profession, for the small fees that were charged were not likely to be a great temptation.

Mr. Hastings, in the course of his reply, said this was a question which chiefly affected the poor, and he did not understand that "liberty of the subject" which would allow disease and death to go on unchecked. He had heard the objection as to the interference with the liberty of the subject brought forward in the House of Commons, and there was, in fact, no nonsense too great to be talked in that assembly of the collective wisdom of the nation, simply because the members would not take the trouble to acquaint themselves with the real facts.

Mr. A. H. Brown, M.P., then read his paper, in which he discussed the question, "Is it desirable to legislate further respecting the duties of Medical Officers of Health?" The various conclusions which Mr. Brown arrived at in his paper may be summed up as follows:—First, that combined districts, giving large areas to medical officers, were advisable; secondly, that the areas should be of such a size and population as to occupy the whole time of a medical officer in his public duties, and therefore he should not have a private practice; thirdly, that the medical officer should be approved by the Local Government Board, because it made him more independent for the term of his appointment; and the term of his appointment should be lengthened. With regard to this latter point, the Local Government Board, in their twelfth annual report, made the remark that hitherto it had been the practice to appoint the officers employed for single districts for short terms, usually not exceeding two or three years; but with the experience which had been gained, since the passing of the Public Health Act of 1872, of the nature and the extent of the duties devolving upon those officers, it appeared to the Board that under certain circumstances they might now not improperly assent to a somewhat more extended term of office. Fourthly, that it was not advisable to give medical officers any independent authority, nor was it advisable to give them any power of appeal from the Local Boards either to any proposed new authority, or to the Local Government Board; fifthly, that the principle of making the medical officer of health a county officer and paying him out of the county rates, would not get over the difficulty, for any expenditure for sanitary purposes must be local expenditure, and would be opposed on the same grounds as now. Finally, that the best means of promoting sanitary improvement and awakening Local Boards to their duties, was by the force of public opinion, by public discussion, and by conferences similar to the present.

In the course of the discussion which followed,

Mr. E. Chadwick remarked that Mr. Brown had rendered good service in the cause of sanitation, and he hoped he would continue his exertions in the cause.

Dr. Saunders was of opinion that until medical officers of health felt themselves secure in their appointments, and that they could not be arbitrarily discharged, their hands could not be so strong in the performance of their duties as they ought to be.

Dr. Wallace corroborated the view expressed by the last speaker as to the necessity of security of tenure in their appointments as medical officers. They ought to feel that they could not be removed except by the Secretary of State. It was absurd that in a large town or city a medical officer of health should be liable to removal at the caprice of a local body elected annually. One of the greatest difficulties medical officers had to contend with was the securing of healthy homes for the working classes.

Mr. Dudfield was of opinion that medical officers required to use discretion in putting in force the powers which they possessed, but he thought it absurd that there should be so many defects in sanitary arrangements, while there were such powers as at present existed for their removal.

Mr. Brown, in replying on the discussion, observed that some local Boards did their duty very well, but he must say that in many instances they did not properly support their medical officers of health in the matter of sanitation. He was quite of opinion that the term of appointment should be lengthened, and that medical officers of health should not be liable to removal, except by the Local Government Board. They would thus become more independent, and their opinions would have more force. It appeared, from a paper supplied by the Local Government Board, that out of 577 Rural Sanitary Authorities, the medical officers of 527 were paid by Parliament to the extent of one-half their salaries, and with the condition that they could not be removed by their Local Boards for the term of their appointment except with the consent of the Local Government Board. There were 947 Urban authorities, and the same remark applied to the medical officers of health of 579 of them. It would be understood that these last figures were the number of authorities, not the number of medical officers; for one officer often superintended several districts.

The Chairman, in closing the discussion, observed that the papers read had been written with remarkable ability, and were inspired by humane and enlightened principles. He trusted the result of the Conferences would be satisfactory, not only to those of the public who were interested in sanitary matters, but to the officials of the National Association for the Promotion of Social Science, under whose auspices the Conferences had been held.

On the motion of Mr. Edwin Chadwick, a vote of thanks was accorded to the President, who briefly acknowledged the compliment, and the proceedings terminated.

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## ARTISTIC TAPESTRY PAINTING.

MR. EDOUARD RISCHGITZ, of 42, Lindengardens, W., has opened what purports to be the first English Exhibition of Painted Tapestries. The quality which a painting upon any textile fabric must have to make it worth the attention of those who look for a principle when they set about decoration is permanence. And this quality Mr. Rischgitz claims for his work. The "Compagnie des Peintures artistiques" who exhibited their work in London two or three years back were the first to discover this secret of giving absolute permanence to paintings executed upon woollen or animal fabrics (on a vegetable fabric it is said this cannot be done). But the secret of the "Compagnie des Peintures artistiques" rests with them, and Mr. Rischgitz has had to discover his method for himself. In all painting of this kind acid is used with the colours. This acid must afterwards be removed by a process which gives, at the same time, fixity to the painting,—a process which, by way of analogy only, may be compared with that of firing in china-painting. Mr. Rischgitz's painted tapestry will wash, and, generally speaking, may be submitted to any cleaning process not injurious to the fabric itself. It thus appears to be a genuine and legitimate industry, and not to be ranked in

## CHURCH BUILDING NEWS.

*Mevagissey.*—A meeting has been held to consider proposals for the restoration of the parish church, which the vicar describes to be in so dilapidated a condition that it is in danger of being blown down. An effort was made for obtaining funds for the work some eight years ago, but unsuccessfully. It is stated in a local paper that plans and specifications were then obtained from Mr. St. Aubyn, architect, and Mr. Henderson offered to restore the body of the church for 1,000*l.*, erect a tower for 200*l.*, and extend the chancel for 100*l.* Total, 1,300*l.*

*Bromley Common.*—Holy Trinity Church, Bromley Common, was re-opened and a new apse consecrated by the Archbishop of Canterbury, on the 23rd ult., after having been closed during restoration. The old building was erected about forty years ago, and was built on a very awkward plan, having a very shallow chancel, no organ-chamber, and inadequate heating apparatus. The present additions consist of an apse giving greater depth to the chancel, an organ-chamber with space underneath for Grundy's hot-air apparatus, choir-stalls, an oak and stone pulpit, &c., the chancel being raised above the level of the nave floor, and projecting into the body of the church. New seating in pitch-pine has been substituted in place of the old straight-backed pews. These improvements were carried out in memory of the late Mr. George Warde Norman by his family, and a memorial tracery window of four lights, filled with stained glass by Messrs. Clayton & Bell, has been put in by the children of the late Mr. Henry Norman. The total cost of the restoration, including an organ by Mr. Henry Jones, of the Fulham-road, will be under 2,000*l.* Mr. William Smith, of Bromley Common, was the builder employed, under the direction of Mr. C. Pemberton Leach, architect, 31, Spring-gardens.

*St. Stephen's-by-Launceston.* — The ancient parish church, dedicated to St. Stephen, at St. Stephen's, near Launceston, has for some time been in the hands of the restorers. St. Stephen's is the mother church of Launceston. The church stands upon high ground, and consists in plan of a nave, north and south aisles, chancel, north transept, and a south porch with parvise and tower. The edifice is generally of grey granite, but polyphant, the beautiful soft finely-grained stone of the district, has been largely introduced into the new masonry. The restoration of the church has long been felt to be most desirable, and at length the task was entrusted to Messrs. Hine & Odgers, architects, Plymouth. From the plans of these gentlemen the work is being carried out by Mr. Henry Burt, builder, of Newport, Launceston. The new roofs assume the ancient wagon type so prevalent in the West. They are covered with lead outside, and within are of pitch-pine, and enriched by carved oak bosses. The stalls are of oak, and have sculptured angels in attitudes of adoration carved upon their ends. These are by Mr. Harry Hems, of Exeter, who has also done the carving appertaining to the new roofs. The new Perpendicular windows are of polyphant stone, and are glazed with cathedral-tinted glass. The plastering has been stripped off the walls, and these are now neatly pointed. There is no pulpit and no seating in the body of the sacred edifice. It is the intention to use chairs,—at least for the present. An exceedingly handsome feature in the chancel is the new reredos, which is erected immediately under the east window. It is, in the main, of Bath stone with polished Devonshire marble columns. The sculpture is of Caen stone. The crowning feature is a high crocketted gable springing from supporting and pinnacled buttresses, whilst at either side are three panels, containing fleurs-de-lis, and surmounted by a cornice of carved worked and pierced masonry. The central panel contains a sculptured representation of the Crucifixion, each figure in the group standing out in high relief. This is also the work of Mr. Harry Hems.

*Newcastle-on-Tyne.*—A new church, to be called St. Jude's, is to be built in the district of Shieldfield, Newcastle-on-Tyne. Mr. Arthur B. Plummer, A.R.I.B.A., Newcastle, has been appointed the architect.

*Gateshead.*—On the 27th ult., the ceremony of laying foundation stones of the Church of the Venerable Bede, at Sunderland-road, Gateshead, was performed by Mrs. Edward Joicey and (in the absence of Lady James) by Sir Walter James. St. Bede's is one of three churches to be built under the Gateshead Church Extension Scheme, which provides for the erection of between twenty and thirty new churches throughout the diocese. The general arrangement of the new church, the contract for the erection of which has been let to Mr. Alexander Thompson, is in the form of a Latin cross, and consists of a nave, north and south transepts, chancel, vestry, and organ-chamber. The nave is 29 ft. wide and 89 ft. 6 in. long; the north transept, 32 ft. 6 in. by 17 ft. 6 in.; the south transept, 32 ft. 6 in. by 20 ft.; the choir and sacrarium, 32 ft. by 24 ft.; the vestry, 19 ft. 6 in. by 13 ft. 6 in.; the organ-chamber, 18 ft. by 13 ft.; and the north porch, 14 ft. 6 in. by 19 ft. As there are no aisles, and consequently no nave arcade, every one will be able to see the preacher. The entrance doors will open outwards, and the whole of the walls will be built of stone, faced with sneck walling, the thicknesses of the walls being based upon the scale of dimensions required by the Ecclesiastical Commissioners. When finished, the building will accommodate 624 adults. The cost will be 5*l.* a sitting. Messrs. Oliver & Leeson are the architects.

## STAINED GLASS.

*Westminster Abbey.*—At a meeting held last week in the hall of the Institution of Civil Engineers it was decided to erect in Westminster Abbey a memorial window to the late Sir W. Siemens. It was resolved, in order that the tribute should be of a truly representative character, to limit the amount of subscription to 1*l.* 1s. from each person. An executive committee was appointed, consisting of the president and two members of each of the five societies represented at the meeting. Mr. James Forrest was appointed secretary and treasurer.

*Paramatta.*—There have been placed in position in the eastern wall of St. Patrick's Church, Paramatta (says the Cumberland *Mercury*), three stained glass windows, presented by Mr. T. H. Rawlings, as a tribute to the memory of the ability, zeal, and worth of the late prelate of the Catholic Church, Archbishop Vaughan. The design,—by the donor,—has been faithfully and tastefully executed by Messrs. Ashwin & Falconer, of Sydney. It embraces full-size representations of St. Benedict, in the habit of his order; the Crucifixion,—showing at the foot of the cross, in group, St. John, the Virgin Mary, Mary Magdalene, and St. Thomas.

**Columbia Market.**—According to Mr. David Scott, of 94, Commercial-street, E., this costly gift to the East End of London has a more fortunate career before it than for a long time, seemed probable. Mr. Scott, in a letter to the *Morning Post*, writes:—"Six months ago the fruit and vegetable department of this market was opened by the twenty-six salesmen who were compelled by law to remove from the Great Eastern Railway Depôt at Bishopsgate to Columbia Market, and it is not too much to say that the efforts of the salesmen have been rewarded with the most complete success. This once unlucky place is growing in importance every day, and would grow still faster and be a greater means of benefit to food consumers if some half dozen or so of those who send their produce to Spitalfields would avail themselves of the undoubted advantages offered by Columbia Market, relieving themselves of the high tolls and charges and want of accommodation, the prevailing features of Spitalfields Market. The idea of failure in connexion with Columbia is a thing of the past, thanks to the generous liberality of that noble-hearted lady, the Baroness Burdett-Coutts, and the business tact and hearty co-operation of Mr. Burdett-Coutts."

**Truro Cathedral.**—On Sunday last the Bishop of Truro gave the second portion of an address in St. Paul's Cathedral on the claim that the Truro Cathedral has on the entire country. His lordship stated that unless 15,000*l.* was forthcoming by the beginning of August a beautiful design would be spoilt by having to place a temporary roof on unfinished walls. His lordship urged those who had abundant wealth and every luxury to give, say, an organ, a pulpit, or a reredos, to the cathedral of the west, besides helping to find the 15,000*l.*

## The Student's Column.

THOUGH our columns are professedly intended for and addressed to proficients in the artistic and practical branches of the architectural profession, we have always had every desire to give assistance or information to beginners who have asked for it, as not a few have from time to time. It has occurred to us that, without modifying in any way the main character of the literary and critical matter of the *Builder*, we may be able to furnish our younger student readers, those who are commencing the study of the rudiments of architecture and professional practice, with a page or two written especially for them, addressed to those who are only just learning, and not assuming on the part of the young reader the existence of anything more than elementary knowledge of the outlines of the subject.

We propose, in this Students' Column to carry on successive series of short articles on artistic and practical subjects, by various contributors specially qualified to treat such subjects. We have found the idea has excited considerable interest both among some of our old and tried coadjutors, and among others who are offering us their hearty and valued co-operation for the first time in this endeavour to add a specially educational feature to our pages.

By way of beginning at the beginning, we give this week the first of a short series of comprehensive lectures on the study of architecture, going over the characteristics of the various styles and their historic and artistic relation to one another. These lectures, as they may be called, have already in substance been delivered to the students in connexion with a well-known architectural society, some of whom will, perhaps, recognise what they will be glad to have a record of in permanent form; and we could hardly begin better than by giving wider circulation to what has already been found useful and interesting by a small circle of students. These will be succeeded by other series on such subjects as foundations, drainage, wood-work, iron-work, construction generally, and various other subjects connected with the endless interests of professional architectural work.

We may add also that we shall be glad to make this column a medium for answering questions such as young students may often have occasion to ask during the time when they are first brought face to face with the very various problems which the study of architecture suggests.

### HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE. I.

MOST buildings, up to the date of what is known as the "Renaissance," three or four centuries ago, are clearly referable, by the evidence of their own appearance, to some particular date and locality. Photography places them, as it were, in our very hands, and the great charm and pleasure to be derived from a study of the History of Architecture lies in the being able to assign such date and locality to any example. The pleasure is, of course, enhanced by visiting the locality and there assigning the date.

A sketching trip, even in our own country, affords a range of several centuries for this interesting amusement, for it really amounts to that, when one holds the threads that give the cue to be followed out.

The Renaissance, which closed up certain recognisable styles of architecture, has, after all, only acted like a finger placed on a drop of quicksilver, and has merely dispersed it into countless smaller drops, making the synthesis a more laborious and more interesting task.

The whole history is like a web, composed, at first, of a few strands into which other strands, from time to time, are woven; and, supposing them to be of different colours, the predominance of any particular colour would indicate the prevalence of a style. Here and

there we should find a blending of several colours, harmonious enough, and in effect as different from those of the component strands as green is from blue or yellow. Other strands will pursue their own course, forming, as it were, a fringe that clings to the edge and forms a pattern of its one colour beautifully varied in texture only, and never mingling with the rest. Another strand of fierce colour will suddenly appear and dart off to permeate the web, and, by its very brightness, absorb its neighbours until they have sufficient energy to reassert themselves and to drive it back.

Now the results of these weavings, as evidenced by the buildings themselves, while they are interesting to the literary student, are far more instructive to the intending practitioner, who will see why certain architectural features have been adopted and improved upon, and perhaps discarded. He need, as a consequence, become no mere archæologist, still less the slave of any one particular style; on the contrary, he will see that beauty is correlative to fitness, and, without making ridiculous attempts at originality, will produce buildings as typical of our time as the most ancient buildings are of theirs. His studies must be started in books, and, as he cannot be always visiting libraries, he will require some general authority constantly at his elbow for reference.

Although there are several excellent handbooks, put into as condensed a form as possible, and moderate in price, it will be worth the student's while to start with Fergusson's "Handbook of Architecture," and to have it bound in one volume. As one turns over the thousand and four pages of this work, the entire range of architectural history, down to the time of the Renaissance, is laid before one; the views are represented by excellent woodcuts; and the plans, sections, and elevations are drawn to uniform scales; while the letter-press is both historical and descriptive. There is only one thing wanting to complete the utility of the book, and that is a date to each illustration. The student can, however, by reading the context, add many of these dates himself, and derive much benefit from the process.

Fergusson's "History of Architecture" is an amplification of the former work, and proportionally more valuable; but the "Handbook," as the one most within the reach of a student's purse, is the work that will be generally referred to.

For those who can read French, Ramée's "Histoire Générale de l'Architecture," in two octavo volumes, will be found a very compendious work, and it is especially valuable on account of the lists of books on the various styles, given at the beginning of each chapter.

Rosengarten's "Handbook of Architectural Styles" is another octavo volume that, in addition to the ancient styles, includes Renaissance and Modern Architecture, and, with larger print and a greater proportion of illustrations, disposes of the whole in 509 pages; that is to say, in the English version edited by Professor Roger Smith. While proving very useful to those who cannot afford to purchase Fergusson's Handbook, it is also a valuable companion to it on account of the many and varied kinds of illustrations contained in it.

Another book, which is likely to be in the hands of students, is Gwilt's "Encyclopædia of Architecture," in which the first 226 pages are devoted to the History of Architecture, besides an appendix on Gothic or Pointed architecture.

Smith & Slater's "Classic Architecture" which was preceded by a work by the first author, and Professor Roger Smith's "Gothic and Renaissance;" these form a pair of useful hand-books, of which a notable feature is the *analysis* of each style.

For those who enjoy ingenious theories, treated by a man possessed of the most varied information and the most consummate skill as a draughtsman, Viollet le Duc's "Habitations of Man in all Ages" will open their eyes to many hitherto obscure forms and features. It has been translated into English by B. Bucknall. This wonderful and indefatigable author's other works will be alluded to in due course.

A book that is frequently referred to as a standard authority is Hope's "Essay on Architecture," the illustrations of which are in outline and bound separately from the text.

Another work which is devoid of all illustrations, excepting a frontispiece, is Freeman's "History of Architecture," devoted, however, chiefly to the honour and glory of Gothic architecture in distinction from previous styles.

Without pretending to exhaust the number of handbooks on the subject, the above will be found accessible to most students, and with the help of larger books, such as Gailhabaud's "Monuments Anciens et Modernes," and the works of d'Agincourt, du Sommerard, &c., will give him a fair notion of the various styles.

Fortunately, in London, we need not trust only to books for our studies, for the British Museum, the South Kensington Museum, the India Museum, and the Architectural Museum in Tufton-street, contain many actual examples and full-sized models of the architecture of all ages, and surely no Architect will begrudge his pupils the time to visit these collections with paper, pencil, and 2-ft. rule in hand.

Groups of two or three students will, by mutual assistance, get through an astonishing amount of measuring in a short time, being careful to *take turns* in *measuring* and *plotting* to scale, and making *perspective* views of the examples, otherwise he who is always plotting will not learn to handle his 2-ft. rule, and he who is always measuring will not realise the appearance of the object laid down in outline; while he who lays down the outline will not appreciate the light and shade of the object.

The Architectural Courts at the Crystal Palace will, to a certain extent, assist the student in realising the actual appearance of the originals; but, after all, there is *nothing* like visiting the originals themselves.

The air, the atmosphere, the smell,—often the dirt,—the people, the sounds, the journey,—all the surroundings of Architecture visited on the spot, exert their influence on the impressions produced by it. It is better to run down to Rochester or to St. Alban's or to Waltham or to Eltham, or to Windsor on a Bank Holiday, and to bring back a sheaf of, perhaps grimy, measured drawings, than to sketch in comfort at the Crystal Palace with a sense of band and buns and coffee pervading the place.

The same remarks are still truer of a week's trip across the Channel, or of a fortnight's trip to, say, Lombardy, or of a month's trip, say, to Greece or Sicily; but the longer the trip the greater the cost, and as the study of the history of architecture must begin at the beginning, and as that beginning is to be found a long way from England, English students must be content to make their first measured drawings from the collections above named.

Now, there are some styles of architecture which, although they cannot be put at the beginning of a consecutive series, like the threads that come to be woven in with other threads in the web, have still a decided colour and texture of their own. These are they which may be said to cling to the edge of the web, forming a fringe. Possibly future discoveries may prove a connexion between them and the consecutive styles; meanwhile, we may follow the example set by Fergusson in his "Handbook of Architecture," and dispose of "Indian," "Chinese," "Japanese," "Mexican," and "Peruvian" architecture as styles exerting no influence upon the other known styles.

### NATIVE INDIAN.

Fergusson, in his Handbook, begins with the native architecture of this country, not because it is by any means the most ancient of the known styles, but because the country is such a long way off that the great conquerors of the world could not get at it, and consequently it kept itself to itself, and, with one exception that will be pointed out, the Architecture of its *native religions* neither influenced nor was influenced by the styles of other countries.

In illustration of this separate existence of India it is worth while to study such a book as Keith Johnston's work on "Geography, Physical, Political, and Descriptive," published by Stanford. In it may be seen a chronological series of small maps of the known world at twelve various periods, with the respective States and Empires indicated by different colours on them. In most of these, India sticks to its own colour, that is to say, until it carries the colour of the British Empire. Other writers also give India a separate chapter unconnected with other styles. Fergusson has, indeed, devoted a separate volume to the subject, published in 1876.

As a brief summary of the style, it may be said that it is divided into two classes. The earliest is devoted to the worship of Buddha, a religion that not only continues to exist, but, if we may believe the description on the model of the Sanchi Tope at the India Museum, now numbers more followers than the Christian religion, though, curiously enough, none of these are in India, the land of its origin.

The other class of architecture that was developed in India is called *Hindu* or Brahminical, from the Brahmins or priests belonging to its two great sects worshipping Siva and Vishnu. Then there is *Jaina* architecture, a kind of offshoot from Buddhism, which appears to exist side by side with Hinduism.

After reading up these subjects in the books referred to, it will be worth while to visit the India Museum (on the opposite side of the road to the South Kensington Museum, and closing at four p.m.), and to measure the gateway and railing of the Sanchi Tope. These, although of stone in the original, are curiously suggestive of wooden construction, and the voluted ends of the cross beams should be borne in mind when the Ionic volute comes to be considered, later on, as referable to a wooden origin.

Another kind of tope, in the form of a column, may also be seen, namely, a pillar from Amravati, octagonal in plan, the alternate faces of which are delicately incised with a running leaf ornament, quite as well worth study as Mediæval or other more recognised examples usually followed.

There are also some oil paintings representing the rock-cut Temples, which are curiously like the nave and aisles and apsidal ambulatories of a Gothic church, though there can hardly have been any connexion between the two.

Another point to study is the form of the pillars left to support the roofs of these temples; at first square, then with the corners cut off to form an octagon, then with sixteen sides, and gradually back to the square again, and supporting an evident imitation of wooden girders, binders, and joists!

Many other native peculiarities may be studied, but there is one class of examples to be found both at the India Museum and at the British Museum (on the staircase near the main entrance), which form the one exception to the exclusive character of Indian art. There are the "Græco-Buddhist" carvings from Peshawur, anciently known as the Bactrian colony of the Greeks, whose influence on the details and carving it is most interesting to observe.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*June* 20, 1884.—9,246, F. W. Coons, St. Louis, U.S.A., Engraving Marble and Stone.

*June* 21.—9,261, J. Hobbs, Bristol, Chimney-caps or Wind-guards.—9,272, A. Kelvie, London, Clamp Window-blind.

*June* 23.—9,303, W. Blackshaw, Birmingham, Cart for collecting pans containing night-soil, &c.—9,308, G. W. Chambers, Rotherham, Converting ordinary Grates into Slow-combustion Grates.

*June* 24.—9,330, J. Parsons, Carlton, Joint for Sewage-pipes, &c.—9,331, Catlow, Burnley, Venetian Blinds.—9,332, J Napier, Kirkintilloch, Cooking Ranges.—9,338, F. R. Wildegoose, London, Safety Sash-fastening.—9,372, W. Rockliffe, Sunderland, Latches and Locks.

*June* 25.—9,379, H. Shelmerdine, Liverpool, Construction of Soil-pipes, Rainwater-pipes, &c.—9,381, W. Glassey, Liverpool, Dados.—9,392, H. Knowles, Woodville, Kilns for Burning Bricks, Tiles, &c.—9,402, F. J. Nibbs, London, Roofing Tiles.—9,405, W. H. Luther, Glasgow, Sash Bars or Astragals.—9,414, J. C. Bromfield, London, Compound for Making Paving and Building Blocks, Slabs, &c.

*June* 26.—9,441, G. Pollard, London, Union Joints for Pipes, &c.—9,450, M. Tobin, Uxbridge, Ventilating Buildings, &c.

### SPECIFICATIONS ACCEPTED.†

*June* 24.—32, H. H. Lake, London, Compound for Plastering or Stucco Work. Com. by H. E. Scales, Newton, U.S.A.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending June* 28, 1884.

4,944, A. C. Kennard, Falkirk, Heating Stove, (Oct. 17, '83, price 6d.)

Above the fire-box are a series of vertical chambers, through which the products of combustion ascend and descend consecutively on their way to the flue, whereby all the heat therein is retained.

5,167, E. E. Allen, London, Portable Buildings. (Oct. 31, '83, 2d.)

The frame-work of these buildings is made of wood, and between the two parts of each frame are secured sheets of corrugated metal. Double sheets may also be used, filled in between with sawdust, silicate cotton, felt, dry earth, peat, &c. (*Pro. Pro.*)

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

5,281, J. L. Stevens and C. G. Major, London, Spring Hinges for Doors, &c. (Nov. 8, '83, 10d.)

To the heel of the door is secured a shoe, which has a short vertical spindle below, on which are two arms enclosed in a box below the floor. Each arm is connected to a piston travelling in a cylinder placed on each side of the spindle, and springs bear on the pistons, which tend to force them to the further ends of the cylinders. The cylinders have two diameters, the smaller of which, at the further ends, exactly fit the pistons, and the heads of the cylinders are open. The box is filled with liquid, and when the door is opened one of the pistons is drawn out along its cylinder, the liquid passing freely round its periphery in the larger diameter of the cylinder, while the other is being forced back, compressing the liquid behind it in the smaller diameter of the other cylinder. Then the liquid acts as a cushion, and prevents any jarring or sudden motion of the piston, and therefore of the door.

7,320, J. N. Mocratti, London, Domestic Fireplaces. (Nov. 10, '83, 1s.)

Above the fire on each side are two air-mixing chambers, into which the smoke, &c., from the fire is drawn by several curved tuyere-mouths opening just above the coal. These chambers are connected together by a number of horizontal pipes arranged to form a basket, in which are placed lumps of asbestos, and the smoke, &c., issues through holes in the pipes, and comes in contact with the hot asbestos, whereby it is consumed, to assist which process also there are other tuyere-mouths, which draw in air from the room into the chambers, and thence to the pipes.

5,385, W. Walker, Birkenhead, Exhaust Ventilator. (Nov. 15, '83, 6d.)

A corrugated shaft is fitted on the top of the chimney, above which are two or more conical corrugated hollow truncated cones, one above the other, and a corrugated conical cap surmounts all. The wind striking these corrugations, passes up these cones, inducing a draught up the shaft.

5,421, E. Hurley, Birmingham, Closet-pan Apparatus. (Nov. 17, '83, 2d.)

Below the upper pan, which is the receiver, is another similar pan, into which the neck of the upper pan passes. The lower pan is connected to the drain, the outlet thereof being governed by a valve. *(Pro. Pro.)*

5,438, T. E. Bladon and W. Matthews, Birmingham, Apparatus for Ventilation. (Nov. 17, '83, 2d.)

A fan is used, which has inclined vanes, which when the fan is revolved drives the foul air away through a tube.

## MEETINGS.

WEDNESDAY, JULY 9.

*Parkes Museum of Hygiene.*—General Meeting, to receive report from Council, &c. 5 p.m.

THURSDAY, JULY 10.

*International Health Exhibition (Conference of the Royal Institute of British Architects).*—At 2 p.m. (1), Professor T. Roger Smith "On the Construction of Houses with regard to Sanitary Arrangements"; (2), Mr. Fred. W. H. Hunt on "The Sanitary Arrangements of Houses in London during the last Eighty Years." The discussion upon these two papers to be opened by Prof. Kerr.—At 4 p.m., Mr. S. Flint Clarkson on "Drainage under Dwellings." The discussion upon this paper to be opened by Mr. Thos. Worthington.—Mr. Ewan Christian, Chairman for the day; Mr. Charles Barry, Vice-chairman.

*Association of Municipal and Sanitary Engineers and Surveyors.*—Annual Meeting, to be held in the Town-hall, Newcastle-on-Tyne. 11 a.m. (1) Annual Report. (2) President's Address (3) Paper by Mr J. P. Spencer, F.R.S., on "Inspecting and Testing the Sanitary Arrangements of Houses."

FRIDAY, JULY 11.

*International Health Exhibition (Conference of the Royal Institute of British Architects).*—At 2 p.m. (1), Mr. Edward C. Robins, F.S.A., on "The Impermeable Construction of Roofs, Walls, and Basement Floors with a Reference to Ventilation and Warming incidental thereto"; (2), Mr John P. Seddon on "The Construction of Chimneys." The discussion to be opened by Mr. C. Forster Hayward.—At 4 p.m., Mr. Horace Jones on "A Suggestion with regard to the Construction of Doors, so as to afford opportunity of Escape from Fire; and another on an Economical Mode of Fireproof Construction adopted in several instances in Public and Private Buildings." The discussion to be opened by Mr. Henry Dawson. Mr. George Godwin, F.R.S., Chairman for the day; Mr. Alfred Waterhouse, A.R.A., Vice-chairman.

*Association of Municipal and Sanitary Engineers.*—Meeting at Newcastle, continued. 10 a.m. (1) Mr. James Hall on "Steam on Tramways." (2) Lieut.-Col. Jones, V.C., on "Sewage Disposal." (3) Mr. F. S. Brunton on "The Cost of Local Government and the Distribution of the Funds."

SATURDAY, JULY 12.

*International Health Exhibition (Conference of the Royal Institute of British Architects).*—At 2 p.m. (1), Mr. George Aitchison, A.R.A., on "The Sanitary Aspect of Internal Fittings and Decoration"; (2), Mr. William White, F.S.A., on "The Hygienic Value of Colour." The discussion to be opened by Mr. T. W. Cutler.—At 4 p.m., Mr. Thomas H. Watson on "The Collection, Storage, Management, and Distribution of Water, for Domestic Purposes, within the House." The Right Hon. A. J. B. Beresford Hope, M.P., Chairman for the day; Professor T. Hayter Lewis, Vice-chairman.

*Association of Municipal and Sanitary Engineers.*—Meeting at Newcastle, continued. 10.30 a.m., Closing Business. 11 a.m., Visits to various works.

## Miscellanea.

**Tiverton Drainage.**—After considerable delay the Town Council of Tiverton (acting upon the report of Mr. E. Pritchard, M. Inst. C.E., to whom the competition drawings were submitted) have awarded the premium of 25*l.* to Messrs. Gotto & Beesley, of Westminster, for their scheme for the disposal of the sewage of the town by irrigation, at a cost of 3,500*l.*

**Society for Improving the Condition of the Labouring Classes.**—The fortieth annual meeting of this society was held at Willis's Rooms last week, under the presidency of the Earl of Shaftesbury. The report of the committee showed that the society was the first to step into the gap to provide improved dwellings for the poor, and although their progress had been slow, their efforts had been crowned with beneficial results, as the report upon the condition of the society's houses showed that the houses were in good repair, and the superintendent's reports were very satisfactory. It also stated that the model dwellings in Streatham-street, Bloomsbury, for fifty-four families, had been fully occupied. Portpool-lane model houses, for twenty families and 128 single women, reported as a rule all the houses and rooms let; the public washhouse returned 23,906 washers. The Dyott-street (late George-street), Bloomsbury, lodging-house, for 104 single men, returned an average of ninety-eight. Macklin-street lodging-house, for seventy-two single men, had averaged sixty-four nightly inmates. The renovated dwellings, Wild-court, Drury-lane, fifty-two rooms had been fully tenanted. Clark's-buildings, St. Giles, for seventy-eight families, returned an average tenancy. Great St. Andrew-street, St. Giles, renovated houses for families, reported generally good occupation. The rate of mortality throughout the houses was 15 per 1,000. The report having been adopted, Lord Shaftesbury said that the society was an admirable institution, and if its work had been carried on as originally intended, many of the evils would have been removed. Although the condition of the London poor was far better than formerly, there still remained much to be done. If the people were better housed their whole condition would be improved. In the course of a few years London might be made to present a very different aspect if capitalists would advance money for building purposes, and be content with a return of four per cent.

**The City Companies Commission.**—The report of the Commission of Inquiry into the Livery Companies of the City of London has now been presented to her Majesty. After detailing the history of the various companies, the report concludes with "Suggestions as to Reform," among which are the following:—"4. We recommend the appointment by Act of Parliament, of a Commission, which shall undertake, pursuant to the terms of such Act, (1) the application of a portion of the corporate incomes of the companies respectively to objects of acknowledged public utility; (2) the better application of the trust incomes of the companies; (3) should it prove practicable, the reorganisation of the constitution of the companies. 5. We are of opinion that by the terms of such Act 'objects of acknowledged public utility' shall be defined as follows:—(1) Scholastic and scientific objects, *i.e.*, elementary education, secondary education, classical education, scientific research. (2) General public purposes, *e.g.*, hospitals, picture galleries, museums, public libraries, public baths, parks, and open spaces. (3) The improvement of workmen's dwellings, and, where the companies represent trades, subsidies to the benefit societies of such trades. 6. We are of opinion that, having regard to the facts that (1) the companies are connected with the municipality of London; (2) their wealth is in the main the result of the remarkable progress of London, the objects of acknowledged public utility to be promoted should be mainly metropolitan objects, but that, in cases in which a trade formerly carried on in London has established itself elsewhere, similar objects connected with the present place of trade may properly be included."

**An Island for Sale.**—An estate in a ring-fence has always been esteemed a desirable acquisition, but at the present time the unusual opportunity is offered of purchasing an estate entirely bounded by the sea, inasmuch as the island of Herm, which is about a mile and a half in length by three-quarters of a mile in breadth, and contains about 460 acres, is announced to be sold by auction on the 29th of July by Messrs. Debenham, Tewson, & Co., who have sent us particulars of the property. It is one of the smallest of the Channel Islands, and enjoys a delightful climate. The purchaser will at once become "monarch of all he surveys," and will have about forty subjects on his island.

**Destruction of the Theatre Royal, Edinburgh.**—The Theatre Royal, in Broughton was, on Monday last, destroyed by fire, happily without loss of life or other serious catastrophe. The fire broke out at midday in the property-room, at the opposite end from the stage, but how it originated does not appear. The progress of the fire was very rapid, and so speedily did it get a firm hold of the building that the efforts of the fire-brigade were directed mainly towards saving the adjoining property. The Roman Catholic pro-cathedral, which adjoins the theatre to the north, had a narrow escape, having twice caught fire, but, by the prompt attention of the firemen, the flames were prevented from getting firm hold. By the exertions of the clergy and other willing assistants, the valuable properties in the church (including the "Dead Christ," by Vandyck, valued at 5,000*l.*) were saved. The theatre was valued at about 13,000*l.*, and the estimated damage is altogether supposed to be about 18,000*l.* or 20,000*l.* The site of this theatre was during the first quarter of the century occupied by a concert-hall, under the direction of Natali Corri; in 1829 it was converted into a theatre known as the Adelphi, which was consumed by fire in 1853. Re-constructed in 1855, under the name of the Queen's Theatre and Opera-house, it was again burned down in 1865; re-built the following year, under the designation of the Theatre Royal, it was a third time burned down in 1875. Upon the occasion of the last fire, the elevations of the building remained intact, and the interior was fitted up under the direction of Mr. Phipps.

**The Crypt of Hexham Abbey Church.**—Some of the passages of this ancient crypt, which have previously been unopened, have been cleared of the *débris* which hid them from view, and laid open to inspection. The steps by which the crypt was entered from the outside (on the west side of the church) have been brought to daylight; and in the crypt many stones of Roman masonry have been freed from the Saxon cement which covered them, which adds still further to the interest of this underground chapel. One of the passages which has just been opened evidently led back to the building above, known as St. Wilfrid's Church, but the point of egress is at present covered by the base of the massive pillars of the tower and the aisle in the transepts of the present church, so that it would appear that the priests had a separate door by which they could enter the crypt, and that there were other doors by which other persons not so privileged could enter. Perhaps the most interesting Roman stone in the crypt is that which formed part of a Roman altar, and from the inscription upon which the name of the Emperor Geta was erased at the command of his half-brother, the Emperor Caracalla, after the assassination of the former. —*Newcastle Chronicle.*

**The Parkes Museum.**—A general meeting of the members of the Parkes Museum will be held in the Museum, 74A, Margaret-street, Regent-street, on Wednesday evening next, July 9th, at five o'clock, p.m. His Grace the Duke of Westminster, K.G., vice-president of the Museum, has intimated his decision of being present. The following is the business to be transacted:—1. To receive report from Council on general work of the museum; 2. To receive statement of accounts; 3. To elect vice-president: George Buchanan, M.D., proposed.

**Mr. W. H. Dalton**, the last of the original members of the Metropolitan Board of Works, died last week at the age of seventy-five. At the time of his death he was the representative at the Board of the parish of St. Martin-in-the-Fields, which parish he had represented since the formation of the Board in 1855.

**The Forestry Exhibition, Edinburgh.**—The opening of the International Forestry Exhibition took place on Tuesday last, under somewhat unfavourable circumstances, the arranging of the exhibits being, as is too commonly the case on similar occasions, greatly in arrear.

**The New Bridge at Putney.**—At the meeting of the Metropolitan Board of Works, on the 27th ult., it was announced that the Prince and Princess of Wales had consented to lay the foundation stone of Putney Bridge on Saturday next, July 12, at four o'clock.

**The City and Southwark Subway Bill.** The Committee of the House of Lords, presided over by Lord Romilly, passed, on the 27th ult., the London (City) and Southwark Subway Bill, authorising a subway under the river from King William-street to the Elephant and Castle.

**The Water Supply of Venice.**—That ancient cause of grumbling among residents and holiday tourists, the undrinkable water of Venice, appears, from the report of our Vice-Consul, Mr. De Zuccato, to be now at an end. Eight years ago a concession for bringing water from the mainland was granted to an association of English capitalists, who subsequently transferred it to a French company, by whom the project has just been brought to completion at a cost of five millions of francs. The great aqueduct passes under the Lagoons. By the terms of the arrangement the municipality pays the water company 100,000 francs a year for the supply of good water to the 120 public wells in the city, which are to remain open three hours a day; but after sixty years the whole of the waterworks will become the property of the city. Private families are supplied with water at the price of about sixpence (60 centesimi) per thousand litres, equal to about 240 gallons.—*Daily News.*

**Roman Remains at Woolstone.**—In the course of his researches on the site of the lately-discovered Roman villa at Woolstone, Mr. R. Walker, of Uffington, has found what he believes to be "a depository for the remains of the dead previous to cremation, similar to the exquisite archæological treasure now moved to Oxford." He has discovered indications of three distinct houses, and has also marked the traces of at least half a dozen others, including one with indubitable tokens of the bath-room. In another locality he has found no less than six or eight houses, nearly parallel, as if forming a street east to west, the foundations of which are clearly discernible. Beyond this other fields are disclosing glass, pottery, iron, and what Mr. Walker "noted as an interesting fact in the Church Field," the presence of a large deposit of oyster shells (real natives),—denoting a luxury of living, and the probable chance of finding rich pavements on a thorough search."—*Reading Mercury.*

**Disused Burial-Grounds as Public Gardens.**—The Metropolitan Public Garden and Playground Association deserves well for its efforts to add to the pleasures and improve the stamina of city children. The conversion of old and disused burial-grounds into open spaces for recreation, which is one of its leading principles, has much that can be said in its favour and is open to no valid objection. It implies no neglect or desecration of those whose remains formerly rested there, inasmuch as their elements have years ago become part of the dust out of which they came. Their very memorials in many cases have perished, as they must at length, crumbled away by the hand of Time. Neither does hygiene require that these spots should continue to be the neglected abode of rank grass and weeds alone. Let it be granted that urban burial-grounds were a mistake of a former generation; they have wrought their evil, doubtless, and have ceased to be effective long before now. The period which has intervened since the abolition of intramural graveyards is sufficient to have purified by disuse the most unwholesome of them.—*Lancet.*

**The Ashmolean Museum, Oxford.**—Mr. A. Evans, M.A., of Brasenose College, has been elected Keeper of the Ashmolean Museum, in the place of the late Mr. J. H. Parker, C.B. The keeper is now required to deliver lectures as well as to superintend the collections of the museum.

**International Health Exhibition.**—A Grand Evening Fête, under the immediate patronage of their Royal Highnesses the Prince and Princess of Wales, who have announced their intention of being present, will be held at the International Health Exhibition, on Wednesday, July 23rd, in aid of the Fund for the London Hospitals.

## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered | Page. |
|---|---|---|---|---|
| Dairy Homestead ..... | British Dairy Farmers' Association ..... | Not stated. | August 25th. | ii. |

| Nature of Work. | By whom required. | Premium. | Designs to be delivered | Page. |
|---|---|---|---|---|
| ..... | ..... | ..... | ..... | ..... |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Blinds, Croydon Infirmary..... | Guardians ..... | ..... | July 7th. | xxviii |
| New Dwellings, St. Catherine's .... | Corporation of Trinity House .. | *Official* ..... | do. | ii. |
| Broken Granite ..... | Bermondsey Vestry.. | do. | do. | xxii. |
| Painting, Anglesea Barracks, Strath. | War Department.... | do. | July 8th | ii. |
| Making up Roads, Battersea ..... | Wandsworth B. of Wks | do. | do | xxiv |
| Concrete Invert, Kerbing, & Asphalting | Tottenham Local Bd. | De Pape ..... | do. | xxiv. |
| Road Making, &c. ..... | Fulham Bd. of Wks | *Official* ..... | July 9th | ii. |
| Granite, Flints, &c. ..... | Hend. R. S. A. .. | do. | do | ii |
| Road Making Footway ..... | Bromley R. S. A. .. | do | July 10th | xxviii |
| Granite Spalls ..... | Brighton Town Clerk | P. C. Lockwood ..... | do. | xxx. |
| Police Station ..... | do. | do | do | xxvi. |
| Underground Reservoir ..... | Epsom Local Board.. | *Official* ..... | July 12th | xxvi |
| Stoneware Pipes and Draining Tiles | Corporation of Burton-on-Trent | J. Massergh ..... | July 14th | xxxiii. |
| Brick Sewer ..... | Paddington Vestry | *Official* ..... | do | xxvi |
| Additions to Goods Shed, Bridgen. | Great Western Ry. Co. | do. | July 15th | ii. |
| Cleaning out Docks, Brentford. . | Local Board ..... | Lacey ..... | do. | xxviii |
| Menuel Deals..... | Norwich Corporation | P. F. Marshall ..... | do. | ii. |

| Nature of Work, or Materials. | By whom required. | Architect Surveyor, or Engineer | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Station, &c. Gateshead ..... | North Eastrn Ry. Co. | W. Bell. ..... | July 16th | ii. |
| Whitewashing, &c Exeter Barracks | War Department .... | *Official* ..... | do. | ii |
| Alterations, &c. to Workhouse..... | Guardians of Poplr. Un. | George Morris ..... | July 18th | xxviii |
| Retort House, Brentwood ..... | Gas Company ..... | Jubez Church ..... | July 19th | xxviii |
| Station Buildings, &c. Liverpool.... | Lan. & Yorks. Ry. Co. | H Shelmerdine ..... | July 21st | ii. |
| Broken Granite ..... | Maidstone Local Bd. | F. J. C. May ..... | do. | ii. |
| Wood Paving ..... | Vestry of St. James', Westminster .... | *Official* ..... | July 24th | xxvi. |
| Brick Sewer ..... | | | August 1st | xxvi. |
| Guernsey Granite ..... | Gravesend U. S. A... | do. | | |
| School Buildings and Master's House | Governors ..... | J. P. Power ..... | August 4th | xxiv. |
| Newbury ..... | | | | |
| Cast Iron Pipes ..... | Bombay Municipality | C. B. Braham ..... | August 6th | ii. |
| Additions, &c. to Schools, N. Hmptn | Committee ..... | C. L. Luck ..... | Not given | xxviii |
| Additions to Mansion, near Barnet | Proprietor ..... | J. J. Lish ..... | do. | ii. |
| Rail Road ..... | W. H. Wheeler ..... | Not given | do. | xxvi. |
| Stonework and Ironwork, Mark-lane | ..... | Sanson ..... | do. | xxvi. |
| Completing Houses and Shops ..... | ..... | Gordon & Lowther .... | do. | xxvi. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in | Salary. | Page. |
|---|---|---|---|---|
| County or District Surveyors in Ireland ..... | Civil Service Commis. | August 1st | Not stated | xxii. |

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Road Foreman ..... | Tottenham Local Board | July 8th | 120*l.* | xxii. |
| Waterworks Engineer ..... | Alnwick, &c. Local Brd. | July 19th | Not stated. | xxiii. |

## TENDERS.

For building sessions court, police-courts, &c, for the Corporation of Birkenhead. Messrs. Thomas D. Barry & Son, Liverpool, architects. Quantities by Mr. George Paton, Salford, Manchester:—

| | |
|---|---|
| S. & W. Pattinson, Ruskington, Sleaford ..... | £31,837 0 0 |
| Wm. Thornton & Sons, Liverpool ... | 30,992 0 0 |
| John Miller, Liverpool ..... | 30,932 0 0 |
| W. H. Forde, Birkenhead ..... | 30,502 16 5 |
| Joseph Bull, Sons, & Co., London... | 30,033 0 0 |
| Thomas Urmson, Liverpool..... | 29,782 0 0 |
| Brown & Backhouse, Liverpool ..... | 29,685 0 0 |
| Hugh Yates, Liverpool..... | 29,407 0 0 |
| Wm. Wainard, Wigan ..... | 29,380 0 0 |
| Samuel Webster, Bootle ..... | 29,331 0 0 |
| Edmund Gabbutt, Liverpool ..... | 29,228 0 0 |
| James Leslie, Bootle..... | 29,217 0 0 |
| Alexander Bleakley & Son, Birkenhead (accepted) ..... | 28,890 0 0 |

For Cullum House, Lime-street. Messrs. N. S. Joseph & Pearson, architects. Quantities by Mr. Stephen Barton Wilson:—

| | |
|---|---|
| Conder..... | £9,678 0 0 |
| Williams..... | 9,473 0 0 |
| Bywaters..... | 9,233 0 0 |
| Lawrence ..... | 9,230 0 0 |
| Pritchard ..... | 9,180 0 0 |
| Patman & Fotheringham ..... | 9,173 0 0 |
| Colls & Sons ..... | 9,140 0 0 |
| Ashby Bros. ..... | 8,983 0 0 |
| Brass ..... | 8,981 0 0 |
| Hall, Beddall, & Co..... | 8,789 0 0 |
| Patrick ..... | 8,758 0 0 |
| Scrivener ..... | 8,574 0 0 |
| Ashby & Horner ..... | 8,540 0 0 |

Accepted for repairs to Nos. 1 to 5, Oliver-road, Leyton, Essex. Mr. William C. Livermore, surveyor:—

| | |
|---|---|
| A. Nicholls, Leytonstone ..... | £185 0 0 |

Accepted for reinstating house and warehouse, damaged by fire, at 39, Cable street, St. George's-in-the-East. Mr. William C. Livermore, surveyor:—

| | |
|---|---|
| A. Nicholls, Leytonstone ..... | £435 0 0 |

Accepted for the construction of brick and pipe sewers, and laying down new granite carriage-ways and York stone footways in the streets embraced in the Pear Tree-court, Clerkenwell (Artisans' Dwellings) Scheme, for the Metropolitan Board of Works:—

| | |
|---|---|
| Mowlem & Co. ..... | £2,890 0 0 |

For alterations to the "Bodega Company's" premises, High-street, Borough. Mr. W. Macie Leir Seaman, 3, Chancery-lane, architect. Quantities prepared by the architect:—

*Structural Alterations, Counters, and Mahogany Work and Fittings.*

| | |
|---|---|
| Drew & Cadman, Holborn ..... | £759 0 0 |
| Patman & Fotheringham, Theobald's-road ..... | 650 0 0 |
| T. Beale, Westminster ..... | 598 0 0 |
| C. F. Hewlitt, Minories (accepted) ... | 520 0 0 |
| Jackson & Todd, Hackney..... | 469 0 0 |
| Hewlitt (accepted) ..... | 475 0 0 |
| Jackson & Todd ..... | 462 0 0 |

*Pewterers' Work.*

| | |
|---|---|
| T. Heath (accepted) ..... | 121 3 8 |

For rebuilding premises in High-street, Sheerness-on-Sea, for Mr. D. Prosser. Messrs. P. P. Perry & W. Macie L. Seaman, architects, 3, Chancery-lane. Quantities prepared by Mr. W. Macie L. Seaman:—

| — | Ham Hill Stone Dressings. | Bath Stone Dressings. | Ham Hill Dressings, omitting Tower. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. |
| A. Steer, Norwood ..... | 2,886 17 7 | 2,865 0 11 | 2,726 14 3 |
| Amos & Foad, Whitstable-on-Sea ..... | 2,750 0 0 | 2,650 0 0 | 2,605 0 0 |
| Eli Tinson, Kensington ... | 2,643 0 0 | 2,567 0 0 | 2,455 0 0 |
| Stimson & Co., Brompton ... | 2,628 0 0 | 2,593 0 0 | 2,480 0 0 |
| Paramor & Sons, Margate ..... | 2,530 0 0 | 2,466 0 0 | 2,398 0 0 |
| W. Martin, Ramsgate..... | 2,475 0 0 | 2,457 0 0 | 2,355 0 0 |
| L. Seager, Sittingbourne .. | 2,465 0 0 | 2,424 0 0 | 2,360 0 0 |
| G. White,* London ..... | 2,251 3 9 | 2,201 3 9 | 2,000 0 0 |

* Accepted.

For completing six houses, Rosslyn-gardens, Hampstead, for Mr. T. A. Amos. Messrs. Spalding & Auld, architects:—

| | |
|---|---|
| L. H. & R. Roberts ..... | £4,062 0 0 |
| J. Outhwaite & Son..... | 3,980 0 0 |
| A. & E. Lea ..... | 3,973 0 0 |
| Donne ..... | 3,834 0 0 |
| T. Russell (accepted) ..... | 3,500 0 0 |
| Stephenson ..... | 3,483 0 0 |

For painting, whitewashing, &c., at the St. Marylebone Infirmary, Notting-hill, for the Guardians of the Poor of the Parish of St. Marylebone. Messrs. H. Saxon Snell & Son, architects, 22, Southampton-buildings:—

| | |
|---|---|
| Smith & Saunders] ..... | £190 0 0 |
| J. H. Jolliffe..... | 186 0 0 |
| Wall Bros..... | 183 0 0 |
| A. W. Derby..... | 163 0 0 |
| M. McCarthey ..... | 160 0 0 |
| M. & M. Fleming..... | 160 0 0 |
| Sheerman & Sons..... | 160 0 0 |
| Vigor & Co. (accepted) ..... | 153 10 0 |

For making up, metalling, and channelling of roadway, and tar paving of pathways, at Manor Park-road, Harlesden, for the Willesden Local Board. Mr. O. Claude Robson, engineer:—

| | |
|---|---|
| Pizzey ..... | £1,292 0 0 |
| Nowell & Robson ..... | 1,183 0 0 |
| Catley ..... | 1,135 0 0 |
| Tomes & Wimpey..... | 1,005 0 0 |
| Neave & Son ..... | 965 0 0 |
| Felton (accepted) ..... | 895 0 0 |

For erecting fifty labourers' dwellings, on the Cann Hall Estate, Leyton. Mr. G. H. L. Stephenson, architect:—

| | |
|---|---|
| Evans ..... | £11,437 0 0 |
| Read ..... | 9,800 0 0 |
| Wilson ..... | 9,250 0 0 |
| Sladwell ..... | 9,250 0 0 |
| Wayman ..... | 8,900 0 0 |
| Wire (accepted) ..... | 8,750 0 0 |

For constructing 1,400 ft. brick sewer, in Bridge-road, Hammersmith, and 3,200 ft. brick sewer, at Stamford Brook East, near Willesden Junction, for the Metropolitan Board of Works:—

| | |
|---|---|
| George Felton,* Iverson-road, N.W. (accepted) ..... | £8,383 0 0 |

* Lowest Tender of thirteen received.

For alterations and additions to "Coleyhurst," Bath-road, Reading, for Mr. Thos. Rogers. Mr. W. Ravenscroft, Reading, architect. Quantities by Messrs. Cooper & Sons, Reading and Maidenhead.—

| | |
|---|---|
| Wheeler Bros., Reading (accepted).. | £1,784 5 0 |

For the erection of a new tobacco factory, for Messrs. W. D. & H. O. Wills, Bedminster, Bristol. Mr. Frank W. Wills, architect:—

| | |
|---|---|
| A. J. Beaven,* Bristol ..... | £17,480 0 0 |

* Accepted, but reduced to 15,710*l.*; the lowest but one of nineteen Tenders received.

For alterations to 19, Pelham-street, Nottingham, for Mr. A. Stedall. Mr. George Edwards, architect :-

| | |
|---|---|
| Morrison | £1,120 0 0 |
| Hind | 917 0 0 |
| Woolsend | 850 0 0 |
| Martin, Wells, & Co. | 790 0 0 |
| Bell & Son | 752 0 0 |
| Stimpson & Co. | 713 0 0 |
| Scharten & Williams (accepted) | 694 0 0 |
| Vickers (exclusive of desk and railings) | 690 0 0 |

For cold water tanks, at the New Wandsworth and Clapham Workhouse. Mr. Thos. W. Aldwinckle, architect, East India-avenue, E.C. :-

| | |
|---|---|
| Thames Bank Iron Company | £987 10 0 |
| Z. D. Berry & Sons | 850 0 0 |
| Appleby | 810 0 0 |

Accepted for erecting six cottages, and workshop in rear, situate in Grove street, Deptford, for Mr. Frank Barnes, Mr. Henry Roberts, architect and surveyor :-

Hubble & Trott, Deptford.

| | |
|---|---|
| Cottages | £1,195 0 0 |
| Workshop | 87 0 0 |

[Except bricks.

For the erection of cemetery chapel, for the Corporation of St Alban's :-

| | |
|---|---|
| F. W. Austen, St. Alban's | £855 0 0 |
| W. Sparrow, Kettering | 818 10 0 |
| C. Chamberlain, St. Alban's | 815 0 0 |
| Marcus Holland, St. Alban's | 813 0 0 |
| J. & W. Savage, St. Alban's | 809 11 0 |
| W. C. Haselgrove, Luton and St. Alban's (accepted) | 799 0 0 |

For alterations at the White Bear public-house, Kennington, for Mr. S. Bannell. Mr. H. I. Newton, architect, 17, Queen Anne's-gate :-

| | |
|---|---|
| Burman & Son | £783 0 0 |

*Pewterers' Work.*

| | |
|---|---|
| Matthews | 99 0 0 |

For alterations at the Windsor Castle public-house, Victoria, S.W., for Mr. S. Raven. Mr. H. I. Newton, architect, 17, Queen Anne's-gate :-

| | |
|---|---|
| Shurmur | £1,170 0 0 |
| Cook | 1,047 0 0 |
| Godden | 975 0 0 |
| Lamble | 887 0 0 |
| Royal | 869 0 0 |
| Steel Bros. (accepted) | 849 0 0 |

*Pewterers' Work.*

| | |
|---|---|
| Warne | £61 10 0 |
| Hellings | 42 12 6 |
| Heath (accepted) | 41 0 0 |

*Gasfittings.*

| | |
|---|---|
| Winn (accepted) | 180 0 0 |

For alterations and repairs to 76, Brecknock-road. Mr. E. Hide, architect, 121, Bishopsgate-street :-

| | |
|---|---|
| Ward & Lamble | £230 0 0 |

[No competition.]

For new house, cottage, meter-house, &c., for the Newmarket Gaslight and Coke Company, Limited. Mr. John Fintman, Newmarket, architect :-

| | |
|---|---|
| Linyell Bros., Newmarket | £1,997 0 0 |
| Smith, Newmarket | 1,985 0 0 |
| Hook & Tebbit, Soham | 1,928 0 0 |
| Kerridge & Shaw, Cambridge | 1,921 0 0 |
| Rednall, Bury St. Edmunds | 1,817 0 0 |
| Simpson & Son, Newmarket | 1,814 0 0 |
| Cowell, Soham | 1,799 0 0 |
| Saint & Sons, St. Ives (accepted) | 1,653 0 0 |
| Mills, Cambridge | 1,537 0 0 |

For new water-closets and drainage, for the Harrow School Board. Messrs. Ernest George & Peto, architects :-

| | |
|---|---|
| A. Webb | £347 10 0 |
| Kindell | 345 0 0 |
| Batchelor (accepted) | 340 0 0 |
| W. Bindon | 329 6 0 |

For the erection of malting cellars, at Watford, for Messrs. Benskin & Co. Mr Arthur Kinder, architect, 11, Queen Victoria-street. Quantities by Mr. Howard, Martin's-lane, Cannon-street :-

| | |
|---|---|
| Andrews & Son | £5,998 0 0 |
| Greenwood | 4,869 0 0 |
| Neal | 4,857 0 0 |
| Turner | 4,694 0 0 |
| Pratt | 4,258 0 0 |
| Waterman (accepted) | 4,217 0 0 |
| Hailey | 3,930 0 0 |

For the erection of two pairs of semi-detached villas, on the Craven Park Estate, Harlesden, for Mr. W. Hyde. Mr. T. P. Shaw, architect, Harlesden. Quantities prepared by the architect :-

| | |
|---|---|
| Beech | £3,422 0 0 |
| Martin | 3,400 0 0 |
| Turner Bros. | 3,200 0 0 |
| Holt | 3,200 0 0 |
| Parfitt | 3,074 0 0 |
| Page | 3,050 0 0 |
| White | 2,872 0 0 |
| Spicer | 2,842 0 0 |
| Ridout | 2,790 0 0 |
| Dennett & Foote | 2,620 0 0 |
| Egan | 2,571 0 0 |

For building new parish room in connexion with All Saints' Church, Clifton, Bristol. Mr. E. H. Edwards, architect :-

| | |
|---|---|
| Bastow | £2,703 0 0 |
| R. J. Crocker | 2,569 0 0 |
| A. J. Beaven (accepted) | 2,428 0 0 |

For building new choir schools, in connexion with All Saints' Church, Clifton, Bristol. Mr. E. H. Edwards, architect :-

| | |
|---|---|
| Bastow | £1,599 0 0 |
| Crocker | 1,582 0 0 |
| Belmont | 1,494 0 0 |
| Cowlin & Son | 1,479 0 0 |
| A. J. Beaven * | 1,450 0 0 |
| W. G. Summons | 1,423 0 0 |

* Accepted, but reduced.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

W. A. C. (parcel received).—H. P.—W. W. L.—W. W. N.—J. T. C.—W. H. B. & Co.—R. P. (we will make a point of looking into the matter, but can do nothing this week).—C. F. A. Y.—F. F.—R. W. R.—G. and S.—W. S.—H. G. (it is a matter of supply and demand, and will take care of itself).

All communications respecting literary and art matters should be addressed to THE EDITOR. All advertisements relating to advertisements and other business matters should be addressed to THE PUBLISHER, and not to the Editor.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere newsitems) which have been duplicated for other journals, are NOT DESIRED.

## PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVI. (January to June, 1884) will be given as a Supplement with our next Number.

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum. PREPAID TO countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

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PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

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Box Ground, Combe Down,
Corsham Down,
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BANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

**Box Ground Stone**
Is the Best for Use in all Exposed Positions, being a well-known and tried Weather Stone.
50,000 feet cube in stock.
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[ADVT.

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**Doulting Free Stone** For prices, &c., address S. & J. STAPLE,
HAM HILL STONE, Quarry Owners, Stone
BLUE LIAS LIME and Lime Merchants,
Stoke-under-Ham,
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# The Builder.

VOL. XLVII. No. 2162 SATURDAY, JULY 12, 1884.


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### *Old Halls in Lancashire and Cheshire.**

THE work brought out under this title by Mr. Henry Taylor, whose "Notes on Sketching Tours" we formerly had occasion to notice favourably, is one of those that is, or should be, as interesting to the generally cultivated reader as to the architect. The general reader, especially if he be of an antiquarian turn of mind (a supposition which perhaps takes him out of the "general" catalogue), cannot fail to find interest in the history and illustration of so many old family houses, connected in some cases with names that have been eminent in English domestic history, and perhaps in public history also. The architect finds here interesting examples of effective and picturesque planning, and still more interesting suggestions in architectural grouping and effect; suggestions which are capable of adaptation and modification in styles of building and with materials widely different from those which are here illustrated.

To have illustrated every old hall of the kind in the two counties named would have been, we can well believe, a too onerous task for any one who had not his whole time to give to it. The author tells us that he has therefore selected for description a limited number of interesting or typical examples, and endeavoured to trace the architectural history of the several buildings in such a manner as to illustrate as much as possible the development of English domestic architecture in general. This latter aim is, perhaps, hardly carried out, and hardly could be in the course of separate and rather brief notes in reference to a number of structures possessing many leading traits in common; but some degree of generalisation is effected in regard to a portion, at least, of the subject.

Mr. Taylor commences, for instance, by giving some block plans of what he recognises as the leading types of plan in the houses of which he is speaking. Six types are thus distinguished, of which, however, one or two seem little more than variations resulting from economy. The tendency of the buildings to form some portion of the sides of a quadrangle is obvious in nearly all of them. In the earliest and simplest type given, where parlour and kitchen departments form the two wings, connected by the hall as an intermediate "curtain," we have what seems the embryo suggestion of the quadrangle plan, the two wings just sprouting into arms which, if extended, would make the second and third sides of the "quad." Then we have the three-sided quadrangle, with open space on the fourth side; the two-sided, in the shape of the letter L, sometimes the result of the pulling down of a formerly existing third side; and we have the complete quadrangle, that picturesque, comfortable, but (on a small scale) distinctly unhealthy form of planning, forming in hot weather a central reservoir for the air to stagnate in. The dates of these buildings are mostly between the Late Gothic and the Jacobean period; a few remnants going as far back as the fourteenth century. The other generalisation which the author gives us is in regard to the sites of these old dwelling-houses; and here he touches upon a point which is the more interesting because it is commonly overlooked. Although we have descended, in our present study, below the age when the castle dominated everything, we are still in times very turbulent and deficient in police as compared with our own, and the houses of the period are built not without regard to the defensibility of the site; indeed Mr. Taylor suggests that this was a matter much more thought of, and more carefully looked to, than any consideration of picturesque effect, and there is no doubt that in this respect he is right. The idea of placing a house picturesquely is probably an essentially modern one; the ruling motives in the fifteenth and sixteenth centuries would be much more convenience of water-supply and security from attack except with considerable advantage of position to those attacked. The author divides the sites, as regarded in this light, into those naturally defensive, such as those on the brow of a hill or within the sharp bend of a river; those which are naturally defensive but improved by art; and those which are made defensive by art alone, such as moated houses on flat sites. The latter are, however, the most numerous class; the sites which required isolating by a moat and drawbridge being, probably, the most convenient of access for friends, and the moat offering a sufficient stumbling-block to foes. The author also draws attention to the "folds," which word represents, in the districts of which he is writing, a small collection of farmhouses, grouped together in a quadrangle for mutual defence and security; the doors of separate tenements all opening inwards on to the quadrangle, which thus displayed only one vulnerable point at the general entrance. This defensive element in the arrangement of ancient homesteads, whether manor-houses or farms, is overlooked by many, but it is an interesting item in the study of old English domestic architecture.

The real interest of these old English houses to the architect, however, lies in their picturesque treatment and arrangement, and the numerous suggestions which they offer to the designer. A large number of the buildings given here belong wholly or partially to that half-timber manner of building which offers so much natural opportunity for varied and effective arrangement of materials; but there are others which, without this extra source of effectiveness, present nearly as varied and effective a treatment with a more solid method of building. In order to give as complete an illustration as possible of the whole disposition of these buildings, they are mostly shown in bird's-eye views. On any other scheme a considerably increased number of drawings would have been requisite to show the whole building, and the expense of production, as well as the bulk of the book, materially increased. The object has been, in fact, not to make pictures in the first instance, but to convey a correct idea at a glance of the disposition and arrangement of the buildings, for which the only expedient is a bird's-eye view.

Among the more solidly built of the examples which are thus exhibited to the reader, in which the half timber method is not used, one of the most interesting and characteristic is Hoghton Tower, as the author describes it, "a picturesque, sturdy-looking pile of buildings, situated on the summit of a lofty eminence, midway between Preston and Blackburn, which is a conspicuous object in the landscape for many miles around," and appearing, on closer inspection, "more like a village than a private residence." On three sides the ground slopes away rapidly, on one side being precipitous; on the fourth side, where the ground is more level, the whole is defended by a battlemented gatehouse and angle-towers, the fenestration of which, by the way, is much more symmetrical than is often found in such buildings. The gatehouse gives access to a large court, flanked by buildings for stabling, kitchens, and retainers, and on the further side is the entrance to the mansion proper, up a flight of semicircular steps and through a gate flanked by massive piers with the favourite stone ball decoration at the top, leading to a

* Old Halls in Lancashire and Cheshire; including rider on the ancient domestic architecture of the Counties Palatine. With numerous illustrations. By Henry Taylor, Architect. Manchester: J. E. Cornish, 1884.

second enclosure, and along a kind of causeway and up a further flight of steps to the actual house, which again forms a quadrangle enclosing a square court. In the angle is the chapel (or the remains of it), which in the desire for correct and honest ornamentation was canted somewhat askew from the main lines of the building. The further side of the quadrangle included "King James's rooms," where James I. stayed in 1617 with Sir Richard de Hoghton, and had a fine time of it in hunting and feasting. In the arrangement of this fine and interesting old house we seem to see, in a more quiet and picturesque form, and with less gloomy expression, the same idea which presents itself to the great French châteaux; the defensive part of the house without, in the shape of massive towers, and the real habitation within the lines of these defences. Enough is shown of the inner or house court in the view, though on a small scale, to let us see that this is one of those examples of picturesque expression, in the grouping of windows and other features, which renders these old English houses such a series of studies for the architect.

This quality of effective and expressive grouping, in fact, is that which always interests us most in this class of buildings. It is difficult to say how far this kind of effect was really intentional on the part of the builders, how far it was merely the result of a *naïve* and unpretending way of building. The plans of the large dining-halls, for instance, are charming examples of effective planning of rooms, with their large bays added often transept-wise, showing how directly social distinctions and the desire to seclude one portion of the party a little from the other, found their direct and natural expression in the architecture. The bays, Mr. Taylor says, were partly used for the effective display of plate, partly also, he thinks, and we should be disposed to think so too, as places of collection for the ladies, a little apart from the more mixed company that would often have filled the hall. In some cases all the window treatment, if one may use the expression, seems concentrated on these bays, the rest of the hall having smaller windows at some distance from the floor, the bay alone having a large extent of window brought nearly to the floor, sometimes being almost entirely one great window. The height of the windows from the floor, in many of the principal rooms, is a point of difference between ancient and modern house building to be remarked; in these days of low windows it is difficult to realise the difference of living in a house where one could not see through the windows without climbing on a chair; but blinds were not in use then, and high windows were desired for privacy. Mr. Taylor finds in the high windows another advantage, that the effect of the interior lighting is better; the shadows fall in a natural manner, instead of being cast upwards from below. How many people in the present day would give up the opportunity of looking through the window for the sake of getting the light to fall rightly in the interior, we cannot say; we are not among those enthusiasts for true and logical chiaroscuro. But the plans of the large dining-halls, of which several are grouped together on one plate, are delightful; with their great ingle-nooks, large bays added in different ways and at different parts of the room as fancy dictated, and the elaborate carved screens which in many of them separated the hall from the entrance passage, they represent the poetry of room-planning.

The hall was the great feature of the interior; but everywhere throughout the exterior of the houses shown in this volume, as well as in others of a similar class and date, we are struck with the prevalence of that feeling for accentuation, whether conscious or unconscious, which makes the great distinction between old and modern house-building, with the exception of recent special efforts in that direction. Of late some people have learned the lesson and repeated it by rote, probably in a far more conscious spirit than it was done by our forefathers; but even this intentional and antiquarian expression is not very often to be found in modern country houses or "halls." The note of modern house-building is staid respectability, an absence of expression; one window like another, or one row of windows, at least, like another; nothing to fix the eye on this or that point, or to indicate that the builder or architect took a pleasure in concentrating architectural treatment on any special feature. Now the reverse of this is what especially strikes one in turning over the pages of a book of illustrations of old houses like the one before us. Everywhere we find incident in the buildings, a grouping of the features, a marking out of some points by a special treatment. More especially is this shown in the arrangement of the windows, the eyes of a house, on which so much of its expression depends. So also in regard to the use of half-timber work, which a little while since, at least, was regarded as in itself, and in any form, a receipt for the picturesque. But it is not used in this blind haphazard way in the old buildings. It is either the method employed for the whole building, and treated with great breadth of effect; or it is concentrated where it has special convenience or meaning, constructively or architecturally. Thus, in Agecroft Hall, the whole building is half-timbered, but in a plain and utilitarian manner on the exterior, with the chimney piers alone built solid and running up unbroken through this mass of post and pan work, like the main supporting skeleton of the building. On the inner side, next the quadrangle, the character of the half-timber work is altered, and becomes more ornate. In Ordsall Hall, on the same page, the varied arrangement of bays and projections is charming, and completely expresses the difference between the show portion and the working portion of the interior. In Royle Hall and Gawthorpe Hall we are almost as much pleased by the simplicity of the architectural treatment, the windows put just where they are wanted, without pretence of systematic arrangement. In "The Lodge, Royle," we see the mullioned windows carried into the horizontal bands right round the three sides of a square projection; and in Belfield Hall the arrangement of the mullioned windows in long groups gives a special and most charming expression to a building which is constructed architecturally out of the simplest materials.

Among other interesting points in the book may be specially named the representations of the remarkably sumptuous wood-work in Rufford Old Hall, and the geometrical drawings of the timber framing (plate xxx.) in Smithells, Baguley, and Garret Halls. This should have a scale, by the way. The author draws attention to the great size of the oak pieces used at Baguley; "it will be seen that the head of the east doorway is cut out of a piece of oak nearly 3 ft. wide, the main upright posts out of timber 2 ft. 6 in. wide." It is not "seen," because there is neither scale nor figured measurement, though we take the author's word for it. He remarks that this building "affords a proof of the great durability of oak, for the timbers here are in splendid condition." Speke Hall, one of the finest and most sumptuous of the Lancashire halls, is inadequately illustrated by a very small bird's-eye view; it would have been worth while to have given more space to it. However, we may thank Mr. Taylor for a charming and very valuable book, and may conclude by giving further publicity to one recommendation in it, namely, that local antiquaries might do great service if they would follow the example of Mr. G. H. Rowbotham, who has kept for some years an album for the collection of engravings, sketches, and documentary evidence of every kind relating to Ordsall Hall, in his neighbourhood. Similar collections in regard to other such old houses would have great and increasing value, as the progress of time and decay bring about inevitable alterations and repairs.

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**Kilburn.**—Mr. J. Avery's tender for the ornamental wrought-iron grilles, gilt and completed, for the Church of St. Augustine, Kilburn, according to the designs of Mr. J. L. Pearson, R.A., has been accepted, at the sum of 325*l.*

## THE SANITATION OF TOWNS AND DWELLINGS.

AN ably composed manual* on the elementary principles of sanitation as applicable to towns and dwellings has been recently issued by the publisher, Baudry, of Paris, compiled by M. A. Wazon, who takes for his motto the aphorism of Pasteur,—"It is within the power of man to extirpate diseases of parasitic origin." The work is divided into six parts, and treats of water supply and distribution; surface drainage; public ways; sewers, and the utilisation of sewage. In the words of the author, "Taking pure water from its different sources of supply we distribute it in the various parts of a dwelling, then following this water when fouled by domestic use we discharge it upon the public way, where it is joined by the foul water from surface drainage; we follow this admixture of polluted water into the network of the public sewers; we carry the sewage to the places where it is utilised and purified; and, finally, after undergoing process of purification, we restore the water to the river in a condition of purity closely approaching that which it possessed primarily, applying thus continually the cardinal principle of constant circulation."

The first portion of the work is devoted to a consideration of the water supply of towns and dwellings in which the principles which should guide the arrangements of this most important branch of sanitation are set out with great perspicuity, with references to the best authorities, English and foreign. It is a satisfaction to find that among these authorities, English and American authors are those most frequently cited. The injurious effects upon health through the contamination of water by public cemeteries are pointed out, and the evils resulting from the use of water from shallow wells, and the storage of water in cisterns, are clearly demonstrated. Artesian wells, as a source of supply, are held to be unsuitable for towns on account of their cost and the fluctuations in the yield, temperature, and composition of the water furnished from these wells which renders it unfit for general use. A constant supply of water from fully-charged mains is considered by most authorities as the only provision suitable for large towns. As regards the minimum quantity of water necessary for health our author fixes the amount at 180 gallons a head a day, which is considerably in excess of what has been hitherto considered to be requisite. The total quantity of water from all sources available for Paris is stated to be about 100 millions of gallons per diem. In 1876 the population of Paris was about 1,988,000 inhabitants; in 1881 it was 2,240,000, or nearly 2¼ millions, showing an increase of 232,000 in five years, and if this increase should continue in the same ratio, it is probable that in 1886 the population will be about 2½ millions, and unless the present water supply is increased, there will be then only 40 gallons of water per head. Marseilles appears to enjoy an abundant water supply, the provision being equal to 180 gallons per head a day. The London water supply is at the rate of about 33 gallons per head a day. About 110 millions of gallons are daily pumped into London, but of this amount it is probable only about one half is consumed, the rest being wasted.

The total quantity of water obtainable in the case of a state of siege in Paris is stated to be 90 gallons per head a day, from which it would appear that Paris, in the time of war, is nearly three times better off as regards water supply than London in a state of peace. In New York it is proposed to construct an aquaduct for the purpose of bringing the Croton water to the city, at a cost of 3 millions sterling. This work, when completed, will, it is estimated, give a daily supply of 180 gallons a head.

The present water supply of Paris is condemned by the author as inadequate. The

* Principes techniques d'Assainissement des Villes et Habitations suivis en Angleterre, France, États-Unis, et présentés sous forme d'Études sur l'Assainissement de Paris, par A. Wazon, Ingenieur-civil. Paris: Baudry, editeur. 1884. 8vo., pp. 364.

use of lead for pipes and linings to cisterns is inhibited, and even when lined with zinc lead pipes are considered by him to be open to objection, and iron pipes lined with some material which will resist the action of salts in water are preferred. Coal tar is recommended by the American engineer, Ripley Nichols, for coating the inside of pipes, but the most perfect results are obtained by the Barff process. As regards filtration, the employment of animal or vegetable charcoal as a filtering medium is now generally discarded on account of its liability to develope animal germs, and spongy iron or carferal are considered to be the only effectual means of filtration. One of the defects of spongy iron as a filtering medium, namely, that it produces filtered water containing particles of iron in suspension or solution is pointed out, but this defect can, it appears, be remedied by passing the water after filtration through a layer of powdered gypsum. Carferal is said to be composed of aluminia, iron, and carbon, and to form a very efficient filtering medium; the composition, however, is a secret, and being also very costly, it is not likely to be generally adopted. It is stated to be largely adopted in the construction of filters for the English navy. The *filtre rapide* of M. Maignen, which is on view at the Health Exhibition, is praised for its simplicity, but upon all points a filter invented by the French engineer Chanoit is preferred by our author.

The pollution of water by water-closets is alluded to, and the necessity of the entire separation of the water required for culinary purposes from that required for flushing is strongly insisted upon, and the various inventions for effecting this separation, and preventing waste, are described and illustrated, the English methods occupying a prominent place. The author is of opinion that the 2-gallon flush, which is required by the Paris regulations, is insufficient, basing his opinion upon the experiments made by Mr. Hellyer, who considers that a minimum flush of 3 gallons is necessary to effectually cleanse the traps. It is strange to find that, while we are grumbling at our system of rating for water supply, the author prefers the English plan of charging for water according to the ratable value of a dwelling, and gives an illustration to show that the price of water is greater in Paris than in London.

Turning to the essay on the removal of refuse, it appears that before the siege of Paris in 1870 household refuse was permitted to be placed upon the side walks from seven in the evening until seven in the morning, and the result was that the atmosphere was tainted with pestilential emanations. Since 1870 household refuse is not allowed to be placed upon the public way, but must be carried to the dust-carts which pass between five o'clock and seven o'clock in the morning. The author considers that the system at present adopted in Paris is inefficient from a sanitary point of view, and recommends that every house should be provided with a dust-shoot fixed on the outside, and delivering into a receptacle, which should be emptied every morning by the *employés* of the municipality.

The use of valves for water-closets of all kinds is strongly condemned. With regard to syphons, all syphons with valves or balls, whether filled with water or mercury, are stigmatised as dangerous, Renk's syphon and Pettenkofer's syphon being denounced by name. Mr. Hellyer is praised for his investigations with reference to what for want of a better name has been called syphonage; but to the American engineer, E. S. Philbrick, the author gives the credit of having been the first to point out the importance of ventilating syphon-traps. The water-closets in use in Paris are declared to be greatly inferior to those in use in England and the United States. The principle of the English pan-closet which, until recently, was preferred on account of its simplicity, and cheapness is examined by our author, and the construction of these closets as well as of the "wash-out" closets (which are much used in America), is pronounced to be unsatisfactory. The hopper closet of Jennings and Rhoad, and the Carmichael closet, the Vortex closet, and the Artisan's closet, all of which are British or American manufacture, are mentioned with approval.

The provision of cesspools to dwellings, which was made obligatory in Paris by a decree of Parliament under date of the 13th of September, 1533, and confirmed by an edict of Francis I., dated 1539, was an immense step in advance, and was destined to put an end to the deplorable condition of the streets, which were encumbered with all kinds of filth. But the improvement was slow, in spite of the severe punishment inflicted upon delinquents. Up to the year 1668 these cesspools were frequently only holes dug in the ground, and the liquid portions of their contents filtered through the adjacent ground and poisoned the wells, as may be observed to the present day in the streets near the Hôtel de Ville, where the well-water has a perceptible odour of sewage which has percolated from old porous cesspools. This state of things continued until the year 1809, when an Imperial decree was promulgated regulating the construction of these important sanitary accessions. Notwithstanding the improvements that have been recently effected in regard to cesspools, the author agrees with Professor Vallin that they should be entirely abolished. In the year 1881 the Commissioners for the Sanitation of Paris proposed as a temporary measure the use of metallic cesspools containing from 60 ft. to 200 ft. cube to be emptied by the pressure of the air. These cesspools would require emptying once a week, and the cost of this work, at the rate of 8 francs per cube mètre, as estimated by the author, would amount to the enormous sum of 200 millions of francs, or eight millions sterling per annum. This amount is irrespective of the cost of providing and fixing the temporary cesspools, which is calculated to amount to nearly fifteen millions sterling, and this for a mere temporary expedient. The total expenditure of the Metropolitan Board of Works for main drainage works up to the end of the year 1883 is under six millions sterling.

The different systems that have been proposed from time to time for disposal of the sewage of Paris are analysed, and illustrations are given of the apparatus to be employed, but the conclusion arrived at is that the water-carriage or English system is upon the whole to be preferred for populous towns, and it is pointed out that in nearly every instance the dissemination of zymotic disease which has occasionally occurred under this system has been traced to defects in matters of detail, which do not affect the integrity of the principle adopted.

The old streets of Paris were unpaved, and it was not until the time of Philip Augustus that the paving of the principal streets was commenced. Before this time the public way was covered with a thick layer of mud, traces of which are sometimes found in carrying out sewer works. Belgrand, the engineer, constructed a map of these layers of mud, which were in places several yards thick, and the old streets are easily distinguished from the modern streets by the depth of their strata. The condition of the streets, even when paved, was not much improved. The gutter was in the middle of the street, and one wheel of the carriages was always kept in this gutter, spattering the roadway with mud and moisture. The interstices of the paving allowed the filth of the streets to pass through, which infiltrated the soil and penetrated under the houses. About the year 1830 the substitution of a convex surface for the pavement of streets led to a great improvement in the condition of the public ways in Paris, which are now watered twice daily, the paving is fairly maintained, and the mud penetrates less readily into the soil.

The first materials employed for paving the streets were cubes of stone, at first of large size, and then gradually reduced; this system was succeeded by that of Macadam, which is now discarded in favour of paving of wood and asphalte. Wood paving has the advantage of being almost noiseless, but it is costly to maintain, porous and unhealthy, especially in dark and narrow streets, where the wood decays rapidly. It is related, on the authority of Douglas Galton, that the wood paving in Regent-street, London, was obliged to be removed on account of the ammoniacal exhalations with which it was impregnated, which tarnished the plate in the jewellers' windows; a statement which was alluded to some time since in our columns and which we have no doubt is correct. After passing in review the different systems of paving at present in use, the author declares himself in favour of cement and asphalte, although he acknowledges that these materials are costly and require frequent repairs.

As regards surface drainage the good effects produced by the drying of the soil is recognised, and the testimony of Dr. Buchanan is cited, who has shown that the mortality from phthisis has diminished in some instances, nearly one-half in some English cities since the execution of drainage works; at Banbury 41 per cent., at Rugby 43 per cent., at Ely 47 per cent., and at Salisbury 49 per cent. The same causes have led to a considerable diminution in the death-rate in the United States, notably in the city of Philadelphia.

Among the improvements, which in the opinion of the author are desirable in the public ways, is the provision of public water-closets, which he considers should be gratuitous, and might be placed under the superintendence of the officers of the public hospitals, a box being placed for voluntary contributions.

Some interesting details are given with regard to the removal of household and street refuse in Paris. The total quantity of this refuse amounts, it appears, to 2,000 cubic mètres, or about 54,000 feet cube daily, and its removal is effected by 600 carts. A rate is levied upon all buildings abutting upon the public way for the expense of cleansing and removing the street refuse, according to the extent of the frontage, the amount of the rate, varying from about 1d. to 7d. per lineal yard. In 1880 this rate produced 104,000*l.*; the cost of cleansing, &c., amounted to 212,000*l.*, leaving a deficiency of 108,000*l.*; which, we presume, is made good out of the metropolitan budget.

The river Seine, the Bièvre, and the rivulet of Ménilmontant, were from the earliest times the natural means of drainage of Paris, and it was towards these three streams that the ancient inhabitants directed the rain-water and household refuse water by means of ditches formed across the garden ground with which the city was surrounded. Later on the moats of the fortifications erected by Philip Augustus and Charles VI. received a portion of the surface drainage. These ditches were open, and as the city increased in size became offensive and injurious to health. About the year 1374 Hugues Aubriot, mayor (*prévôt des marchands*), constructed the first sewer, properly so-called, by covering in the ditch which conveyed the drainage from Montmartre into the brook of Ménilmontant, already polluted from changes near its source. This sewer, which was called the great circular sewer, was reconstructed by Turgot, the then mayor, in 1740. Under the First Empire the improvement of the sewers was looked upon as the necessary corollary of the introduction of the water of the Ourcq into Paris, which was intended by the engineer Girard for the purpose of flushing the sewers, the total length of which, in 1806, was only about 23,000 yards. In consequence of the increase in the volume of water supplied to the city, the Ménilmontant sewer, which was only about 10 ft. wide, was soon found to be insufficient; and when, in the year 1830, the city engineers were desirous of further developing the system of sewerage, they laid the inclination of their new sewers, not towards the Ménilmontant sewers, but towards the Seine. The result of this step was to re-establish the inconveniences which former generations had sought to remedy; and it was not until 1856, when the engineer Belgrand was appointed, that he succeeded in organising a complete system of common sewers and intercepting sewers, which is now partly finished.

By a decree of the Council of State, dated the 22nd of January, 1784, no communication was permitted between dwelling-houses and the public sewers, and an order of the king,

dated the 30th of September, 1814, confirmed this decree, with this exception, that buildings which were too low to deliver their waste water into the kennel, were allowed to deliver it into the sewers. This permission, however, was only of a temporary character, and was limited to certain old houses which could not be rebuilt without stopping up all communication with the sewers.

At the present time every house in Paris is obliged to deliver the rain-water and household waste into the sewers. The municipality thus admits the necessity that every street should be provided with a sewer of sufficient dimensions : a street less than 60 ft. wide must have one sewer, and a street more than 60 ft. wide two sewers, one upon each side of the street. An interesting description of the system of sewerage adopted in Paris is given, and the various methods suggested for cleansing and ventilating sewers are discussed at length, and with signal ability, the systems of ventilation applied to the towns of Eastbourne and Gloucester being selected for approval. The ventilation of the Frankfort sewers is also referred to,—which work was carried out by the English engineers, Messrs. Gordon & Lindley,—and was declared by Sir Robert Rawlinson to be superior to any sewerage works, public or private, in England or elsewhere.

Touching the purification of sewage, the opinion of De Freycinet is quoted, that hitherto all attempts to purify sewage by merely chemical means have been unsuccessful. In Belgium the same conclusion has been arrived at, and in France the partial success of the schemes in operation at Clichy and Gennevilliers do not affect the general principle. The results of the experiments at Rheims are, it would appear, even less favourable than those obtained at Paris. The number of patents for purifying sewage taken out in England between the years 1856 and 1876 was 421. The whole of these processes, which are more or less complex, may act as clarifiers, but they have a very limited effect upon soluble matters.

After passing in review the various processes suggested for purifying sewage, the author concludes that the principle of downward intermittent filtration possesses the marvellous property of completely purifying sewage, but that, as is admitted by the inventor of the system, it is a costly process, and offers no possibility of recoupment.

## NOTES.

THE current number of the *Archæologische Zeitung* contains an interesting discussion on the metopes of the east end of the Parthenon. The sculptures still remain *in situ*, but so severely injured by time and weather that their individual explanation has been regarded as a well-nigh hopeless problem. It is, however, generally accepted that the series represented a giganto-machia, and since the discovery of the Pergamene giganto-machia frieze every monument embodying that myth has been studied with redoubled interest. Dr. Robert now brings together all the available material,—the drawings made by Stuart, those published by Labouche and Michaelis, and the descriptions and notices of Leake, Stephani, Cockerell, and others ; to these he adds a consideration of the general typography of the myth on black and red figured vase paintings, and relying on these data he explains the fourteen metopes as follows :—I. Hermes ; II. Dionysos ; III. Ares ; IV. Hera ; V. Chariot of Zeus, with Nike or Iris ; VI. Zeus ; VII. Chariot of Athene, with Aglauros ; VIII. Athene ; IX. Herakles ; X. Chariot of Herakles, with Iolaus ; XI. Apollo ; XII. Artemis ; XIII. Poseidon ; XIV. Chariot of Poseidon, with Aphrodite. This arrangement has the advantage that it places in a central, conspicuous position Zeus, Athene, and Herakles, always in the giganto-machia the three most distinguished combatants, while the remaining gods and goddesses fall into natural pairs on either side. The arrangement is ingenious, and shows how much can be done with scanty material. But, surely mutilated though they are, these metopes deserve to be carefully cast before time and weather entirely complete their ravages.

THE Prussian Imperial Archæological Institute has in hand no less than five serial publications which are of the highest importance to archæologists and artists. 1. A continuation of the great work of E. Gerhard on Etruscan mirrors. Since Gerhard's day much new material has been added and some new light thrown on these somewhat mysterious Greco-Etruscan designs. The first issue of this continuation has appeared. It is edited by Klügmann and Körte. 2. A collection of antique terra-cottas, intended, so far as possible, to be a complete series. The second volume of this publication will shortly appear. The whole is under the management of Otto and Kekulé. 3. The collection of Roman sarcophagi, arranged by Robert, of which a few specimen-plates are prepared and will be shortly published. 4. A continuation of the series of Etruscan ash chests by Korte. 5. A continuation of the collection of Greek grave reliefs, the Attic part of which is just about to be published by the Academy at Vienna. It will be seen that all these publications have one common aim, *i.e.* to bring together material. This material is at present scattered far and wide, often only accessible to a few, and that by an almost impossible expenditure of time and money. When these five publications are completed we may hope for a flood of light on difficult questions connected both with mythography and the chronology of art. Only by juxtaposition can come comparison ; only by the comparative method comes secure elucidation.

THE absorption of the two small gas companies, called the Woolwich Consumers' and the Woolwich Equitable, by the South Metropolitan Company, is a step that appears to be in the interest of all concerned, and primarily in that of the public. The total capital raised by the two small companies (according to Mr. Field's Analysis) consists of 67,814*l.* for the first, and 22,500*l.* for the second : items that form but a small proportion of the South Metropolitan raised capital of 2,211,510*l.* The character of the gas manufacture, and especially the mode in which, owing to its extreme lightness, the manufactured product is conveyed from the works, are such as to render concentration of work a source of greater economy in gas, than in perhaps any other industry. Thus the working expenses of the two small companies for last year came respectively to 15·70d. and 19·95d. per 1,000 cubic feet of gas sold, while those of the South Metropolitan Company were 13·83d. Thus the reduction of 2d. per 1,000 in the price of gas may at once be secured to the customers, to say nothing of the advantage of the further extension of the sliding scale. The account given of the terms of amalgamation, indeed, speaks of a reduction from 3s. to 2s. 8d. per 1,000, as well as of a rise in illuminating power ; but the charge of the South Metropolitan for 1883 was at the rate of 2s. 10d. per 1,000. For the net cost of coal and all expenses, last year, the small companies paid 21·63d. and 23·47d. respectively, and the South Metropolitan 18·20d. per 1,000 cubic feet sold. It is only by grasping facts of this nature that the question whether concentration is advantageous, or the reverse, can be really decided.

THE Turks, we have been recently told, concern themselves with the present only, the future is in the hands of Allah, the past is unprofitable. With such a creed it is much if they do not destroy any such relics of this unprofitable past as they possess. It is much more that they have allowed an unbeliever to classify and catalogue the antiquities now exhibited in the Tchinli-Kiosk. This work was undertaken by M. Salomon Reinach, a member of the French School at Athens. It gives a somewhat hasty but most valuable description of the treasures of this museum. He found the monuments heaped together in the utmost disorder, and with unhappily no clue to their identity excepting occasional loose labels. The catalogue was completed in 1882. It is now being followed up by publications from photographs of certain selected monuments of particular interest. Three appeared in the May-June issue of the French "Bulletin" with explanatory text by M. Henzey. 1. A very remarkable archaic head which M. Henzey attributes to Rhodes, and to which he devotes a searching analysis. 2. A beautiful stele from Macedonia, representing the nude figure of a young warrior with helmet, spear, and shield,—a work probably of the early part of the fourth or latter half of the fifth century B.C. 3. A large bronze Hercules, standing with the club over the right shoulder, the lion's skin over the left arm, and some uncertain object in the left hand. This bronze is remarkable for its size and the novelty of its motive, but is somewhat dry in execution.

SIR CHARLES DILKE is reported to have said in the House of Commons last week (the 4th) that property was assessed much higher in London than in other towns. What is the fact? Taking the only towns with which any comparison can be instituted, viz., those of upwards of 200,000 inhabitants each (the whole of which, taken together, make up only about half the population of London) we have the following comparison. In London the ratable value is 82·5 per cent. of the gross rental ; in Liverpool it is 90 per cent. ; in Manchester and Salford, 84·7 per cent. ; in Leeds, 83·4 per cent. ; in Birmingham, 83·6 per cent. ; in Bradford, 83·7 per cent. ; and in Sheffield (alone lower or so low as in London) 75·9 per cent. For all England the ratable value is 82 per cent. of the gross rental. These facts are as important to the Londoners with regard to their present proportional rating, as they are with reference to the health of the metropolis. It should be considered indispensable to ascertain the actual facts of a case before setting to work (in the absence of such knowledge) to improve it.

THE first meeting of the Société des Amis des Monuments Parisiens, after that which was held for the purpose of organisation, took place on the 29th of June, and was occupied by the reading of a paper by M. Maurice du Seigneur, relating to some sculptured stones, work of the last century, to which M. Ch. Lucas had drawn attention, and which must have formed part either of one of the three former *frontons* of the Panthéon (before those by David d'Angers), or of the bas-reliefs formerly decorating the façade of that building. The Society has commissioned MM. du Seigneur and Lucas to pursue their researches on the history of this sculpture of a century old, and we shall probably be able to state the further results of their investigations in due course.

THE competition organised in connexion with the national manufacture of Sèvres, in which first and second prizes are awarded to French designers only, will have for its subject this year, "Une cheminée de boudoir et la garniture pouvant faire corps avec la cheminée." The work which receives the 5,000 fr. prize will remain the property of the State, and will be executed at Sèvres at Government expense. Why will not some other Governments take example?

ON Wednesday evening the Executive Council of the International Health Exhibition, represented by His Grace the Duke of Buckingham and Chandos, K.G., and the Council of the Society of Arts, represented by Sir Frederick Abel, C.B., F.R.S., &c., received at the "Healtheries" a vast concourse of visitors, and provided for their entertainment every imaginable form of delight. The grounds never looked so much like fairy-land, and were the subject of unstinted and universal admiration. "Old London" under the combined influence of a bright moon and the electric light was charming. The shops were kept open, and smiths and braziers in their quaint costume worked away and explained with never-failing suavity and patience the mysteries of their several crafts, while the

hand-bell ringers from a balcony discoursed the kind of music most familiar to the scene represented. In only one point the resemblance to the original failed, for Old London never witnessed such a crowd of gaily-dressed and handsome women as on that night thronged its streets from dusk till midnight. Perhaps the chief of the attractions was the Chinese department, opened for the first time on Wednesday evening. The Chinese have had the entire control of the building and decoration of their court, and wonderfully light and pretty they have made it. Benign Celestials dispense "real Bohea," and smile serenely when questioned in a language they unfortunately "do not understand." We admire a great deal that belongs to the Celestial Empire, but we cannot admire their music. The band performed at intervals, and the programme comprised some remarkable solos. As to the singing, it was the nearest conceivable approach to caterwauling. There is reason to believe that the themes were serious, and that "The Seal of Longevity" and "The Ladder of Happiness" were not comic songs, notwithstanding the loud and immoderate laughter with which they were received. The calm philosophic Celestials smoked their long pipes in the intervals of their programme, and no doubt set down our misappreciation of their efforts to the general benightedness of our condition. As we pass out the strains of the Coldstream Guards band swell upon our ear, and it will take a good deal to persuade us that Chinese music is the real thing.

THE verdict of the jury on the fatal accident on the New Angarrack Viaduct (Great Western Railway) can hardly be accepted as satisfactory. Two men were lowering a stone of 22 cwt. with a crane when the "spill," a piece of iron by which the weight was suspended at the top of the "jacket," broke, and one of the men was killed by the consequent fall. The piece which broke was wrought iron, and was supposed to be safe at a load of 30 cwt., and the evidence went to show that nothing unusual occurred in lowering the stone. The verdict merely recorded the facts, without expressing an opinion. Unquestionably either the limit of safety was too low, or the iron was defective. It is an accident that ought not to have happened.

THE important case of Vassie *v.* Baker, an action by a tenant against his landlord for bad drains, which was partially heard and adjourned some weeks ago, ended in a *fiasco* on the resumption of the case on the 4th ult., the jury being unable to agree, in the face of very conflicting evidence. The case turned on whether the pipes had originally been badly laid or not, about which it is hard to come to any conclusion on the evidence. Lord Coleridge, in his summing up, laid it down that, the plaintiff having taken the house after an assurance that the drains were in proper order, the landlord was undoubtedly liable if the contrary were proved to be the case.

THE unsanitary condition of the House of Commons, we are sorry to see, occupied the attention of Mr. Lowther and the Speaker on Wednesday evening. It appears that the effluvia from a sewer which runs outside the gates of the Westminster Palace, at the corner of Parliament-street, makes itself felt in the House, under certain atmospheric conditions. If the sewer is the real originating cause of the odour, we do not see what the ventilating arrangements of the House itself have to do with it, as the Speaker seemed to imply. It is the sewer that wants ventilating, not the House of Commons,—at least in regard to this special evil.

AS we stated a long time ago, the project for concentrating the Thames Valley sewerage at Mortlake would, if the sewerage were properly treated according to the best mechanical and chemical processes, have probably resulted in the discharge into the river only of an effluent which would have been practically innocuous and imperceptible, and we were noting the other day with satisfaction that our previous opinion was supported by the evidence of Dr. Frankland, Professor Dewar, Mr. Crookes, and other scientific men whose opinion on such a subject is of special value. Suddenly, on Wednesday of this week, came the news that the Special Committee had quashed the scheme. The particular reasons for this unexpected result are at present only on hearsay; they are said to be commercial rather than sanitary. At all events, there seemed a near prospect of something being done, and now all is at sixes and sevens again. Fifty rowing clubs, it appears, gave evidence of their dread of the effluent. But what was the value of their combined scientific experience? or which do they prefer in a river, a "treated" effluent or raw sewage? There is plenty of the latter in the Thames at present, at all events.

BY the way, the question not only of what we run into the Thames, but of what we take out of it, is likely to become of increasing practical interest. People seem at last to be getting made painfully aware of the fact that you cannot go on pumping so many millions of gallons per diem out of a river of moderate size without producing visible and unmistakable effect on the contents and condition of the stream. So much water is abstracted from the Thames now that in dry weather there is not enough coming over Teddington weir to cover the bed of the river. One consequence of this is that there is less stream to carry away the impurities which now find their way in, and the Thames above Richmond is unquestionably more muddy and offensive at low tide this year than it has ever been before. As you can't both have your cake and eat it, so you can't both have your river and drink it.

THE Select Committee on the Thames Communication question have delivered their report. As was to be expected, they have negatived the utterly unpractical idea of the Duplex Bridge, but report that two crossings are immediately necessary,—a low-level bridge at Little Tower Hill, with two openings, each about 100 ft. wide, spanned by a pivot swing-bridge; the other a subway at or near Shadwell, which they consider would best meet the wishes of the inhabitants in the more eastern part of London. We believe the latter will be a useful work, inevitable sooner or later. Concerning the swing-bridge we feel much more doubt. Two vessels arriving from opposite directions can pass at the same time, but then vessels will not always be so obliging as to come at the same time, and then the bridge must be kept open to wait for the later one. The time of detention for vehicles crossing will thus be considerably lengthened; and, as we have said before, a bridge which may at any moment be open, and which is sure to be open just when you are in a hurry, is hardly worth calling a bridge, for the practical purposes of a large traffic.

## CAMPS, CASTLES, FORTIFICATIONS, AND EARTHWORKS OF WARWICKSHIRE.*

### BRINKLOW EARTHWORKS.

THE village of Brinklow is situate on the Roman Foss-way eighteen English miles from Leicester, the Ratis of Antonius, and six miles south of Claybrook, or Venonis, the Roman centre of Britain, where the great Roman British military roads the Foss and Watling-street crossed each other. Its mound or tumulus is a most conspicuous object for miles round, and the camp in which it is situated is upon the terminating point of a ridge of elevated land stretching thence in a north-easterly direction. Dugdale, in his "Antiquities of Warwickshire," says, "This place has its name from that eminent tumulus whereon the keep or watch-tower of the castle, which long ago was there, did stand, but whether it was because this little hill, by our ancestors termed a low, stood upon the edge or brink of the natural ascent overtopping the rest of the country thereabouts, or from the British word 'brynn,' which is the same with *collis* in Latin, 'tis hard to say. Leaving my reader, therefore, to his own fancy, I shall first consider the ruins of that quondam castle, concluding that had it been a work since the Norman Conquest our public records or some other authorities would have taken notice thereof. But that it was more ancient the diversion of that noble Roman way, viz. (the Fosse), for the raising such a fort does no less argue than the extent of that pool which, from the said road, covered the adjacent valley even unto the skirts of Newbold Revel. How be it, in Domesday Book there is no mention of it, for as much as it was then involved with Smite, and so consequently part of the possessions which Earl Alberic had." When the Roman General Ostorius, in the year 50, invaded Mid-England, the forest of Arden covered the greater portion of Warwickshire; he met some slight opposition from the natives, who, however, were unable to repel the invasion of their territories, and therefore submitted to the conqueror. They appear to have had a perfect chain of fortresses upon the hills hereabouts,—at Burrow-hill, near Daventry, Edgehill, Brinklow, Breedon-hill, Corley, Brownsover, Oldbury, and elsewhere,—to which they could retreat and offer defence when their lands were invaded. These fortresses were on the frontiers of the British tribes and upon the borders of the countries of the "Dobuni" and "Carnabii," and from them communication was no doubt given of an enemy's approach, by means of watch-fires, to the dwellers of the neighbouring hills and forests.

The Romans probably found this spot fortified on pushing their military road southward from Venonis, for slight traces of old rude earthworks existed amongst the small inclosures and gardens towards the village. Having carried the position by force, and thinking it too good to give up, it would appear they constructed a camp for their own occupation to the north-east of that of the native tribe. As a rule the Roman engineers chose level low-lying ground for their camps, where supplies of wood for fuel, and water for horses were plentiful; but policy often dictated otherwise, for, desiring not entirely to extirpate their opponents or their defences, they gradually caused camps of the square form to be built adjacent to the British ones, and thus the inhabitants, mixing with themselves, acquired Roman ways and manners, became useful members of the State, or attended the imperial armies to other lands and conquests as soldiers or servants under the ensigns of the empire. The remains of the Roman or parallel line camp consist of a double row of ramparts and ditches facing the south-east and cresting the summit of the hill on that side; they are not straight, however, but had a entrance nearly at their centre, and probably some outer defensive work existed at this spot. At the foot of the hill there is a corresponding drip or cutting from the fosse to the land, which seems evidence that a road to the camp existed on this side; the rampart is returned at the angle, and shortly dies into the natural slope. A ridged track is perceptible on this side, and is said to have formed a road to the camp. The rest of the earthworks of this earlier camp are not now discernible; probably a stockade or wooden fence existed on its ramparts. It would see an engagement during the turbulent hundred years 450 to 550, when Britain, no longer held by Roman arms, was invaded by bands of Saxons, Jutes, and Angles, who overran the country and destroyed much of the Roman defences in the Midlands.

In process of time the Saxon, finding the remains insufficient for defence against the Danes (during the period 840—1040), and near the boundaries given to that people to settle in, built the camp anew, or rather erected his castle upon what was left. The works being unwieldy, he divided them into baileys or courts, raising more extensive ramparts and defensive ditches from the ridges of the hill sides, and terminating in the Roman inclosure at the north-east, in which he placed his mound or castle keep, surmounted with round wooden or rude rubble stone dwelling (similar to the representation shown in the Bayeux tapestry and contemporary illuminated MSS.), for the use of himself and family, and around which a constant guard was kept against invasion and the sudden approach of a stealthy foe; whilst his soldiers and immediate attendants occupied the baileys in time of peace, living in rude wooden thatched dwellings; and the whole population of the district assembled therein in times of war

* The illustrations are all to a scale of 6 chains to an inch.

## DECLINE IN THE TRAFFIC OF THE SUEZ CANAL, AND FRENCH AND ENGLISH VIEWS OF THE CAUSE AND THE REMEDY.

So far as the proceedings of the Directors of the Suez Canal, at their meeting on the 1st current, have been permitted, or rather arranged, to transpire, the first half of 1884 has witnessed a marked decline in the traffic. That such was the case may have been the suspicion of many persons who have noticed the accounts of daily transport published in the morning journals, although but few will probably have taken the trouble to carry the items to account day by day. The MM. de Lesseps are said to regard the check as only temporary. From the opening of the Canal in 1869 the increase in the number of ships that passed was steady until 1875, and then fluctuated for four years, the number for 1879 being seventeen fewer than that for 1876. The tonnage and the traffic receipts, however, rose till 1877, but were less in 1879 than in 1877 by upwards of 120,000*l.* From 1879 the rise in all these items was rapid and continuous till the close of 1883, when the receipts were rather more than seven times the amount received in 1871, although the expenditure of 1882 was less than that of 1870 by more than 20,000*l.*

A check in the traffic, therefore, would not give much cause for alarm but for its connexion with facts that hardly lie within the purview of the French directors of the Canal. In the year 1881, for the first time since the publication of the statistical returns of our shipping, the shipping tonnage of the United Kingdom declined in amount. The present state of that important trade is very serious. The imports and exports of the United Kingdom were 4 per cent. less for the half-year, and 20 per cent. less for the month of June, in 1884, than in 1883. The last report of the Tyne Commissioners states that the number of steamers now laid up in the river is 104, with a total tonnage of 90,000 tons. At Jarrow, at Witton Park, and at Middlesbrough, "the streets are full of unemployed men." For a vessel classed A 1, well engined, and guaranteed fast, valued at 20,000*l.* no higher bid was obtained on the 23rd ultimo than 12,000*l.* Whether it be the case, as the shipping interest appears to consider, that this panic is due to the introduction of the Government Shipping Bill, in part or in whole, or not, of the paralysis there can be no doubt.

Under these circumstances it is not matter for wonder if the French directors of the Suez Canal are desirous to postpone the reduction of 50 centimes per ton, which was arranged to commence this month, and which would amount for the six months to something like 70,000*l.* The seven new English directors have not yet been able to take their seats, the requisite change in the statutes of the Company not having yet been authorised by the Egyptian Government. But it is not a question of a tax of this amount (some 75 per cent. of which would be borne by English bottoms) on our Indian trade which most claims the attention of the country. To ascertain the real cause of the check in one of our most important industries is a matter of far more moment than is an addition of 4½d. per ton to the freight of a long voyage; and if it be true that the shipowners and shipbuilders of Germany are not struck by any similar check, but are, on the contrary, thriving on our discountenance, it would seem as if the reply to the question, "What is the cause of the shipping decline in England?" ought to be as ready, and as distinct, as it is virtually important to the country.

The question of the mode in which the necessary increase of accommodation for the ocean traffic through the Isthmus should be provided appears to have been set at rest by the three nights' debate on the subject of "Speed on Canals," on the 5th, 12th, and 19th of February, 1884, which is reported in the seventy-sixth volume (just issued) of the Proceedings of the Institution of Civil Engineers. Out of thirty speakers who took part in that debate,—including civil engineers, shipbuilders, and naval men,—but one was found to advocate the scheme of a second canal, and his remarks only brought into fuller relief the advantages to be derived from widening the existing channel, rather than attempting to cut a new one. When it is borne in mind that each vessel that passes through the Canal pays a total of nearly 800*l.* (in 1883, 3,307 ships paid on an average 796*l.* each); while the total expenses of maintenance, transit, and administration only amounted to 74*l.* per ship, it is tolerably clear that the customers of the Canal have the right to expect that those measures which, as pointed out in the debate in question, would reduce the time needed for the passage of a vessel from the actual allowance of 53 hours 41 minutes, to a maximum delay of 12 hours, should be taken without further procrastination. According to the reports taken from the French papers, the hope is entertained in Paris that the new English directors will themselves propose to defer the reduction of 50 centimes per ton that should come into operation during the present month. It is much more rationally to be expected that the influence of these gentlemen will be thrown into the scale with the view of making an enterprise that earns that enormous proportional profit really available for the requirements of navigation, which, at the present moment, cannot properly be said to be the case.

Since the above was in type we have ascertained from official sources that the decline in the receipts of the Canal Company from navigation has been 14·7 per cent. in May, and 21·1 per cent. in June, 1884, as compared with the same months in 1883.

## SALE OF PRINTS IN THE FOUNTAINE COLLECTION.

SIR ANDREW FOUNTAINE was born in a fortunate day for collectors, and he made good use of his time. The fact that he should have been able to gather treasures together enough to take Messrs. Christie & Manson eight days in the selling, says much for his energy and discrimination. The aimless crowds who came flocking when the faïence was sold, to extaticise over clumsy candlesticks, and kitchen utensils of Urbino, or Nevers, or Palissy ware, are happily absent from the rooms when a great collection of engravings is to be sold. The strength of the collection lay in the works of the "little masters" of Germany, and of the great master, Dürer; in the etchings of Vandyke, and the Marc Antonios; and the interest was fairly spread over the whole four days of the sale. The splendid set of Aldegraver's work was the feature of the first. No reason, by the way, is given by Bartsch, or any other writer with whom we are acquainted, for distinguishing, as Bartsch does, the "Master of the Monogram, A.G.," from Aldegraver himself, or some fraudulent copyist of him. The date of Aldegraver's death is placed speculatively at 1558. May not the fact that this "master" (or fraudulent possessor of) "the monogram A.G." puts 1562 to many plates, suggest for his demise a later date? Be this as it may, the collection was a very fine one, containing the "Parable of Dives and Lazarus" (in five prints), and the set of the "Wedding Dancers," 1538, and other things which Duplessis holds up to especial admiration. The work of the two Behams, Barthel and Haus Sebald, was distributed in more than 120 lots, out of which it would be hard to particularise. No. 192, "The Portrait of an Emperor," from Sir Peter Lely's collection; No. 217, "The Musicians"; No. 240, "The Little Jester"; and No. 245, "The Two Genii," in the first state, all by Hans Sebald Beham, are works of the greatest rarity.

A great many of the choicest prints of Sir Andrew seem, by the way, to have come to him from Sir Peter Lely. That bad painter was no mean connoisseur, and the plain P. L. within a circle, which denotes his ownership, does nothing to prejudice a print with an experienced buyer. The name of Baccio Baldini is one which commands more respect than his artistic merits seem to allow. His association with Botticelli on the famous 1481 Dante, accounts in some measure for this. So long as the early history of typography and wood-cutting is explored, Baldini's name will not die. Narford Hall had nothing much of this artist to show,—only a set of the "Prophets" (wanting ten out of twenty-four), and these not in their most valued state. Duplessis thinks that in the "Prophets" also he can trace the design of Botticelli. It is rather surprising to find but one Rembrandt in the collection. Others, perhaps, were sold at some earlier date; or perished in that cruel bonfire at "White's" which destroyed so many of Sir Andrew's treasures. The rage for Rembrandt is pretty old, whilst that for the little masters is comparatively new. Sir Andrew Fountaine, however, was a very surprising person. We have seen already how wisely he went to work collecting Limoges enamels and majolica, and medals of Pisano and Sperandio, whilst his silly countrymen were raving over bad copies of the "Eclectic" school, and over broken fragments of Roman "antique." A desire to be original in his line may account for his leaving Rembrandt upon one side. To make up for it, however, he made a fine collection of Dürer's prints, and gathered together a splendid lot of Vandyke's most treasured etchings. It may here be remarked that the ardour of any particular cult is determined more often by the amount of scope which it offers to pure connoisseurship, than by the attractiveness of the subject from a merely artistic point of view. Between the plate-mark of an etching and its margin there may be matter for a study no less minute, though it may well be less profitable, than that which the etched subject itself demands. Vandyke's etchings, whilst their splendid artistic qualities give them rank only second to Rembrandt's, present also infinite varieties of state and condition which make them a specially popular subject of study. If any unthinking person wants to be finally convinced that the last "state" of a plate, as of unregenerate manhood, is worse than the first, he has only to be shown those brilliant portrait-heads in their first or second states, as they came fresh from the needle of Vandyke, and then shown the later states of the same, in which his own work may be untouched, but the backgrounds have been filled in and various circumstantial details superadded. After Vandyke's death his plates came into the hands of his friend Van den Enden, and by him were republished; later, again, they were purchased by Gillis Hindrix, whose abhorred initials (G. H.) seen below the plate-mark cause the heart of a collector to shrivel within him. Looking over these portfolios we had rare opportunities of studying and comparing the "states." Space does not permit us to treat at length of other matters. A vast number of portrait engravings after Vandyke would interest chiefly the historian. Hollar was fairly represented. He, in Mr. Haden's view, to which we subscribe, was no more than a highly-skilled mechanic; yet, even so, some masterpieces of the etcher's craft would have been unknown to the world had it not been for his patient point. Such a piece of work was 616, "A Muff"; such, too, were his famous "Shells." A very rare portrait of "Vandyke with a Sunflower," in perfect condition, was among the finest of Sir Andrew's Hollars. Of German masters, we have made no mention of Burgkmair, nor of Brosamer, nor of the "little master," Jacob Binck, who, much to his advantage, has been confounded with the "Master I. B." Why the said J. Binck should have chosen to sign himself ⅃⅁ (H. C. B.) whilst his own proper initials were thus sent a-begging, is a point we must leave men wiser and better to determine; and with only a glimpse at a complete set of Hogarth, and the remark that one may fail to be deeply impressed by the heavy work of Raimondi, and yet be in excellent company, we take leave of a collection which ere now has taken final leave of us.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

THIS Exhibition, which is the first of the kind ever held, owes its origin to the Arboricultural Society of Scotland. The Society felt that the education of this country in the science of forestry had been very much neglected, and that, however much we might be in advance of other nations in many respects, in this one point we were far behind most of the other nations of the world. This was all the more to be regretted, seeing that we possess to a larger extent than any other nation, forests in every quarter of the globe, a fact which in itself implied that these are of varied character, and required different treatment. Owing to the difficulty in obtaining a site for the requisite buildings, it was not until March last that the plans of the building now erected were accepted, and these buildings are universally admitted to be well adapted for the end in view. The effect of this delay, however, has been that the time was insufficient, not only for the thorough completion of the building and its accessories at the period fixed for the opening, but it has deterred some in-

tending exhibitors from coming forward, and the exhibits of others were behind time. The result may, on the whole, be considered satisfactory, and the exhibition is really a very interesting one.

The Marquis of Lothian, in the opening address, expressed a hope that out of the exhibition might come a School of Forestry, and, if possible, that it should be located in Edinburgh. They had their Botanical Garden, their Arboretum, and their University, and they had the Highland Society, which had taken an interest in forestry matters, and they had abundant opportunities in the country for students learning practical and theoretical forestry. During the few months the Committee had worked very hard, and had done their best to make the exhibition practically useful and also attractive, but he was afraid that usefulness without attraction did not go for much sometimes, but let them hope that before long money would be forthcoming, and that they might see a School of Forestry in Scotland. The Lord Provost referred to the interest which the Town Council had, during the last three hundred years, taken in the University, and to the important duty they had performed in recently acquiring ground for an arboretum at a cost of about 20,000*l.*, and placing it at the disposal of the Government for the purpose of improving the education of the students, and ultimately with the object of providing a School of Forestry.

The building, designed by Mr. Robert Moreham, City architect, is simple in its arrangement and mode of construction, and is admirably adapted for its purpose. The only attempt at internal decoration has been the colouring of the arched principals which support the roof pale blue tint with stencilled ornament thereon. This is either too much or too little, and the effect would have been better had these beams been left uncoloured like the rest of the woodwork.

The first object that attracts the attention of the visitor on entering the building is a section of a "Californian redwood tree," 13 ft. in diameter, which forms a small apartment hung with photographs, shewing the operations of the lumberers in the forests. In the adjoining transept are examples of the wood as applied to different articles of furniture, polished and unpolished, carved and inlaid; for all of which purposes the wood seems to be well adapted. The wood is generally of a deep red colour, but it varies considerably both as regards hue and grain. These trees are the grandest productions of nature's vegetation, sometimes having a diameter of 20 ft. and a height of 200 ft. before a branch is thrown out. The grove of these trees in the Yosemite Valley has been frequently described by travellers, but to see the tree in perfection and the forest in its most sublime aspect, the lover of nature must penetrate to solitudes whose depths have seldom or never met the gaze of civilised man. The outskirts of these forests are for a distance of about half a mile fringed by spruce and smaller trees, with here and there a few redwoods. It is in the depth of the forest that the true grandeur of the redwood is found, and where it usurps the entire possession of the ground. At first it is difficult to form an accurate idea of the magnitude of these monarchs of the forest, there is no scale by which they can be contrasted; tall and close together, they seek the upper light, often thirty or forty of them with diameters of upwards of 14 ft. being found upon a single acre. It is only within the last few years that the capabilities of this wood have become known, and the forests once given up to solitude and the Indian now resound with the stroke of the axe and the grating of the saw. A ready market is found for the wood in Chicago and the Eastern States, which is now extending to Europe. The wood is found to be adaptable to outside work as well as to internal fittings, and to be durable and free from shrinkage.

**Demolitions in Blomfield-street.**—The Corporation have just made a clean sweep of the buildings on the south side of Blomfield-street, extending to about half the entire length of the street, in the direction of the North London and London and North-Western Railway stations, and to a considerable depth eastward, the site thus cleared being nearly an acre in extent, which is now announced to be let on building leases.

## GUILDFORD ART LOAN EXHIBITION.

After the stimulus that has been given to exhibitions of all sorts, by the first and most brilliant of them all, that of 1851, the English public has been so often invited to visit collections drawn from the inexhaustible sources of private as well as public wealth, that it requires some special element to give to any local display the chance of success. There is, indeed, only one way in which a local exhibition, not of enormous dimensions, is likely to attract any other than strictly local notice, and that is when local associations, of historic moment, can be appealed to and illustrated. In this respect the county town of Surrey may be said to be not unworthy of its position. Its structural memorials go back to a date long antecedent to the Conquest. The "strips" on the tower of its most ancient church savour of Saxon building; and the small double-splayed windows of that part of the sacred edifice appear to have been constructed to keep out the sacrilegious invader. It was down the Wey that the bier of the fair Elaine floated; Guildford Castle, with its ancient herring-bone brickwork, has traditions of Alfred; and the spot is identified with the Astolat of the poet. In the neighbourhood are such historic sites as Wotton, still held by an Evelyn; Sutton, with its noble chapel, occupying the first floor of an entire wing; Losely, with its Elizabeth windows, and its memorials of the Mores. The muniments, plate, pictures, and other articles of interest, from houses such as these, the regalia and records of the corporations of Guildford, Godalming, and Farnham; and the objects of interest lent by the houses of Percy, of Onslow, and other neighbouring families, are such as to make this loan exhibition worthy both of visit and of record.

Among the paintings ascribed to "Old Masters," which head the Fine Art Section of the catalogue, are a few of undoubted authenticity and merit. Such are the portrait of Cardinal de Retz, after his return to France on the death of Mazarin, by P. de Champagne; a small, but beautifully-distinct view of London, by Canaletti; portraits of the regicides Bradshaw and Cromwell, by Dobson; of Lord Walpole, of Wolterton, by Denner; of Charles I., attributed to Vandyck; of Horace Walpole, by Hogarth; and a wonderful head of an old woman, from the Orleans Collection, by Denner. The claims of the portraits of Edward VI., of Sir T. More, and of Wolsey, to be from the pencil of Holbein, may perhaps be better avouched by the records of Losely, whose owner lent them, than they would seem to be at first sight. One portrait is in itself enough to repay the cost of a visit to the exhibition. It is a head of Dr. Johnson by Gainsborough, the property of Sir J. Whittaker Ellis; a portrait that goes far to show the nobler and more tender aspect of a rugged character which has been obscured by the incense of Boswell.

Of the collections of modern oil pictures, crayons, and water-colour drawings; of the groups of works by Morland and by Russel, the latter a local celebrity; of the deeds, MSS., &c.; of seals, autographs, coins, and medals; of ancient printed books and manuscripts; of porcelain and pottery; of needle-work, embroidery, and tapestry; of articles of plate and bronze; of neolithic and palæolithic stone implements; and of miscellaneous articles, we have no room to speak. Under each head are ranked very interesting specimens. The sword left by Charles I. at Weston, the seat of Sir Richard Halford, the night before the battle of Naseby; two ivory chairs taken from Tippoo Sahib's tent; and some fine bronzes are lent by her Majesty the Queen. A case contains a selection of silver and gold-plate vases and other objects from the wedding presents to their Royal Highnesses the Duke and Duchess of Albany. The Guildford Corporation plate, comprising an ebony staff with silver top, presented to the town by Queen Elizabeth; a silver mace presented by the High Steward,—one of the Howards,—in 1663; and another mace, of great but unknown age (which the occurrence of a single plume, like the centre feather of the three in the Prince of Wales's plume, may, perhaps, enable the expert to fix), and other objects, are lent by the Corporation. But, whether it was due to the good lighting or to the excellence of the sculpture, nothing has lingered longer on the memory of the writer than two marble busts lent by the Duke of Northumberland,—one of Mr. Spencer Perceval, thoughtful and delicate; and one of Lord Melville, the forcible classic features of which recall to mind the lines,—

> "in whom
> The ancient Roman honour more appears
> Than any that draws breath in Italy."

## THE EFFECTS OF FROST ON BUILDING STONE.

The study of the above question has led to many detailed investigations, without precise and definite results having been arrived at. The only indications of any exactness are those which have proceeded from lengthened observations of materials employed in climates and under circumstances analogous with those for which it is proposed to draw inferences from practical experience.

In bringing forward, in the *Revue Industrielle*, some connected details upon various branches of this subject, M. Braun remarks that nothing definite is proved by the statements made at a certain period respecting sulphate of soda. It has often happened that stones which have resisted expansive force, have later on given way under the influence of frost, while the contrary has sometimes been remarked. It must not, however, be concluded if stone has for a length of time resisted the effects of frost, that it will do so for an indefinite period. The case of the stone bridge at Borrège, cited by Vicat, is a striking proof bearing on this point.

After calling attention to the fact that the effects of frost are often confounded with other causes of deterioration to which stone is liable, M. Braun endeavours to define in an exact manner the question under discussion, asserting that a stone is affected by frost when its resistance to longitudinal traction is less than the force of expansion of the water contained in its pores at the moment of its transformation into ice.

The *Journal du Céramiste et du Chaufournier* remarks that this theory requires certain modifications in practice. It is, however, admitted that, supposing this definition to be exact, it furnishes a provisional solution of the problem, and would allow of the resistance of a stone to frost being ascertained without exposing it to a practical test. According to mechanical theories, a kilogramme (2½ lb.) of water in freezing develops an amount of mechanical labour equalling 33·681 kilogramme-mètres (243·51 foot-pounds). This knowledge of the force developed by water at the moment of its changing its condition would enable the resistance of a stone to frost to be estimated if there were also known,—1, its density; 2, its porosity; 3, its resistance to longitudinal traction. Thus, if the quantity of water contained in a cubic centimètre (·061 cubic inch) of a stone does not produce in congealing a force superior to its resistance to traction per square centimètre (·15 square inch), the stone would not be affected.

Unfortunately, however, matters are not so simple in practice. The principal elements of perturbation are (1) the want of homogeneousness in stones; (2) the state of superfusion of water, which is often produced in the interior of stones; (3) the chemical action of the waters of the quarry. The first point is too well known to call for detailed reference. The capacity for absorption of water which is possessed by stones from the same quarry (or even from the same part of it) varies to such an extent as to render it difficult to fix *à priori* what is the quantity of water the expansive force of which in congelation has to be estimated.

The circumstances under which the longitudinal traction takes place must not be lost sight of. M. Braun, relying upon Hodgkinson's experiments, considers that the figures arrived at in the tests of traction should be reduced by one-third. As the complete rupture is always preceded by a disaggregation which is indicated by fissures, and as these fissures are generally produced under a burden which varies between one-third and one-half of that necessary for the total rupture, it would be necessary, in view of these facts, to introduce a new co-efficient of reduction, comprised within the limits indicated. This *co-efficient of broken equilibrium*, as M. Braun designates it, must be always attended by uncertainty in its determination, according to the opinion expressed by the journal already mentioned. As a

summary of his investigations, M. Braun gives this formula:—

$$(C + C_1)\ R \gtrless 33{\cdot}681\ A.$$

C = The co-efficient of reduction as deduced from Hodgkinson's experiments.
$C_1$ = The co-efficient of broken equilibrium.
R = The average burden per square centimètre, which determines the rupture under the action of longitudinal traction.
A = The quantity of water contained in a cubic centimètre of stone and expressed in grammes.

When the first number of the above is superior to the second, the stone is fit for building purposes. When the contrary is the case the stone should only be used in situations where it is not exposed to frost.

It is admitted, in conclusion, that M. Braun's ideas are both new and original, displaying, at the same time, such an amount of probability as to render it possible for them to mark a new point of departure in experiments bearing upon the subject under discussion, notwithstanding the speculative nature of some of the principles enunciated.

## Illustrations.

### DESIGN FOR A MODEL THEATRE.

THE fundamental principle of this design for an ideally perfect theatre, which obtained the first prize at the Berlin Health Exhibition of 1883, has been the arrangement of the building in detached groups, allowing of an easy and general supervision. The advantages of such a disposition would seem to be,—1, The separation, as far as possible, of the auditorium and the stage; 2, The provision of easy and rapid modes of entrance and exit for the audience; 3, In cases of fire facilities for localising the flames and attacking them from all sides at the same time; 4, The external lighting of the auditorium, the staircases, and most of the rooms belonging to the stage; 5, Economy of space both on the stage and in the auditorium.

The central point of the whole design is the circular auditorium with its three staircases. It gives access to open courts on four sides, and beyond these it is surrounded by the main vestibule and the foyer in front, by three rehearsal rooms, the manager's room, &c., on the two sides, and by the stage behind.

The stage is so arranged that only the most necessary apartments are actually contiguous to it. The dressing-rooms, property-rooms, and workshops lie on either side, but they are isolated by means of corridors. The painting-room is above the back of the stage, and in the further corners of the building are two large store-rooms, separated from the stage by small open courts.

The principal entrance to the theatre leads direct into the main vestibule, which communicates easily with the smaller vestibules on either side of the auditorium, intended for the use of the gallery portion of the audience.

The staircase leading from the main vestibule is intended for the use of the audience in the area of the theatre, and on the first and second tiers of boxes. The two side staircases lead to the galleries. The staircase from the vestibule, however, also goes up to the top gallery, in order to afford easy communication between the upper stories and the foyer, and to be used by the gallery audience in case of panic. Extra staircases, to be used in cases of emergency, are approached from open *loggie* on each floor and lead down to the four open courts, and thence through passages direct into the street.

The auditorium is thus seen to be completely isolated, surrounded by four detached groups of buildings, giving access on four sides into open courts provided with extra staircases for the safety of the audience. The open *loggie*, extending along the side of the courts on each floor, serve to disperse the audience as far as possible in cases of panic, and in summer they can be used as places of refreshment; each of them is capable of containing 200 persons.

| | | | |
|---|---|---|---|
| The front area of the auditorium seats | 396 | persons. | |
| The back | „ | 274 | „ |
| The first tier above | „ | 142 | „ |
| The second „ | „ | 244 | „ |
| The third „ | „ | 364 | „ |
| The fourth „ | „ | 370 | „ |
| Total | | 1,700 | „ |

Access to the stage is given as follows:—

The staircases for the actors, singers, &c., male and female, are in the group of buildings on each side of the stage, and completely separated from the entrances for the workmen, machinists, and scene-painters, which lie behind the stage.

The entrance to the manager's room and offices are in the second group on the right of the auditorium. Extra staircases for the actors open from the galleries in immediate proximity with the dressing-rooms.

The stage is 24 mètres long by 17 mètres deep and 34 mètres high. Corridors extend along either side partly as means of communication with the stage, partly as convenient and protected posts for the firemen and their machinery. The stage is roofed in by a dome constructed of panfiles, and covered with a second roof of iron. This device affords, in the opinion of the designers, a security against the falling in of the roof, by providing, in any case of fire, a cool current of air between the dome and the iron outer roof. The central opening on to the stage serves for ordinary ventilation, the four side openings for the issue of heat and smoke should fire break out on the stage.

The flies, consisting of four stories, have grated floors, and a considerable open space is left above, calculated to check the progress of fire and to diminish the danger of the falling-in of the roof.

In providing for the separation of the stage from the auditorium in case of fire, the authors of this design have kept in mind the danger attendant on the use of an iron drop which, as soon as it becomes heated above a certain point, falls and leaves free passage to the flames. They believe they have obviated the danger by designing the construction of two iron drops, a lighter one as an act-drop, and a heavier one for use at the conclusion of the performance, each completely independent of the other, and under the direction of a fire-inspector. The fire-inspector's room is between the two drops and in direct communication with the fire-engines and the water supply, so that in case of need the iron curtains can be continuously sprinkled with water, and their over-heating prevented.

The front stage is separated from the back by an iron wall, which is hollow and filled with water, and can be raised and lowered by hydraulic pressure. There are, of course, doors in all the three drops for use in case of need.

The storerooms are in two stories and very strongly constructed. They are in easy communication with the back stage and the painting-rooms above.

The ventilation and heating of the theatre are designed by Herr J. Strebel, engineer, of the firm of R. O. Meyer, Hamburg. They are on a very complicated and perfect system of hot-air and steam-pipes, and provision is made for the introduction at an equable temperature of hot air, moistened by steam. The stage, property-rooms, dressing-rooms, corridors, &c., are each provided with stoves or coils, for steam or hot water, and the whole apparatus is so constructed as to be easily under control in case of fire or accident. The boilers and steam-engines are located in the basement for the better safety of the building. The employment of steam both as a purifying and a heating medium renders this isolation of the machinery and apparatus possible, since it loses but little either of heat or pressure by its passage through any length of pipes.

The design for ventilation cannot be explained in detail without the aid of diagrams. It provides for a change of the air on the stage every half-hour, and for an hourly supply of 25 to 35 cubic mètres of fresh air per head in the auditorium.

There is an abundant water supply with separate systems and cisterns for the ordinary purposes of the building, for the extinction of fire, and for use on the stage, all of which could be utilised at any given point within a very few minutes.

### SKETCHES BY THE LATE G. E. STREET, R.A.

THESE are photolithographed from two others of the set of pencil sketches by the late Mr. Street, of which we gave two last week. They are reproductions of the lines of the originals, though the peculiar *texture* of pencil work cannot be reproduced in lithography.

### PULPIT IN CHURCH OF SAN LORENZO FUORI LA MURO, ROME.

THE lithograph of this effective example of inlaid work in marble is from a drawing of it made on the spot by Mr. R. Barratt. The design, with its hard straight lines and flat surfaces, is thoroughly suited to that class of work, and it is judiciously raised on a plain solid base of masonry which sets off the inlay work above and, at the same time, prevents the whole from appearing too slight or deficient in monumental character.

### SILSDEN MECHANICS' INSTITUTE, YORKSHIRE.

THIS building, of which we give an illustration, is now in course of erection, by local contractors, and is intended to be opened in September.

On the ground floor are a reading-room, 19 ft. by 19 ft.; news-room, 24 ft. by 16 ft.; conversation room, 24 ft. by by 14 ft.; lavatory, shop, and living room.

On the first-floor are an assembly or lecture room, 48 ft. by 30 ft., and retiring or class-room, 19 ft. by 19 ft.

The contractors are,—for masons' and brick-work, Mr. Joshua Tillotson, Silsden; joiners' work, Mr. Frank Cowling, Silsden; plasterers' work, Messrs. Laycock, Silsden; plumbers' work, Mr. B. Newbould, Keighley; slaters' work, Messrs. Hill & Nelson, Bradford; and painters' work, Messrs. Tillotson & Harrison, Keighley.

The stone is fine sandstone from neighbouring quarries,—the ashlar being tooled and the wall stones fine hammer-dressed. The joiners' work is all of the best red deal, and will be painted plain colours. The rooms are intended to be warmed by a low-pressure hot-water apparatus by Messrs. Clapham Bros., Keighley.

The architect is Mr. W. H. Sugden, of Keighley, who has contrived, we think, to give a good deal of character to a simple and inexpensive building.

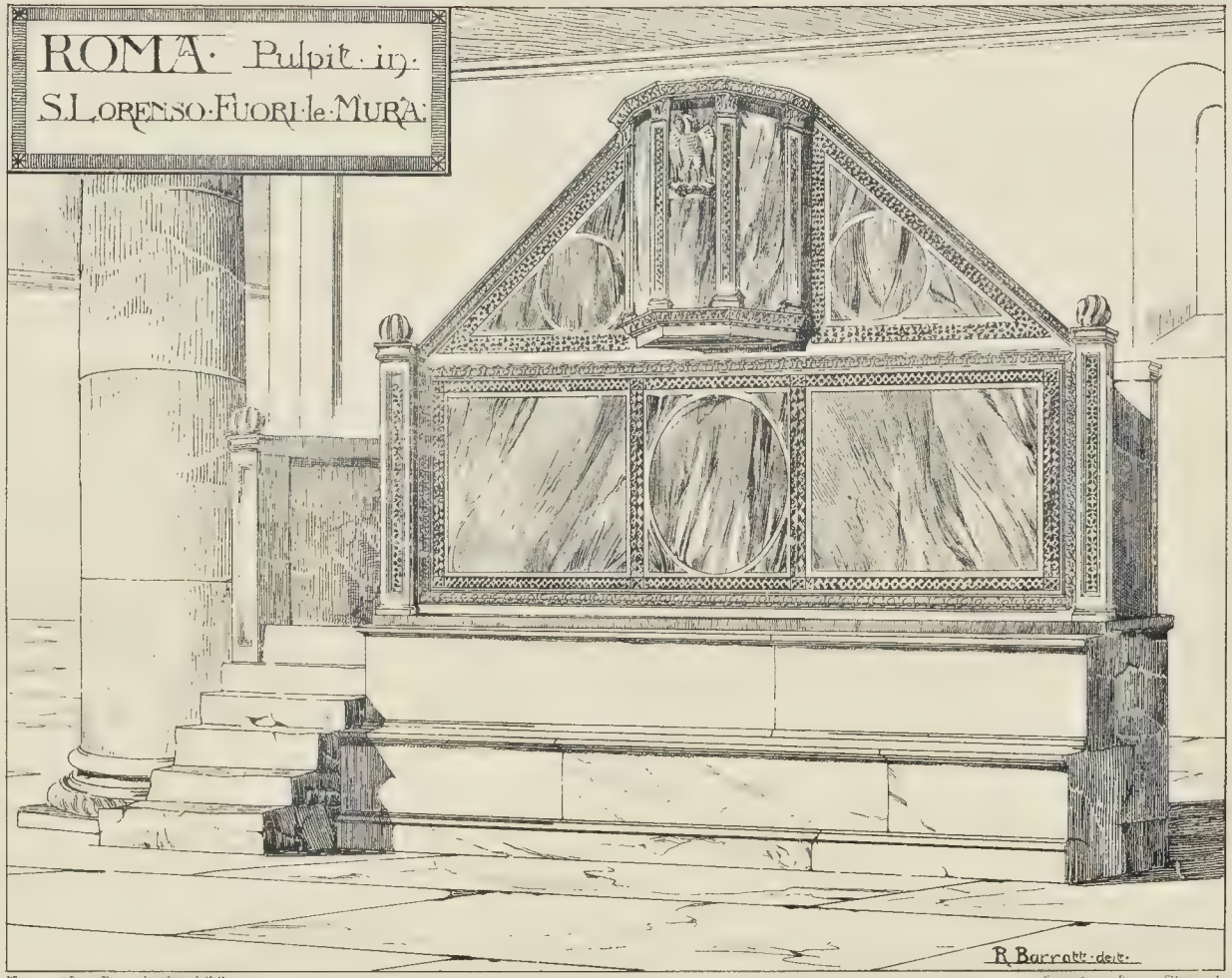
**Cholera and Cowardice.**—It is a most deplorable proof of the weakness of human nature that it is at all times prone to fall into a state of panic when brought face to face with the inevitable. We must all die, and we are not ignorant of this our destiny; nevertheless, the instant a danger to life is recognised, we fly from the peril with the impetuous haste of crazy and cowardly creatures, forgetful alike of duty and decency. It is vain to argue in favour of self-possession. Philosophy has no charm for, or power over, the man who impulsively turns his back to the enemy. Nothing we could urge would have the slightest weight with the multitude bent on escaping from the ports and cities which are just now supposed to be rife with infection of cholera. These flying crowds, on safety all intent, must be left to their own devices. It is manifest that they will spread the malady, and it is scarcely less certain that they will, many at least, lose their lives in trying to save them. With regard to these matters, however, it is useless to speak. Suffice it to point out that, although in the presence of an epidemic of cholera, there is always and unquestionably some personal peril of contracting the disease, it is by no means certain that this is increased by remaining in association with the sick, or that the danger is to be avoided by running away. During severe epidemics it has been noticeable that the mortality has not been, by any means, greatest in the very *centre*, so to say, of the disease. In the hospitals and among the cholera patients scattered throughout the population, medical officers and nurses have gone about doing their duty with no greater mortality than that of those who have kept aloof. Indeed, it is probable that a certain amount of immunity from disease has been enjoyed by those who have not feared the danger of infection. The great secret of success in warding off disease is the preservation of health. We mean that if, heedless of danger, men and women do their duty to those around them,—keeping up a cheerful temper and a trusty spirit, neither abusing the good things of life nor avoiding them,—in short, living as all should live, whether in the midst of a healthy population or in the presence of an epidemic,—they have a far better chance of escaping disease than by falling into a state of panic and "hastening to leave."—*The Lancet*.



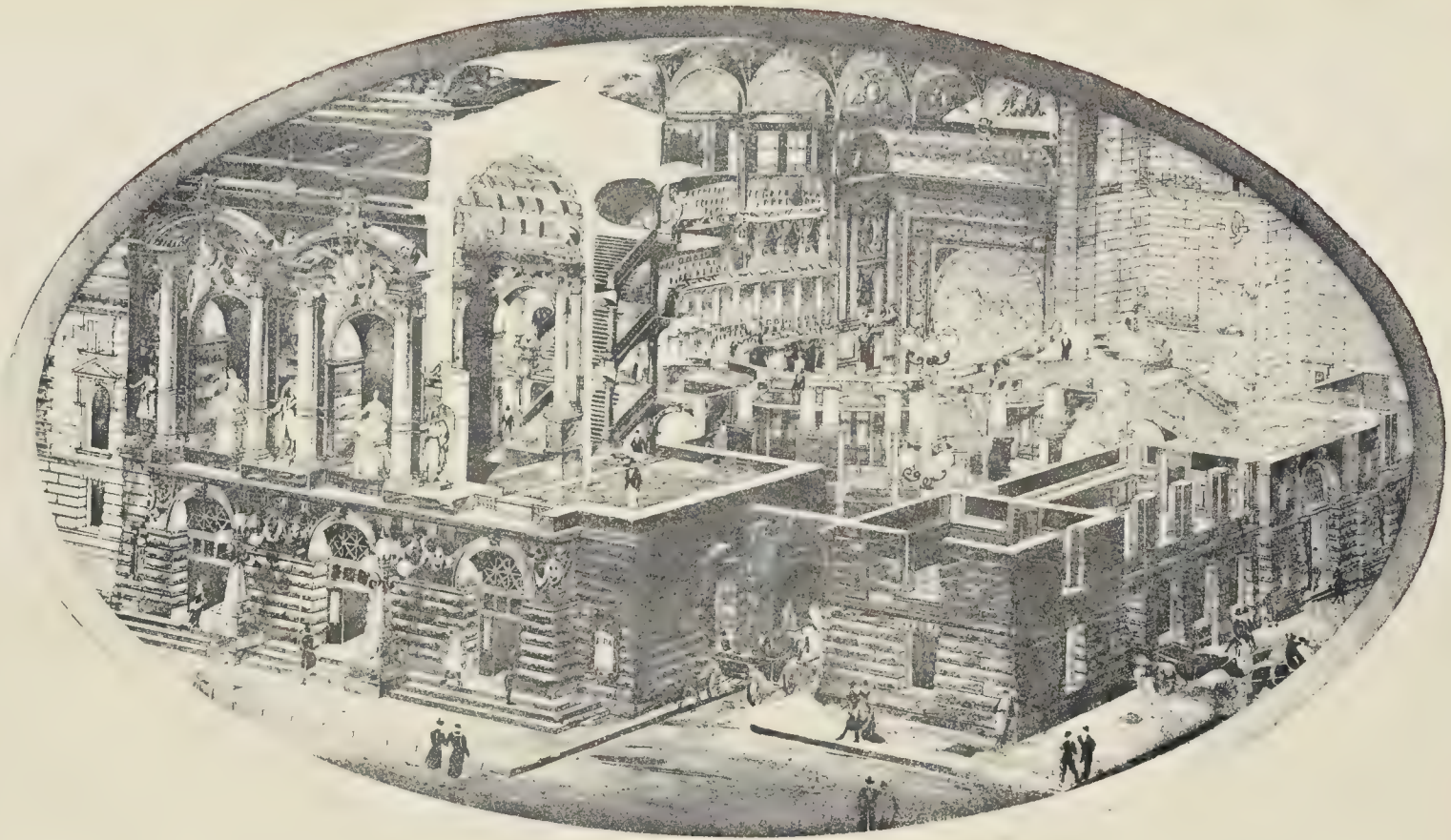
ST. QUENTIN, SOUTH TRANSEPT.

FROM A SKETCH BY THE LATE G. E. STREET, R.A.

J. F. Kell Photo Lith & Printer 8 Castle St. Holborn London E.C.




Whiteman & Bass Photo-litho
Wyman & Sons, Printers, Great Queen Street

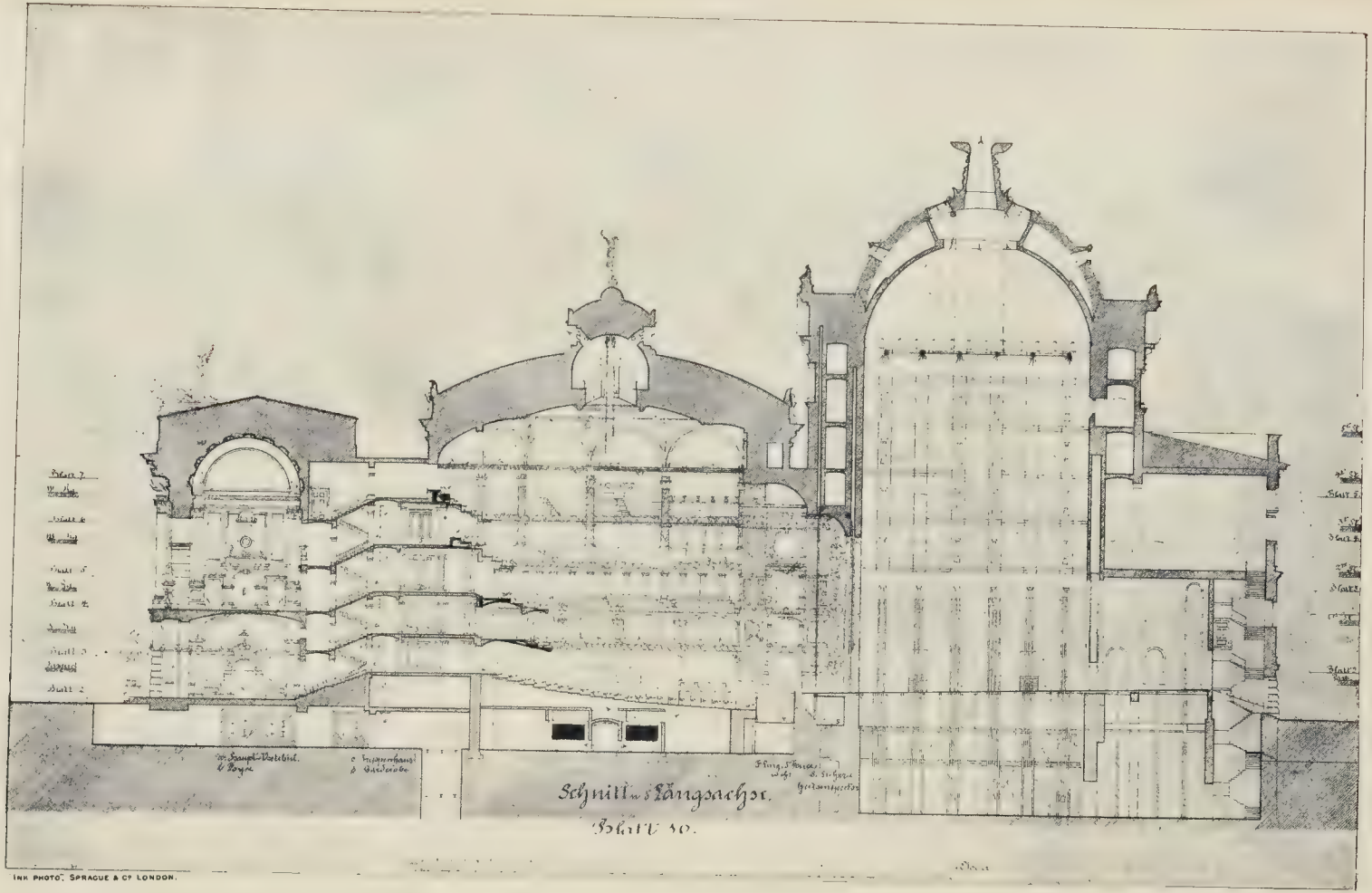


INK PHOTO SPRAGUE & Co LONDON

PRIZE DESIGN FOR A THEATRE. HYGIENE EXHIBITION, BERLIN, 1883.

PERSPECTIVE SECTION.

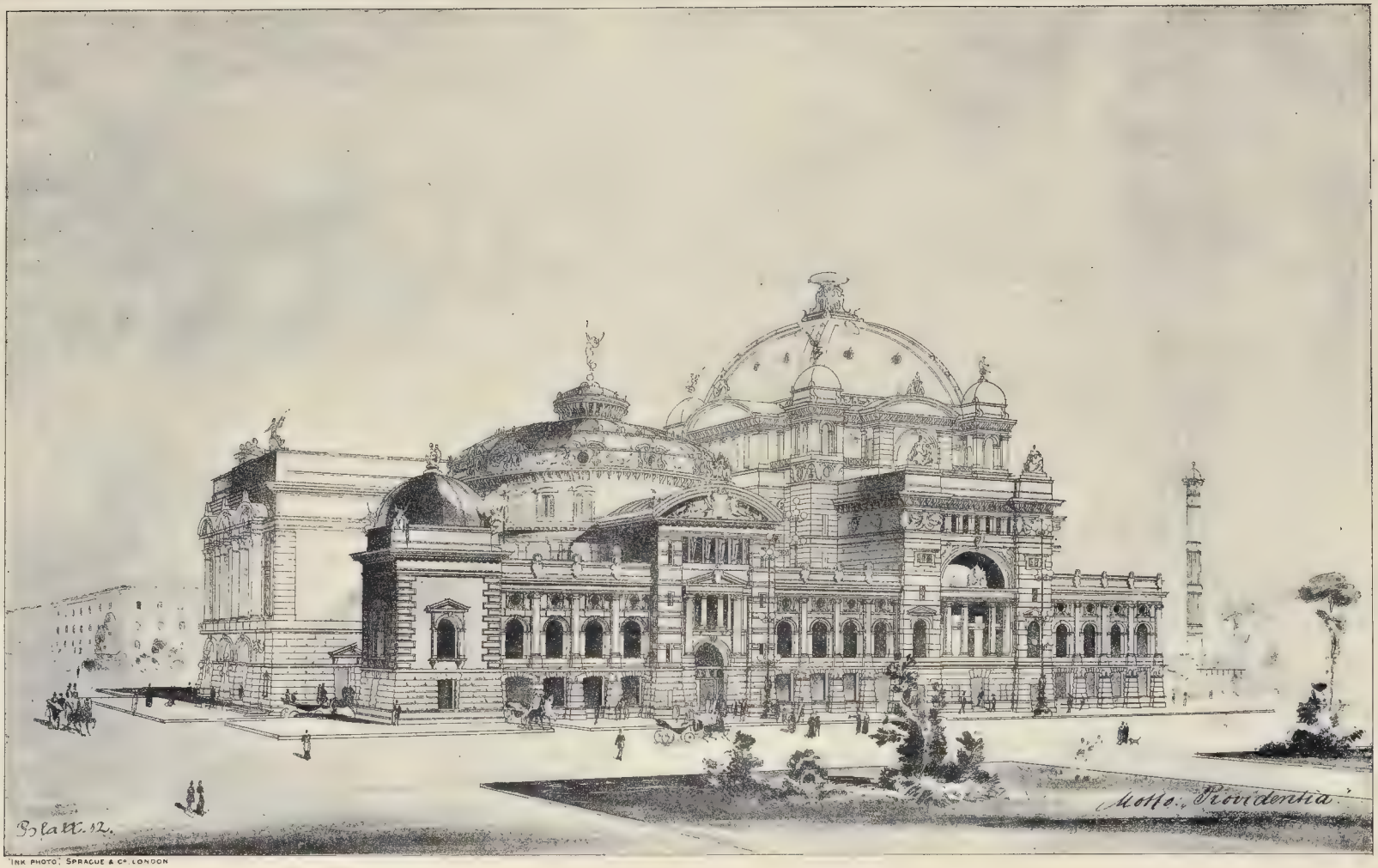
MESSRS. SCHMIDT & NECKELMANN, ARCHITECTS.




INK PHOTO: SPRAGUE & Cº LONDON.

PRIZE DESIGN FOR A THEATRE. HYGIENE EXHIBITION, BERLIN, 1883.

LONGITUDINAL SECTION.

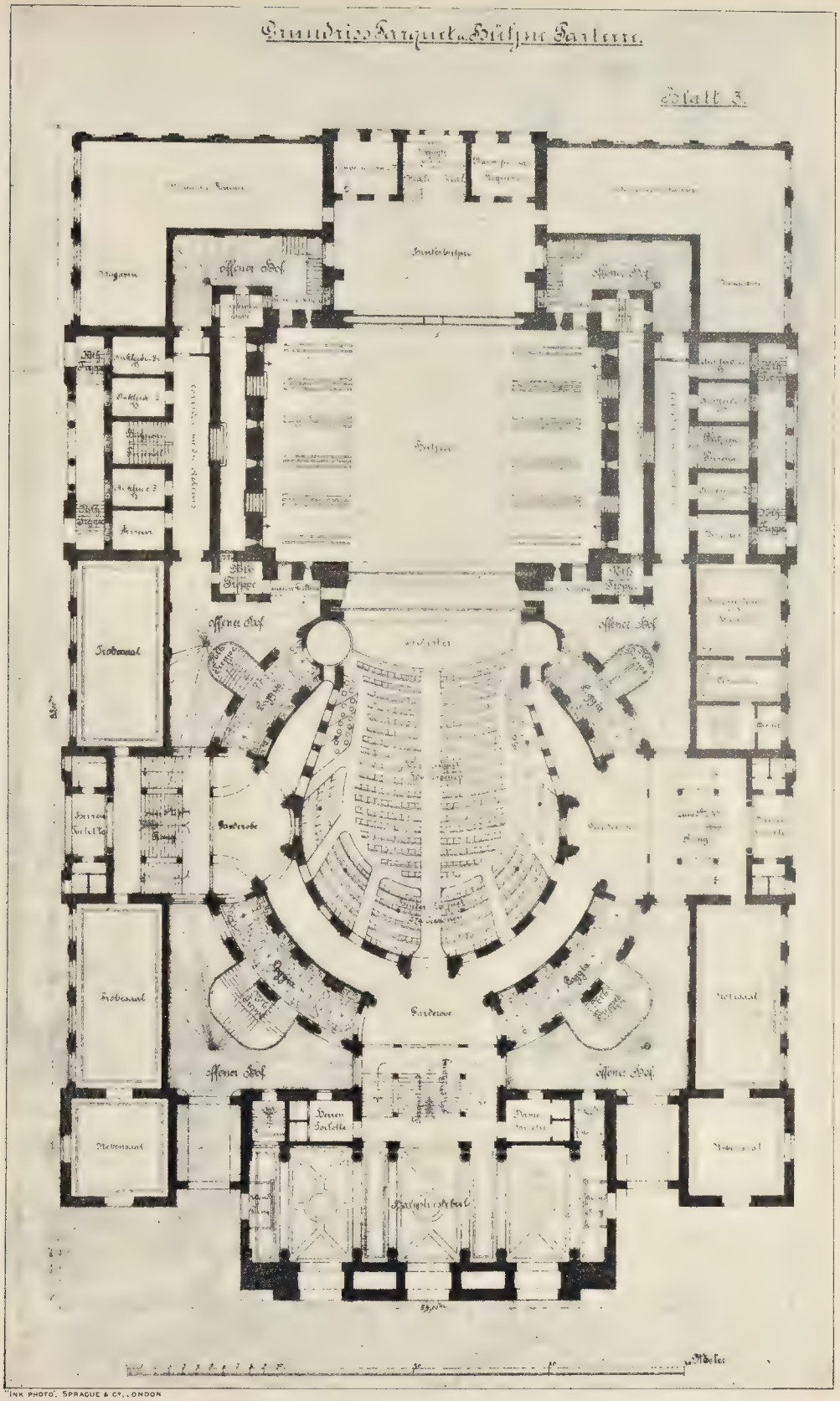



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PRIZE DESIGN FOR A THEATRE. HYGIENE EXHIBITION, BERLIN, 1883.

VIEW OF EXTERIOR.

Messrs. Schmidt & Neckelmann, Architects.

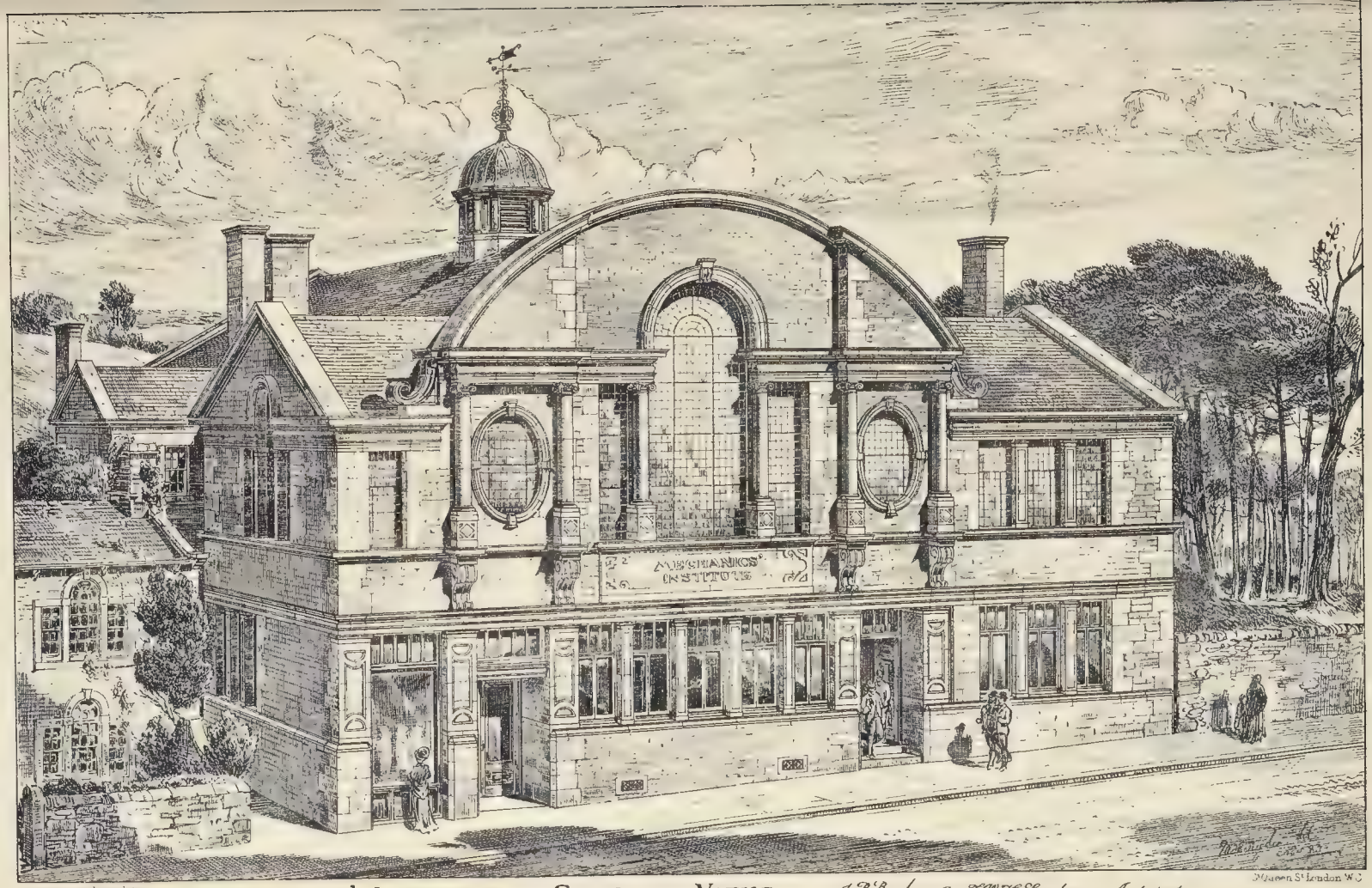



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PRIZE DESIGN FOR A THEATRE. HYGIENE EXHIBITION, BERLIN, 1883.

GROUND PLAN.

MESSRS. SCHMIDT & NECKELMANN, ARCHITECTS




MECHANICS' INSTITVTE . SILSDEN , YORKS . *J.B.Bailey & W.H.Sugden , Architects.*



ROUEN CATHEDRAL: N.W. TOWER.

From a Sketch by the late G. E. Street, R.A.

## HEALTH EXHIBITION LECTURES.

### FOUL AIR IN HOUSES.

A LECTURE was delivered by Professor Corfield at the International Health Exhibition on the 4th inst., on "Foul Air in Houses." Dr. Heron presided, in the absence of Sir P. Cunliffe Owen.

The lecturer introduced his subject by observing that it was one in which all should take an interest. He then proceeded to show the result of breathing air highly contaminated by the respiration of human beings, referring to the catastrophe of the Black Hole at Calcutta on June 20, 1756, where 146 persons were confined for ten hours at night, and 123 were found dead in the morning, while twenty-three of the survivors were covered all over with boils, and in what was called a high putrid fever. Typhus, or gaol disease, was a characteristic of places where there was overcrowding. There was another disease prevalent under such circumstances, namely, consumption. Dr. Guy mentioned an instance of printing-works in which the workers had only just 200 cubic feet of air each, and they died of consumption as fast as if they had had typhus fever. Now, what was the reason why air that had been breathed was unfit to be breathed again,—why rooms that contained air that had been breathed over again were so injurious to health? Was it the diminution of oxygen in the air? The amount of oxygen in badly-ventilated rooms was 2,080 or 2,075 parts in 10,000 of air. The instances were very rare where it was reduced below 2,070. So that the diminution of oxygen was very small. Then that was not sufficient to account for the deleterious results he alluded to, and neither was the increase of carbonic acid, although poisonous. The prevalence of typhus fever and consumption was undoubtedly attributable to the foul organic matter, and the excessive moisture in the air. They were able to estimate the amount of air required by each individual in an hour. That amount was 3,000 cubic feet, so that if he remained in a room seven hours, he would require 21,000. He could not get that in any ordinary-sized room, and so the air required changing. If the atmosphere of a room was in such a condition that a disagreeable sensation was experienced on entering, that was evidence of the presence of putrescible organic matter. The results observed from the entrance of air from drains into houses, whatever way it got in, was the appearance of certain diseases, such as sore throats, diphtheria, scarlet fever, diarrhœa, typhoid fever. Foul air got into houses from bad appliances or from defective arrangements of good appliances, from using things that were out of order, and still more from the disuse of things. New drains were often made of porous materials, which allowed foul water or foul air to pass out. They were feequently made of bricks and mortar, which were very improper materials for such a purpose. The presence of rats was to be regarded as a serious sign, and as a sign that in all probability the drains were out of order. Besides, these rats took some amount of filth from the drain, and very likely they got into the larder. But rats might get into a house through the imperfections of the drains of neighbouring houses. A curious instance of this occurred in a house in which the pipes were imperfectly joined together. A layer of concrete was used by the occupants to cover up the pipes instead of taking them out altogether. The rats made their way into an adjoining house in which the drains were in an excellent condition and made a place under the hearthstone, where they lived and died, and whence they ran all over the house, and had a very nice time of it. When the hearthstone was taken up there were found the remains of thirty-six rats in various stages of decay. That was a curious instance in which a man who did not attend to his own drains might be a nuisance to his neighbours. Foul air often got into houses from pipes which were not properly made. Not infrequently the pipes were laid the wrong way. Instead of being laid with the socket upwards they were laid with the socket downwards, and thus the water ran out and the drains were stopped up. If the pipes were joined with cement that was an excellent plan, but it might be done inefficiently; for instance, the cement might be put round the top of the joint and nothing underneath. Dust-bins were too frequently placed near the walls of houses, and thus foul air passed into the dwellings, first into the basement and next into the upper rooms. Very often connexions were made with the drains from the floor of the house. Openings were made in the drains and they were provided with some kind of trap. A very common trap was the bell-trap, which, a few years ago, was to be found in every house in London. This was a kind of trap which should not be tolerated inside of a house, especially if connected with a drain. Soil-pipes were the pipes into which water-closets discharged. They were very frequently placed inside houses, and often not ventilated. One of the best materials for them was lead; but lead was not the best material if they were not ventilated. Foul air had a propensity to eat through solid lead where the pipes were not ventilated, and thus the foul air escaped into the house, and sore throats and other diseases were the consequence. Dr. Corfield showed examples of soil-pipes which had been eaten through by foul air, and went on to say that they should be ventilated at the top. Ventilators of soil-pipes were not infrequently carried near to windows of sleeping-rooms, and disease was the result. Where there was a foul smell the best way was to throw down some oil of peppermint into the suspected drain. In the case of one country-house he knew of, this had been tried on a soil-pipe in which, in spite of the escape of peppermint, no defect could for a long time be found; but ultimately the wall was opened, and one portion of the pipe was found there which had been struck by a workman with his chisel, and a hole left in it, through which the foul air escaped and wandered through the floors into quite a different part of the house. The most common kind of closet used in houses was the pan-closet, but that was about the worst form of sanitary arrangement ever put into a house. They might have the best arrangements for ventilation, but if there were a pan-closet there was sure to be a nuisance, especially if they had a D-trap under it. This form of apparatus should not be tolerated anywhere. There should be syphon-traps on the soil-pipes; and waste-pipes should not be connected with soil-pipes. Rain-water pipes were frequently placed inside houses; they passed through the bedrooms, perhaps through the drawing-room, through the dining-room or hall, and through a room in the basement to the drain. Proper care was not taken to see that the joints were made air-tight, because they were only the joints of rain-water pipes. But foul air from the drains came up from the rain-water pipe through such leaky joints and passed into the rooms. Lead rain-water gutters were not infrequently taken from the outside of a house through the top rooms. He had known cases of disease caused by rain-water gutters passing under the floors of rooms. Waste-pipes of cisterns were not uncommonly connected with drains or soil-pipes, and so foul air got into the cistern. The best plan was to cut off the waste-pipe and make it discharge into the open air. Foul air frequently travelled about houses by means of tubes through which the bell-wires ran. This was a fact which was not so much attended to as it should be. He had known instances where the rooms had become uninhabitable from the foul air passing through those tubes. Foul air was not uncommonly produced by a slight escape of coal gas, through the gasfittings not being perfectly air-tight. The smell caused by this was very peculiar, and it was not easy to detect. Whenever there was a doubt as to a peculiar smell in a room the gas-pipes should be tried. He did not mean that they should try with a light, for the escape would be too slight for that. Coal gas contained carbonic oxide, one of the most poisonous of gases. It was through this slight escape of coal gas that headaches were often produced. Foul air from drains sometimes got into larders, and so affected the food. It was not uncommon for soil-pipes to pass downwards through the larder. Milk rapidly absorbed foul matter from the air and became poisonous. It was exceedingly dangerous to have in a house sanitary apparatus not in use. Foul air came in through them. Dr. Corfield mentioned a case, by way of illustration, of a large school-house formed by two houses being thrown into one. The sanitary arrangements were thought to be perfect, but in one of the houses was a sink that was not wanted. The scullery was not used, and the foul air that came through the sink and from the bell-trap was "enough to turn a windmill."

A cordial vote of thanks was passed to the lecturer.

## THE PARKES MUSEUM.

THE annual report of this valuable Institution, adopted at the general meeting held at the Museum, 73A, Margaret-street, Regent-street, on Wednesday last, observes that "the first year of the occupation of its new premises by the Parkes Museum has been mournfully marked by the death of the President, H.R.H. Prince Leopold, Duke of Albany. This event has been an incalculable blow to the progress of the Museum.

The able address which His Royal Highness delivered at the opening of the Museum in May, 1883,* was an evidence alike of the sympathy which he felt for Sanitary Science, and of the importance which he attached to the diffusion of that branch of knowledge through the country. The Council feel that in losing His Royal Highness they have lost a President who had the interests of the Museum deeply at heart, and who would have spared no effort to render it worthy of the objects for which it was established. The Council have carefully considered the question of electing another President, but they think that it is undesirable to take steps in this matter at the general meeting of this year. The Council have the satisfaction of being able to report that the Museum has made a considerable advance during this, its first year in the new building.

In January of this year, Dr. Louis Parkes, nephew of Dr. Parkes, in whose memory the Museum was founded, was appointed honorary librarian, and he has since his appointment devoted himself to a more regular classification and complete labelling of the books, reports, and pamphlets contained in the library, so that any volume sought can now be found more readily than had hitherto been the case; in addition to this, the work of cataloguing the library has been taken in hand, and is now in an advanced state of preparation. Numerous and valuable presentations have been made to the library during the last year; but to mention here even a few of the names of the munificent donors would occupy more space than could be spared in this report. The total additions to the library since June, 1883, have amounted to about 530 volumes; and the present collection, in point of numbers and of extent of subjects embraced, forms a very valuable library of sanitary literature.

The library and reading-room, although now open to the student on the payment of the small fee of 5s. a year, has not been so largely frequented as might have been anticipated, when its numerous advantages are considered. The Council are deeply indebted for many services rendered to the Museum by its honorary officers.

During the year the Sanitary Institute of Great Britain and the National Smoke Abatement Institute have been provided with office accommodation in the building, and a space in the Museum has been set apart for the exhibition of smoke abatement apparatus. Although these two societies have not in any way amalgamated with the Museum, it is felt that, their field of labour being so similar, this association of offices will be beneficial to all, and will also prove an advantage to the public generally.

Since the opening of the Museum in its present premises, the number of members has largely increased. The members numbered 99 on the 30th of June, 1883, just after the opening of the Museum. They now number 260. During the year the Museum has been visited by 6,870 people.

The financial position of the Museum is not as yet so firmly established as the Council could wish; but they feel assured that if the members would evince their interest in the Museum by bringing the good work that it is accomplishing under the notice of all the various people with whom they are brought into connexion, both in business and otherwise, so as to add to the number of members, they have reason to hope that the income of the Museum would be sufficient to carry out its objects with even more usefulness than at present.

All things considered, the Council are able to look back upon the first year's work of the Parkes Museum with considerable satisfaction.

The utility of the Museum has increased month by month. The Museum has clearly

* Reported in full in the *Builder* at the time.

met a great public want, and the Council would again strongly urge upon the members, and upon all who are interested in sanitation, to use their personal influence, so to increase the number of members and life members that the future of so valuable an institution may no longer be a matter of doubt."

## ACTION FOR THE RECOVERY OF ARCHITECT'S FEES.

TOMLINSON *v.* BARNETT.

On Tuesday last, this case came up for judgment before Mr. Justice Field.

The plaintiff, an architect, of 35, Great James-street, Bedford-row, W.C., brought an action for the recovery of fees for plans, &c., for erection of houses at Sutherland gardens, Maida-vale, and for a further sum promised him for extra supervision, in consequence of the failure of the builder to perform his contract. The total sum claimed was 167*l.* 7*s.*, and the defendant, who described himself as an engineer, put in a counter-claim to the amount of 2,000*l.* for alleged negligence. The defendant had by order previously paid into Court 100*l.*, beside the sum of 27*l.* 10*s.* obtained by the plaintiff on account, and it having been agreed that the plaintiff was entitled to the sum of 91*l.* 7*s.* for plans, &c., and a fair sum for extra supervision from the time of the builders leaving the works until completion. Mr. Henry Hunt, of 45, Parliament-street, Westminster, was appointed referee to report on this and upon the counter-claim. The evidence showed that the plaintiff had been put to considerable annoyance, having been held responsible by several firms for goods supplied for the defendant's houses. Mr. Hunt reported that the plaintiff was entitled to the sum of 26*l.* 5*s.* for extra services, and that the defendant was not entitled to anything on his counter-claim. His lordship entered judgment, with full costs, for the plaintiff accordingly.

## CASE UNDER THE METROPOLIS MANAGEMENT AND BUILDING ACT AMENDMENT ACT.

A CASE of considerable importance to builders was decided at the Surrey Sessions on Tuesday last.

A Camberwell builder, Mr. James Hampton, had laid out for building a plot of ground in the rear of some houses in Chiswell-street, and had erected thereon six blocks of combined dwellings, approached by a street only 16 ft. wide, without having first obtained the approval of the Metropolitan Board of Works. The Vestry of Camberwell complained to the Board, who thereupon directed proceedings to be taken for an infringement of the 8th section of the Metropolis Management and Building Act Amendment Act, 1882, 45 Victoria, ch. 14, which requires that where it is intended by any person to lay out any road, passage, or way for building, as a street for foot traffic only, such person shall give notice to the Board of his intention, and the Board may, on the receipt of such, approve of the formation of such street, either with or without conditions, or may decline to approve of the same, and in the event of the road not being approved, it cannot be lawfully formed.

The defendant in this case, on proceedings being commenced, placed gates at the entrance to the street leading to the houses built by him, and contended that the public not having the right of access to the street it was not subject to the provisions of the Act. The case was heard before Mr. Chance at the Lambeth Police Court on the 29th of May last, when the defendant was represented by counsel. After a lengthened discussion the magistrate convicted the defendant, and imposed a penalty of 20*s.*, and costs, the maximum fine being 40*s.*

The defendant appealed to Quarter Sessions against the conviction, and the case was again argued on Tuesday last, the 8th inst. Mr. Horace Avory, instructed by Mr. Thos. Burton, appearing for the Metropolitan Board of Works, the respondents, in support of the conviction; the appellant being represented by Mr. Besley and Mr. Ernest Baggalay.

After hearing the evidence the magistrates dismissed the appeal, with costs, subject to a case being stated for the opinion of the Superior Court (which will probably be the Court of Queen's Bench) as to whether the street in question is "a road, passage, or way" under the meaning of the 8th section of the Metropolis Management and Building Act Amendment Act, 1882.

**The Reform Club, Liverpool.**—The Liverpool Reform Club, which has for some weeks been closed for repairs and redecoration, has been again opened for the use of the members. The work has been done from the designs of Mr. Edmund Kirby, architect, and under his direction. Messrs. Wannop & Son, of Renshaw-street, have done the painting and decoration, and the panelled dado to the dining-room is the work of Messrs. Norbury, Upton, & Patterson, all of Liverpool.

## DISSENTING CHURCH-BUILDING NEWS.

*Hoylake.*—The foundation-stone of a new Congregational Church at Hoylake was laid a few days ago. The site of the new church is at the corner of Station-road and the road to West Kirby. It will not only afford space for the present building, but for a much larger church at some future date, when the edifice now to be erected will be used as a lecture-hall and class-room. The present building will be constructed of brickwork and covered with Welsh slates. Messrs. Smith, builders, of Hoylake, are the sole contractors; and Messrs. W. & J. Hay, of Liverpool, are the architects, from whose designs and under whose supervision the work will be carried out. The cost of the building will be about 1,650*l.*

*North Shields.*—The Free Methodist Church, North Shields, which was designed by the late John Green, of Newcastle, something like forty years ago, and is in the Italian style of architecture, is about to undergo considerable alterations and improvements, including the introduction of an ornamental pulpit-platform in place of the present pulpit, together with a re-arrangement of the galleries. The church is to be newly painted and decorated throughout. The committee have engaged Mr. J. J. Lish, architect, Newcastle-upon-Tyne, to carry out the works.

*Newcastle-on-Tyne.*—The design of Messrs. S. Oswald & Son, of Newcastle, has been selected in the limited competition for a new Wesleyan Chapel to be erected at Heaton. The chapel will seat 900 to 1,000 persons; and adjoining it there will be a lecture-hall for 350, besides five class-rooms and vestries. The style adopted is Early English.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—II.

AFTER examining the books and examples referred to last week on the subject of Native Indian Architecture, and postponing, for the present, the consideration of Indian Saracenic Architecture, the student will do well to learn something of the architecture of two other distant parts of the globe, namely, of Mexico in one direction, and of China and Japan in another direction.

China is treated of in Fergusson's Handbook, at page 133, and in his History, in vol. ii., at page 733; and he remarks that the Chinese differ from all European nations, not only in the objects they propose to attain by their arts and in the forms in which they seek to embody their conceptions, but also in the processes by which they carry them out. Their largest works belong rather to engineering than to architecture, as evidenced by their bridges and embankments, and, last but not least, by their Great Wall, said to be about 1,400 miles long and over 20 ft. thick.

With regard to their more architectural works, Rosengarten, page 54, says that Indian art made its entrance into China with the worship of Buddha, and he points out the use of *bracket* construction in place of a capital for the support of the architrave, owing probably to the use of wood, added to the cravings of a restless fancy. They were not satisfied with ordinary straight lines, but curved their roofs about, especially at the eaves and at the feet of the hips, in a distracting manner. Such treatment, when sobered by the effect of repetition in their many-storied pagodas, is not unpleasing. (A pagoda may be seen at Kew Gardens.) In their gateways, a similarity to the construction in the Sanchi Tope, mentioned last week, is pointed out by Fergusson, with the exception that the ends curl upwards instead of downwards.

Some idea of Chinese Domestic Architecture may be gathered from the wonderful models of houses, with their surrounding pleasure-grounds, at the South Kensington Museum, and no doubt their minute accuracy would admit of their being enlarged without much loss of correctness. The frequent use of the *fret* should be noticed in Chinese art.

The adjoining country of Japan possesses some interest for us now that we have so many specimens of its wonderful art in our midst, but until recently we have not had much information about its architecture. This want has now been admirably supplied in Dr. Dresser's "Japan," illustrated with many views of buildings, in addition to drawings of the smaller objects with which we are now familiar. On p. 102 is represented the old wooden building in Nara, where the Mikado's treasures have been preserved for 1,200 years. The roof has been restored, but the body is probably the oldest wooden building known. Here the eaves and hips are straight. The whole building is raised on posts clear of the ground, which may account for the preservation of the wood for this astonishing number of years. Although many instances are given of roofs with a hollow curve from ridge to eaves, there is not much of that curling up of the hips so common in Chinese architecture. At the same time, most elaborate bracketing is used. The treatment of columns and the general proportions of buildings are quite different from anything that we are accustomed to think correct.

On page 148 will be found an interesting example of a tie-beam roof, the beam being used, as in many of our English examples, to steady the walls and to support the roof posts rather than to hold together the feet of the principal as in a truss.

There is given on page 201 a pagoda at Nikko, which is much more cumbrous than the Chinese examples, and also much less curved up at the hips of each tier of its roof. Both in this view and one of the end of a wall, on page 113, should be noticed the jointing of the masonry at the angles of such walls. These are tilted up, but probably for a very different reason from that in the case of the roofs, namely, for preventing the quoin stones from getting loose. This should be borne in mind when Egyptian walls come under consideration, though there was probably no connexion between the two countries.

The Temples at Osaka, illustrated on page 140, bear a stronger resemblance than do the Chinese gateways to the before-mentioned gateways of the Sanchi Tope; the wooden construction is further emphasised by the keys driven through the posts to tighten the cross beams, the upper ones of which are curved upwards throughout their whole length, and the under ones straight.

A journey across the Pacific to Central America introduces us to styles of architecture that are yet further removed than any of the above-named from the *sequent* styles. Here we come to the architecture of Mexico and Peru, which offer ample subject for study and food for thought, and for this reason, that they bear such a tempting *resemblance* to the styles of other countries that it is difficult to believe that there has been no exercise of influence between one and the other; but after enumerating the various theories by which Mexican architecture has been ascribed to the influence of Egyptians, Babylonians, Moguls, and,—at great length by Lord Kingsbrough,—to Jews, Fergusson, page 147, concludes that, on the whole, we may safely exclude all such considerations, and treat of the architecture of Central America as complete in itself and unconnected with any known style.

The best books in the library of our Institute to study on this subject,—though not found in the catalogue under the title of "Mexico,"—are by J. Stephens, and beautifully illustrated by F. Catherwood. They are "Incidents of Travel in Central America, Chiapas, and Yucatan," 2 vols. 8vo., New York, 1841; and "Incidents of Travel in Yucatan," also 2 vols. 8vo., New York, and published two years later, in 1843.

The peculiarity of the Mexican temples consists in their being built on the top of substantial pyramids, and in being of very massive construction with slanting roofs, constructed with oversailing corners of stone. Some light is thrown upon the necessity for this method of construction by the description of an earthquake which the author experienced, and which are said to be of frequent occurrence. In many of the temples the external walls are divided horizontally, the lower portion being essentially massive stonework and the upper part also in stone, but copied from wooden construction; indeed wooden lintels are actually found in some buildings, and the fact of their not having yet utterly decayed, in spite of an unpropitious climate and neglect (as compared with the Japanese example), points to the possibly modern date of these structures.

Fergusson's chronological table ranges over a short period, from the arrival of the Toltecs in 648 A.D. to the arrival of the conquering

Spaniards in 1519, during which this curious out-of-the-way style attained a very high degree of artistic merit. In support of this statement, a visit should be paid to the collection of sculpture, &c., formerly at Mr. Franks's, in Victoria-street, and now at the British Museum. A type of head will be found, showing a technical knowledge of modelling and a grasp of character very much in advance of most antique sculpture,—excepting, of course, that of Egypt, Greece, and Rome.

There are a great many stone idols carved on upright monoliths in which so much space is allotted to the head-dress above the head, that the face itself comes about a third of the way down the stone; the surmounting head-dress consisting of a conglomeration of confused ornament. In vol. ii., however, of Stephens's earlier book, facing p. 349, an idol or statue is represented in which this head-dress is distilled, so to speak, into a grand and simple form that is wonderfully suggestive of the colossal Osiride figures in Egypt.

The frequent use of hieroglyphics covering a great portion of the wall-space supplies another point of resemblance to Egyptian art; but both facts are probably mere coincidences, showing how different people may arrive at similar results.

There is another feature which can hardly be anything but a coincidence, and that is a trefoil-headed opening not unlike those that are found in Gothic work! An example of this will be found facing p. 344 in the volume last mentioned.

The use of the fret as an ornament has probably never been carried to such gigantic proportions as in Mexican work. It has been noticed above in speaking of the Chinese, and would there seem to have been suggested by the rectangular lattice framing of their carpentry and joinery. In Mexico, on the contrary, the first indications of it may, perhaps, be found in the system of making some of the facing stones to project beyond the rest, which produces a number of shadows in irregular directions,—now along the wall, now down, now back again twice as far, now up again, and so on.

As regards the surface sculpture generally, as applied to buildings, it is of the class best described as "bogey"; but the broad pilasters which separate the openings leading into the temples are sometimes ornamented with bas-reliefs of gods or priests, executed with extreme delicacy and refinement. These priests are represented with flattened foreheads and long noses of the Aztec type, and do not differ much from each other; whereas the other heads, carved about in various positions, have the appearance of individual portraits, and the element of caricature is conspicuous.

The almost neighbouring country of Peru is a degree more puzzling than Mexico, so far as regards the origin of its architectural style; for this does not even bear any resemblance to that of its neighbour: on the contrary, whereas the Mexican style revels in sculptured decoration, the Peruvian buildings are austerely severe, and are examples of masonry rather than of architecture.

Fergusson, on page 154, attributes a very short existence to the style, namely, from the time of a godlike man, known as Manco Capac, in the thirteenth century of our era, to the conquest of the country by Pizarro in 1534, during which short time he notices great progress to have been made in the art or science of masonry. Curiously enough, this Peruvian work, which can hardly have had any connexion with that of Europe or Asia, presents two features that are characteristic of the Pelasgi and (perhaps we should say, or) the Etruscans, of whom more will be said in the proper place. But after all, this is only one of the proofs that architecture is primarily a matter of construction, for both these people had to construct with the same kind of materials, huge stones of irregular shape forming the masonry known as Cyclopean (or such as might have been put together by the fabulous one-eyed giants known as Cyclopes), which masonry led to another point of similarity, namely, the openings in such walls narrowing upwards, so as to reduce the work of the stone lintel. Even after their skill in masonry had improved, the sloping form of the openings survived, and was employed in buildings of the most refined construction, and the result is a most striking resemblance to the European style known as Etruscan.

A more curious coincidence is pointed out by Fergusson in describing the walls or fortifications enclosing Cuzco, the ancient capital of the kingdom; for here we find a series of walls, one behind another, arranged in the form adopted by modern military engineers to withstand the assault of firearms, and it is extremely improbable that the use of gunpowder was known to the builders of the walls of Cuzco.

It is possible that other hitherto unknown countries may be discovered, exhibiting recognisable styles of architecture, either detached from or linked on to the chain which we have next to consider, and before taking leave of those already mentioned, attention should be drawn to the ingenious manner in which these ruins have been restored and re-inhabited by the rich fancy of Viollet-le-Duc, in his work on the "Habitations of Man in all Ages."

Ethnology is no mean factor in the study of architecture, and, even if the same climate and the same materials be given, a distinct impress will be added by the temperament of those who build.

We will now take leave of the fringe of the web (to use the simile adopted last week), and endeavour to grasp the beginnings of those threads which can still be traced in architecture of our own day.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*June* 27.—9,468, J. Brooks, West Bromwich, Door-knobs, &c.—9,479, A. Shepherd, Birmingham, Dwarf Window-blinds.—9,514, J. F. Spong, London, Blinds.

*June* 28.—9,522, S. Hirschberg, Berlin, and T. Bath, Berlin, Germany, Combined Bedstead, Wardrobe, Washing Utensil, Support, and Drawers.—9,546, E. G. Brewer, London, Cooling and Ventilating Apparatus. Com. by L. Koppel, Dresden.—9,552, G. H. Jennings, S. Jennings, and J. Morley, London, Controlling, Regulating, &c., the Supply of Water for Sanitary purposes.—9,553, G. H. Jennings and S. Jennings, London, Controlling, Regulating, &c., the Supply of Water for Sanitary purposes.

*June* 30.—9,568, C. Callow, Burnley, Suspending and Adjusting Venetian Blinds.—9,573, J. C. Baker, London, Ventilating Buildings, &c.

*July* 1. 9,598, J. Adams and J. Telford, Liverpool, Preventing Down-draught in Chimney-tops and Ventilators.—9,604, J. H. Gibson and W. Glazier, Liverpool, Curtain-stretching Apparatus.—9,647, H. H. Lake, London, Ventilating Cap or Cowl. Com. by H. L. Day, Minneapolis, U.S.A.

*July* 2.—9,657, J. J. Green, Halifax, Chimney-pots.—9,667, J. C. Snelling, West Croydon, Bricks. 9,670, W. W. Fyfe, Aberdeen, Ventilators.—9,671. J. Linden, London, Blind-holder or Stretcher.—9,685, G. L. Pearson, London, Appliances for Detecting the efforts of burglars, &c., to enter premises.—9,699, S. Frankenberg, London, Damp-proof Compound, &c.

*July* 3.—9,705, W. P. Thompson, Liverpool, Manufacture of Panels, Frames, &c., for Decorative purposes. Com. by W. Saul, Jersey, U.S.A.—9,740, L. R. Marsden, Darwen, Apparatus for Stretching Curtains, &c.

### SPECIFICATIONS ACCEPTED.†

*July* 1.—976, E. Lloyd, London, Kitcheners.—1,690, J. D. Mackenzie, London, Sash-bars or Astragals for Roof-lights and Window-sashes.—2,653, C. H. Riley, Huddersfield, Chimney-tops.—7,118, E. P. Gibbon, Dublin, Channel Roofing and Awnings.—8,091, F. Cuntz, Karlsbad, Automatic Flushing Tank.—8,327, W. Smith, Barnard Castle, Ovens.

*July* 4.—6,403, C. D. Abel, London, Converting Liquids into Spray for Ventilating Purposes. Com. by E. Oehlmann, Berlin.—7,507, H. Trott, London, Water-waste Preventer and after-push combined, for Water-closets.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending July* 5, 1884.

5,333, W. P. Kelly, Mount Brandon, Retaining and Releasing Window-blind Cords, &c. (Nov. 12, '83, 6d.)

A box is fitted in which are two wooden blocks, one of which is wedge-shaped, while the other has a corresponding recess. The cords pass through the box and between the blocks, being jammed there by a spring behind one of them.

5,388, H. A. Goodall, London, Blinds for Windows. (Nov. 15, '83, 6d.)

These are made of slate, of wood crossed on each other and pivoted at their crossings, and to keep them stiffly in position a longitudinally grooved rail, extending from side to side, is placed above and another below the slats, which rails slide in the grooves of similar vertical rails the whole height of the window.

5,391, J. Warhurst, London, Excluding the Entrance of Draughts and Rain, &c., to Rooms. (Nov. 15, '83, 6d.)

This is an improvement on Patent No. 1,690, of 1869, in fitting the strip of wood to a roller, on which is a quick pitched screw-thread fitting into a nut projecting beyond the edge of the door. A coiled spring surrounds this roller to keep the strip up in the door when the same is open, but when the door is shut the nut presses against a plate on the door-post, and the roller is revolved thereby, and the strip is pressed down on the floor.

5,467, M. Mackay, London, Plastic compounds. (Nov. 20, '83, 4d.)

This compound for ornamental architectural use, &c., is made of lac, gum sandarac, rosin, ivory black, or other carbon and asbestos.

5,576, T. H. Fielding and A. U. Jonsen, Sydney, Protecting Buildings, &c., from Heat. (Nov. 29, '83, 2d.)

Metallic foil or leaf is applied to the outer surface of the building, &c., to be protected. (*Pro. Pro*)

5,585, W. J. Penny, London, Window-sashes and Sash-frames. (Nov. 30, '83, 6d.)

The sashes slide in between the beads as usual, but, to enable the sashes to be turned to clean, &c., the outsides thereof, either the beads are divided into two parts longitudinally, which parts are hinged together to allow the projecting part to be turned out of the way of the sash, or the side stiles of the sashes are similarly divided just clear of the beads, the two parts being hinged together on one side, and on the other being secured by bolts, &c., so that when these are disconnected the window can turn like a door.

5,596, G. Graig, Harvieston, Ventilating Apparatus. (Dec. 1, '83, 2d.)

The fresh air is introduced into the room in the centre of the ceiling, and immediately under the mouth of this inlet is a circular concave deflecting plate to spread the current of air all over the room. (*Pro. Pro*)

5,600, G. F. Redfern, London, Substitute for Stone, Bricks, &c. Com. by J. Stickle, Denver, U.S.A. (Dec. 1, '83, 2d.)

Moulds of the required pattern are filled with pieces of scoria, and then molten scoria is poured in to bind them together and shape the block. (*Pro. Pro.*)

5,824, A. M. Clark, London, Metallic Plastering surfaces. Com. by J. Stanley, New York, U.S.A. (Dec. 20, '83, 6d.)

Wire cloth is used as a plastering surface, and it is also corrugated or ribbed to stiffen it.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

## MEETINGS.

### SATURDAY, JULY 12.

*International Health Exhibition (Conference of the Royal Institute of British Architects).*—At 2 p.m. (1), Mr. George Aitchison, A.R.A., on "The Sanitary Aspect of Internal Fittings and Decoration"; (2), Mr. William White, F.S.A., on "The Hygienic Value of Colour." The discussion to be opened by Mr. T. W. Cutler.—At 4 p.m., Mr. Thomas H. Watson on "The Collection, Storage, Management, and Distribution of Water, for Domestic Purposes, within the House." The Right Hon. A. J. B. Beresford Hope, M.P., Chairman for the day; Professor T. Hayter Lewis, Vice-chairman.

*Association of Municipal and Sanitary Engineers.*—Meeting at Newcastle. 10.30 a.m., Closing Business. 11 a.m., Visits to various works.

*St. Paul's Ecclesiological Society.*—Visit to Winchester by 9 a.m. train from Waterloo. The Cathedral and St. Cross will be visited, under the guidance of Mr. Somers Clarke, F.S.A.

*Association of Public Sanitary Inspectors.*—Visit to Messrs. Doulton's Potteries 10.45 a.m. Subsequently at 1.45 a steamboat will leave Westminster Bridge for the works of Messrs. Johnstone, at Belvedere, Kent.

### WEDNESDAY, JULY 16.

*National Smoke Abatement Institution.*—Meeting to consider the Bill now before the House of Lords to Amend the Smoke Abatement Act. 3 p.m.

## Miscellanea.

**The "Sir John Gray Reservoir," Dublin.** On the 26th ult. the Lord Mayor of Dublin performed the ceremony of turning the water into the new reservoir at Stillorgan, which, in memory of a distinguished citizen, who took a leading part in promoting a perfect system of water-supply for the city, has been named the "Sir John Gray Reservoir." The Lord Mayor stated that the reservoir covered 22½ acres, and it was capable of holding 88,000,000 gallons: and this, they believed, would meet any possible emergency. He need scarcely inform his fellow-citizens, many of whom he saw present, that the water of the great reservoirs at Stillorgan was collected from a water-shed of 14,000 acres, and that there was impounded in these reservoirs 2,400,000,000 gallons, which it was calculated would last the city and the suburbs 170 days. The greatest possible care was taken to convey the water supply to the city in a pure state. Great trouble was taken in having it filtered. The Waterworks Committee, through the medium of a large accumulation in the reservoir, were enabled to send a constant supply to the city and to the whole of the outlying townships, with the exception of Rathmines. The district which was embraced in the area of supply reached as far south as Bray, and in the north as far as Drumcondra and Glasnevin. Mr. Neville is the engineer.

**New Buildings in London - wall and Coleman-street.**—A new face is at present being given to a considerable portion of London-wall and Coleman-street by the erection of several new buildings on an extensive site belonging to the Drapers' Company, which has been cleared of the old buildings that until recently stood upon it. The site thus cleared covers an area of upwards of 30,000 ft., or about an acre in extent. Amongst the new buildings now on the point of completion is one in Coleman-street, immediately opposite the Armourers' Hall. It contains four lofty floors, and is faced with Portland stone, freely carved, having fluted piers and pilasters between the windows. The building has also a similar return frontage in London - wall. Mr. George Vickery is the architect, and Mr. Morter the contractor. Immediately adjoining, with its frontage in Coleman-street, is another building, much resembling this in its architectural features. Messrs. W. & F. Croaker, of Great Dover-street, are the contractors. The Coleman-street frontage of these two buildings is upwards of 70 ft. in length. In continuation in London - wall westward is another building forming a block of warehouses, with a frontage of 30 ft. in length, and extending 70 ft. in depth along an intended new street or approach to several sites yet to be built upon. This building, containing four stories above the ground-floor and basement, is faced with red brick and stone dressings, and covers a ground area of about 1,700 ft. Mr. W. E. Brown is the architect, and Mr. R. Conder the contractor. On the west side of the intended new street just referred to, and opposite the last - named building, is another extensive block, having a frontage to the intended new street of about 70 ft. in length, with a return frontage in London-wall upwards of 30 ft. long. It is 60 ft. in height, containing five lofty floors. It is faced with white Suffolk brick, having Portland stone dressings with red brick bands. Mr. Lewis Solomon, of Gray's-inn-square, is the architect, and Messrs. Patman & Fotheringham are the contractors. Beyond the last-named building another block of warehouse premises is approaching completion. They are faced with Portland stone, having polished Shap granite piers at each side of the ground floor. Messrs. Joseph & Pearson are the architects, and Messrs. Patrick & Sons are the contractors. The entire London-wall frontage of these several buildings is about 200 ft. in length. The Drapers' Company announce the sale, on building leases, of thirteen more sites on the estate, covering an aggregate of 20,000 ft., each site containing 1,500 ft.

**The Inventors' Institute.** — The annual dinner of this Institute took place on the 2nd inst. at the Health Exhibition. Admiral Jasper Selwyn presided, and about eighty gentlemen sat down to dinner. After the usual loyal toasts, the Chairman gave "Success to the International Health Exhibition." Mr. Winter responded. "Inventors and Inventions" was proposed by Mr. Davey, who maintained that the advancement of the interests of inventors meant the advancement of the interests of civilisation itself. Mr. J. Standfield, C.E., in replying, traced the progress of inventions during the last quarter of a century, and referred to the new patent law. Previous to the new Patent Act it had been considered by the world that the English were not inventors but improvers. He had always maintained that the number of patents taken out was controlled by the fees which were demanded for them, and his opinion had been fully borne out by the operation of Mr. Chamberlain's Patent Act which had come into force only this year. There were more patents taken out in England during the first three months of this year than had ever been taken out in England in any year before that. He ventured to predict that the number would continue to steadily increase. Those countries which gave the greatest facilities to inventors gave the greatest facilities to trade and commerce. He referred especially to the immense service rendered not only to his own country but to the interests of civilisation at large by Trevethick. He also spoke of the important inventions of Dudd Dudley, Wedgwood, John Allen, Wm. Lee, and Arkwright.

**The Wallace Memorial, Aberdeen.**—In regard to this competition, we learn that none of the designs lodged have been accepted in their present form; but revised designs have been invited from the three competitors having for mottoes "Patriot," "Spes," and "Fortiter."

**A New Dock at Battersea.**—A new dock which has been excavated and built on a large tract of ground adjoining the foundry works of Mr. Allan Ransome, at Battersea, was opened on Wednesday. New flour-mills, which will be an immediate source of profit and commerce for the dock, were also opened at the same time. These mills are fitted with improved machinery by Messrs. Marriage, Neave, & Co., and are intended to compete with the American efforts to absorb the milling trade of this country. The dock entrance is midway between the Albert and old Battersea bridges, and the dock extends from the southern shore of the Thames nearly to the highway between the town and the park, and converts a large area of poor grazing land into very valuable wharf property. The gates are wide enough, and the dock deep enough, not only to take in lighters, but also sailing barges and coasting steamers. Further, the entrance has been dredged to allow the largest vessels coming through the bridges to enter and leave the dock at the top of neap-tides. Its width is over 100 ft. in the inner basin,—sufficient to allow the turning of a steam-tug; and two lines of barges can pass each other in the narrowest part. The dock work has been carried out under the direction of Mr. Edward Woods, C.E., the contractors being Messrs. Cooke, of Battersea.

**The New Roof of the Royal Exchange.** Since the commencement of April last the workmen of Messrs. Whitford & Co., constructive engineers, of the Royal Ironworks, Limehouse, who are executing the iron work for the new roof over the central area of the Royal Exchange, have been engaged in erecting the roof, which was constructed and fitted together at their works. The works have now been far advanced towards completion, the greater part of the roof being now in position. The iron work of the arched portions at the east and west ends has been fixed, and is now being painted preparatory to glazing. The works in connexion with the central dome of the roof are likewise progressing, the base of the dome having already been fixed, whilst the erection of the arched iron ribs has been commenced. Messrs. Cubitt & Co. are carrying out the alterations which are required in the fabric of the building. The decorations of the roof have been entrusted to Messrs. Jackson & Co., of Rathbone-place, and the whole of the works are expected to be completed in about two months. The roof, which is being constructed from the designs of Mr. C. Barry, will cost about 10,000*l*. We published a large view of this roof in the *Builder* for October 13, 1883.

**Putney (New) Bridge.**—The foundation-stone of this bridge will be laid at 3 p.m. on Saturday (to-day) by their Royal Highnesses the Prince and Princess of Wales, who will proceed from Marlborough House, *viâ* Knightsbridge and Fulham-road, over Putney-bridge, to the entrance to the new bridge at the northern end of High-street, Putney. They will there enter the works and see models and plans of the bridge in a small pavilion close to the stone to be laid. After laying the stone their Royal Highnesses can, if they are so disposed, proceed for a short distance over the temporary bridge to see the piers in course of construction within the dam. Returning to the entrance where they left their carriage their Royal Highnesses will then drive back by way of Putney High-street, Wandsworth High-street, York-road, through Battersea Park, and over Chelsea Bridge.

**The New Railway Bridge at Blackfriars.**—Messrs. Lucas & Aird, the contractors for the London, Chatham, and Dover Company's new station and bridge across the Thames at Blackfriars continue to make rapid progress with the works, and on Wednesday the ironwork of the first portion of the Middlesex side arch was placed in position. With the exception of that on the Surrey side, next the land abutment, the masonry of the whole of the four river piers is nearly finished and ready to receive the ironwork, and it is expected that the main portion of all the arches will be in position in about three months from the present time. The works in connexion with the erection of the new station are also considerably advanced.

**Decoration of the Dome, St. Paul's Cathedral.**—We are informed that the modification of Stevens's design by Mr. Hugh Stannus, which is to be fixed up in the cupola on the south side, opposite to the design by Mr. E. J. Poynter, R.A. (which we illustrated in our last), will be visible in about three weeks' time.

**Bourse Buildings, Bucklersbury.**—These extensive buildings, at the corner of Bucklersbury and Queen Victoria-street, have just been completed by the erection of an angular block at the rear, faced with white enamelled brick. The Bucklersbury frontage is faced with red brick and Portland stone, the central portion of the elevation having ornamental bay windows, with fluted pilasters. The buildings throughout have been very substantially erected, all the brickwork being laid in Portland cement. Altogether the buildings contain nine floors, including a basement and sub-basement, with ground and six upper floors. There is a lift, on Hart's principle, from the basement to the top of the building. An artesian well has been sunk on the premises, from which the several offices are supplied with water. This well has been sunk to a depth of about 400 ft. below the ground-surface, and bored into the chalk 100 ft. deep. The well was sunk by Messrs. S. F. Baker & Sons. Altogether there are upwards of 200 rooms in the buildings. Mr. J. Whichcord, F.S.A., is the architect, and Messrs. E. Lawrence & Sons the contractors.

**Locks and Lock Furniture.**—Mr. James Hill, of Queen Victoria-street, has sent us his new illustrated catalogues of his specialities in this line, which have been and are being largely used, not only in private but in public buildings. The catalogues are likely to prove useful for reference. Mr. Hill has just completed a large contract for the Great Eastern Railway Hotel, Liverpool-street, comprising upwards of 600 locks in different suites, and governed by various master-keys, together with his patent door and sash furniture, all of which we understand were selected by the architect, Mr. Charles E. Barry.

**Gift of a Public Park to Dundee.**—At the meeting of the Law Committee of the Dundee Town Council, on the 25th ult., the clerk read a letter from Messrs. Shiell & Small, solicitors, with a memorandum of the terms in which Sir John Ogilvy's gift to the town of the Fairmuir is to be carried out. It appeared that Sir John, with the consent of his son, Colonel Ogilvy, is to convey to the Town Council and the Police Commission the Fairmuir to be a public park for the inhabitants of Dundee in all time coming, and for the playing of cricket, but subject to the present right of the town to hold the market fairs on the ground.

**Social Science Association.**—Mr. Clifford Smith, the energetic secretary of the Association, has compiled an index of the subjects and names of the authors of all papers read in the Department of Public Health of the Association since its establishment in the year 1875. It makes a pamphlet of 40 pages, and gives a remarkable idea of what the Association has done on this class of subjects, and of the extent and variety of its labours. The pamphlet forms a useful memorandum "where to turn" for special information in regard to many subjects of interest in connexion with sanitary science.

**The Frere Memorial.**—At a meeting of the Frere Memorial Committee at Marlborough House on the 7th, the Prince of Wales presiding, it was unanimously resolved that Mr. Brock should be communicated with as to undertaking the work, and a letter was read from Sir J. M'Garel-Hogg stating that the Metropolitan Board of Works would be happy to give a site on the Embankment for the purpose, near the statue of Sir James Outram.

**Appointments.** — In consequence of the retirement of Mr. George Pownall from active professional practice, the directors of the Law Fire Insurance Society have appointed Mr. George Harry Pownall, of No. 29, Parliament-street, and Mr. Edward Street, of No. 9, Sergeant's Inn, Fleet-street, as their architects and surveyors.

**Cemetery, Ryton-upon-Tyne.**—The Ryton (parish) Local Board are just completing their new cemetery works, at a cost of near 4,000*l*. Messrs. Salter & Lishman, of Ryton, are the contractors, and the works have been carried out from the designs, and under the superintendence, of Mr. J. J. Lish, architect, Newcastle-upon-Tyne.

**Kensington.**—The foundation-stone of St. Cuthbert's Church, South Kensington, was laid on the 2nd inst. by the Earl Beauchamp. Mr. H. Rounnel Gough is the architect, and Messrs. S. Belham & Co. are the contractors. A view of the church, which is one of considerable importance, is exhibited at the Royal Academy this year.

## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered | Page |
|---|---|---|---|---|
| ew Church, Liverpool | Trustees | Not stated | August 11th | ii. |
| Dairy Homestead | British Dairy Farmers' Association | Not stated. | August 25th. | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered | Page. |
|---|---|---|---|---|
| largement of Christ Church, Clifto | | W Bassett Smith | July 14th | ii. |
| nual Deals | Norwich Corporation | P. P. Marshall, C.E. | July 15th. | xxvi. |
| hitewashing, &c. Exeter Barracks | War Department | *Official* | July 16th | ii. |
| oken Granite | Mile End Vestry | J. M. Knight | do. | ii. |
| pairing St. Mary's Church | Vestry of St. Mary-lebone | *Official* | July 17th | ii. |
| Bryanston-square | | | | |
| eaning and Painting Stations | Midland Railway Co. | A. A. Langley, C.E. | do. | ii. |
| terations, &c to Workhouse | Guardians of Poplar Un | George Morris | July 18th | xxvi |
| gh Bridge, Stower, nr Gillingham | County Authority | W. J. Fletcher | do. | xxvi. |
| tort House, Brentwood | Gas Company | Jabez Church | July 19th | xxv. |
| ttings, Plymouth New Post Office | Com. of H. M. Works | *Official* | do. | ii. |
| one Kerbing | Mortlake Highway Bd | J. Medworth | July 20th | ii. |
| nstruction of Road | E. A. Robinson | | July 21st | ii. |
| terations, &c. to Offices | Hornsey Local Board | T. de Courcy Meade, C.E | do. | xxvi. |
| nds, Croydon Infirmary | Guardians | | do | ii |
| undary-walling, &c. Cryd n Infirmy | do. | Franklin & Andrews | do. | ii. |
| Making-up Street | Wands. Dis. B. of W. | *Official* | July 22nd | ii. |
| Painting, &c. Offices, also additions | Guardians St. Matt. Bethnal Green | J. & W. Stone | do. | xxvi. |
| Construction of Roads | Rock Freld Land Soc. | | July 23rd | ii. |
| Iron Railings and Gates | Paddington Vestry | *Official* | do. | ii. |
| Granite, Flints, &c. | Hendon R. S. A. | *Official* | do | xxv. |
| Foundry Bridge | Norwich Corporation | P. P. Marshall, C.E. | July 28th | xxvi. |
| School and Teacher's Residence, Crumlin, near Monmouthshire | Mynyddislwyn School Board | E. A. Lansdowne | July 29th | xxvi. |
| Canal Basin, &c. Stourport | Great Western Ry. Co. | *Official* | do. | ii. |
| Foundations, &c. of Bridge | Hull Corporation | J. Fox Sharp | July 31st | ii. |
| Town-hall, Wellington, Somerset | Directors | E. T. Howard | August 2nd | ii. |
| School Buildings and Master's House Newbury | Governors | J. P. Power | August 4th | xxvi |
| Granite | Reigate Town Council | *Official* | August 5th | xxvi. |
| School Buildings, Stoughton | Guildford School Bd | S. Welman | Not stated | xxvi. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in | Salary. | Page. |
|---|---|---|---|---|
| erk of Works for Sewage Works | Kettering Local Board | July 17th | Not stated | xvi. |
| afterworks Engineer | Alnwick, &c Local Brd. | July 18th | do. | xvi. |
| rveyor and Inspector of Nuisances | Haverhill Urban S. A. | July 21st | 100*l.* | xvi. |
| County or District Surveyors in Ireland | Civil Service Commis. | August 1st | Not stated | xv. |
| Assistant Superintendent of Furniture | Civil Service Commis. | August 2nd | do. | xv |

## TENDERS.

For the erection of artisans' dwellings, in Cartwright-reet, Royal Mint-street, Minories. Messrs. Davis & manuel, 2, Finsbury-circus, City, architects. Quantities pplied by Mr. H. P. Foster, 5, John-street, Adelphi:—

| | | | |
|---|---|---|---|
| F. & F. J. Wood | £19,483 | 0 | 0 |
| T. Boyce | 16,068 | 0 | 0 |
| Wall Bros. | 15,940 | 0 | 0 |
| J. Mowlem & Co. | 15,665 | 0 | 0 |
| W. Shurmur | 15,480 | 0 | 0 |
| G. Shaw | 15,180 | 0 | 0 |
| G. S. S. Williams & Son | 15,100 | 0 | 0 |
| Colls & Son | 14,910 | 0 | 0 |
| M. Gentry | 14,600 | 0 | 0 |
| Harris & Wardrop | 14,370 | 0 | 0 |
| E. Lawrance & Son | 14,280 | 0 | 0 |
| J. Grover | 13,970 | 0 | 0 |
| S. J. Jerrard | 13,793 | 0 | 0 |

For building new schools and offices, in Priory-grove, uth Lambeth, for the London School Board. Mr. E. R. bson, architect. Quantities by Mr. C. W. Brooks:—

| | | | |
|---|---|---|---|
| Goodman | £13,333 | 0 | 0 |
| Shurmur | 13,221 | 0 | 0 |
| Lathey Bros. | 12,928 | 0 | 0 |
| Hart | 12,873 | 0 | 0 |
| Priestley & Gurney | 12,816 | 0 | 0 |
| Perry & Co. | 12,798 | 0 | 0 |
| Scrivener & Co. | 12,764 | 0 | 0 |
| Turtle & Co. | 12,763 | 0 | 0 |
| Wall Bros. | 12,723 | 0 | 0 |
| Jackson & Todd | 12,715 | 0 | 0 |
| Patman & Co. | 12,643 | 0 | 0 |
| Wm. Oldrey | 12,610 | 0 | 0 |
| Grover | 12,490 | 0 | 0 |
| Bangs & Co. | 12,358 | 0 | 0 |
| Kirk & Randall | 12,328 | 0 | 0 |
| Shepherd | 12,326 | 0 | 0 |
| Holson | 12,274 | 0 | 0 |
| Stimpson & Co. | 12,240 | 0 | 0 |
| C. Wall | 12,195 | 0 | 0 |
| Hunt | 12,141 | 0 | 0 |
| Downs | 12,090 | 0 | 0 |
| Jerrard | 13,289 | 0 | 0 |
| Holloway | 12,040 | 0 | 0 |
| Tongue | 11,675 | 0 | 0 |

For building new schools and offices, at Kilburn-lane, for London School Board. Mr. E. R. Robson, architect. antities by Mr. W. H. Barber:—

| | | | |
|---|---|---|---|
| Perry | £18,990 | 0 | 0 |
| Scrivener | 18,787 | 0 | 0 |
| Downs | 18,317 | 0 | 0 |
| Lathey | 18,295 | 0 | 0 |
| Patman | 18,263 | 0 | 0 |
| Bangs & Co. | 18,200 | 0 | 0 |
| Kirk & Randall | 18,155 | 0 | 0 |
| Shurmur | 18,023 | 0 | 0 |
| Wm. Oldrey | 18,000 | 0 | 0 |
| Hart | 17,885 | 0 | 0 |
| C. Wall | 17,832 | 0 | 0 |
| Jerrard | 17,749 | 0 | 0 |
| Priestley & Gurney | 17,693 | 0 | 0 |
| Grover | 17,539 | 0 | 0 |
| Wall Bros. | 17,397 | 0 | 0 |

For cleaning and painting Park-walk School, Chelsea, the London School Board:—

| | | | |
|---|---|---|---|
| Kearley | £459 | 0 | 0 |
| Lathey | 453 | 0 | 0 |
| Wm. Oldrey | 429 | 0 | 0 |
| Stimpson & Co. | 382 | 0 | 0 |
| Smith & Son | 374 | 0 | 0 |

For cleaning and painting North End-road School, for London School Board:—

| | | | |
|---|---|---|---|
| Kearley | £477 | 0 | 0 |
| Hornett | 447 | 0 | 0 |
| Wm. Oldrey | 445 | 0 | 0 |
| Knight | 443 | 0 | 0 |
| Stimpson | 389 | 0 | 0 |
| Smith & Son | 378 | 0 | 0 |

Accepted for building residence, at Broadst ne, Dart-uth, for Mr. D. Manning. Mr. E. H. Back, arch tect. antities by architect:—

| | | | |
|---|---|---|---|
| Williams | £435 | 0 | 0 |
| Voisey | 410 | 0 | 0 |

Accepted for building two houses and shops, at Lower-street, Dartmouth, for Mr. Hamlyn. Mr. E. H. Back, architect, Dartmouth. Quantities by architect:—

| | | | |
|---|---|---|---|
| Williams | £695 | 0 | 0 |

Accepted for alterations to four tenements, at Kingswear, Devon, for Mr. H. Parry. Mr. E. H. Back, architect:—

| | | | |
|---|---|---|---|
| Winsor | £125 | 0 | 0 |

For the erection of schools, in Bolt-street, Newport, Mon., to accommodate 620 boys, girls, and infants, for the Newport United District School Board. Mr. E. A. Lansdowne, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| C. Miles, Newport | £3,500 | 0 | 0 |
| J. Burgwyne, Pontypool | 3,375 | 0 | 0 |
| Moulton & Bromscombe, Newport | 3,349 | 0 | 0 |
| W. Jones & Son, Newport | 3,347 | 0 | 0 |
| H. Parfitt, Pontnewydd | 3,295 | 0 | 0 |
| W. Blackburne, Newport | 3,287 | 0 | 0 |
| W. Price, Newport (accepted) | 3,195 | 0 | 0 |

For storm-water drainage works, Great Malvern. Mr. J. E. Palmer, engineer:—

| | | | |
|---|---|---|---|
| Small & Son, West Bromwich | £3,390 | 0 | 0 |
| Inwood, Malvern | 3,186 | 0 | 0 |
| Welsh, Hereford | 3,168 | 0 | 0 |
| Jevons, Dudley | 2,853 | 1 | 6 |
| Eyerd, Malvern | 2,803 | 0 | 0 |
| Biggs, Birmingham | 2,663 | 0 | 0 |
| Osborn, Malvern | 2,655 | 0 | 0 |
| Law, Kidderminster | 2,647 | 5 | 3 |
| Hughes, Dudley | 2,506 | 15 | 4 |
| Broad, Malvern | 2,459 | 0 | 0 |

[Engineer's estimate, £2,680]

For the erection of a residence in the Church-road, Shortlands, Kent. Mr. William H. Duffield, architect, Cedars-road, Beckenham, Kent:—

| | | | |
|---|---|---|---|
| D. D. & A. Brown, Camberwell | £2,195 | 0 | 0 |
| J. Barnett, Shortlands | 1,790 | 0 | 0 |
| Leech Bros., Shortlands | 1,784 | 0 | 0 |
| E. E. Palmer, Beckenham | 1,666 | 0 | 0 |
| H. Balding, Bromley (accepted) | 1,591 | 0 | 0 |

For alterations, &c., at the Roebuck Tavern, Kennington-cross, for Mr. F. Doré. Mr. H. I. Newton, architect, 17, Queen Anne's-gate:—

| | | | |
|---|---|---|---|
| Burman & Sons | £497 | 0 | 0 |
| Schlater | 455 | 0 | 0 |
| Jennings & Sons | 380 | 7 | 0 |
| Cook | 358 | 0 | 0 |
| Crabtree | 345 | 0 | 0 |
| Walker (accepted) | 319 | 0 | 0 |
| *Pewterers' Work.* | | | |
| Davidson (accepted) | 39 | 10 | 0 |

For the erection of new Board School, for the Clee-with-Weelsby School Board, Great Grimsby, for 500 children. E. W. Farebrother, architect, Grimsby:—

| | | | |
|---|---|---|---|
| Riggall & Hewins (accepted) | £3,515 | 15 | 0 |

For the erection of new house, Town Hall-street, Grimsby, for Mr. Calvin Shankster. Mr. E. W. Farebrother, architect, Grimsby:—

| | | | |
|---|---|---|---|
| H. Doughty | £649 | 5 | 0 |
| T. Simipson | 606 | 0 | 0 |
| G. Smith | 580 | 0 | 0 |
| J. & R. G. Guy | 573 | 0 | 0 |
| Riggall & Hewins (accepted) | 563 | 0 | 0 |

For supplying and fixing wrought-iron unclimbable fencing, with posts and gates, at the Boscombe Chine-gardens, Bournemouth, for the Bournemouth Commissioners. Mr. G. R. Andrews, surveyor. Quantities supplied:—

| | | | |
|---|---|---|---|
| Birtwistle & Co., Burnley | £635 | 6 | 0 |
| Faulkener & Sons, Walton-on-Thames | 526 | 18 | 8 |
| F. Spreadbury, Bournemouth | 485 | 12 | 0 |
| E. Howell, Poole | 447 | 8 | 0 |
| H. S. Crump, Gloucester | 410 | 16 | 0 |
| H. Street, Boscombe | 410 | 15 | 4 |
| Hill & Smith, Brierly Hill | 409 | 0 | 0 |
| Wood & Co, Bournemouth | 406 | 16 | 0 |
| Bacon & Co., Bournemouth | 403 | 0 | 8 |
| C. W. Broocke, Bournemouth | 402 | 17 | 0 |
| H. Kitcher, Bournemouth | 372 | 5 | 8 |
| Rowell & Co., London | 360 | 12 | 0 |
| W. Haydon, Bournemouth (accepted) | 356 | 8 | 0 |

For the erection and completion of a factory, at No. 102, Bermondsey-street, for Messrs. J. E. & W. Christy & Co. Mr. John Gale, architect:—

| | | | |
|---|---|---|---|
| Brass | £4,813 | 0 | 0 |
| Greenwood | 4,330 | 0 | 0 |
| Colls & Sons | 4,225 | 0 | 0 |
| Rider | 4,200 | 0 | 0 |
| Shepherd | 4,189 | 0 | 0 |
| Boyce | 4,141 | 0 | 0 |
| Green | 4,072 | 0 | 0 |
| Higgs & Hill | 3,940 | 0 | 0 |
| F. Higgs | 3,840 | 0 | 0 |
| J. O. Richardson | 3,759 | 0 | 0 |

For building new warehouse, on the site of No. 81, Bunhill-row, St. Luke's, E.C., for Mr. Richard Scully. Mr John Groom, architect:—

| | | | |
|---|---|---|---|
| Mattock Bros. | £1,093 | 0 | 0 |
| J. O. Richardson | 1,073 | 0 | 0 |
| Harris | 997 | 0 | 0 |
| Harper | 980 | 0 | 0 |
| Sabey | 979 | 0 | 0 |

For the erection of a sanitary hospital, &c., on the Freemantle Estate, Boscombe, Bournemouth, for the Bournemouth Commissioners. Mr. G. R. Andrews, architect and Town surveyor. Quantities not supplied:—

| | | | |
|---|---|---|---|
| G. James, Bournemouth | £3,250 | 0 | 0 |
| H. Blachford, Bournemouth | 2,925 | 0 | 9 |
| J. A. Nethercoate, Bournemouth | 2,900 | 0 | 0 |
| R. Pike, Bournemouth | 2,800 | 0 | 0 |
| B. I. Sanders, Southampton | 2,798 | 0 | 0 |
| Lawson & Donkin, Bournemouth | 2,798 | 0 | 0 |
| C. A. D. George, Bournemouth | 3,700 | 0 | 0 |
| W. Stanley, Bournemouth | 2,650 | 0 | 0 |
| A. H. Stroud,* Bournemouth | 2,260 | 15 | 0 |

* Accepted.

For constructing a 12-inch intercepting sewer, in the Commercial-road, Bournemouth, for the Bournemouth Commissioners. Mr. G. R. Andrews, surveyor. Quantities supplied:—

| | | | |
|---|---|---|---|
| G. James, Bournemouth | £798 | 19 | 0 |
| Whetham, Weymouth | 686 | 14 | 0 |
| Saunders & White, Bournemouth | 581 | 10 | 0 |
| H. J. Sanders,* Southampton | 518 | 0 | 0 |

* Accepted.

For constructing a system of sewerage in the Valley of the Bourne, for the Bournemouth Commissioners. Mr. G. R. Andrews, surveyor. Quantities supplied:—

| | | | |
|---|---|---|---|
| G. James, Bournemouth | £863 | 3 | 0 |
| Whetham, Weymouth | 7-3 | 19 | 0 |
| H. J. Sanders, Southampton | 695 | 0 | 0 |
| Saunders & White,* Bournemouth | 600 | 19 | 0 |

* Accepted.

For detached villa, for Mr. G. R. Andrews, Christ-church-road, Bournemouth. Mr. G. R. Andrews, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| G. James, Bournemouth | £1,050 | 0 | 0 |
| Lawson & Donkin, Bournemouth | 1,026 | 0 | 0 |
| Hoare Bros. and Walden, Bournemouth | 1,025 | 0 | 0 |
| C. A. D. George, Bournemouth | 1,000 | 0 | 0 |
| A. H. Stroud, Bournemouth | 993 | 0 | 0 |
| G. Weaver, Bournemouth | 926 | 5 | 0 |
| J. McWilliam, Bournemouth | 920 | 0 | 0 |
| R. Pike, Bournemouth (accepted) | 905 | 0 | 0 |
| *Concrete Foundations, Drains, and Road Making.* | | | |
| Saunders & White (accepted) | £103 | 5 | 6 |

For alterations and additions to premises, 65, Crockherbtown, Cardiff. Mr. Edward H. Bruton, A.I.B.A., architect:—

| | | Time. |
|---|---|---|
| Davies | £1,130 | 3 months |
| Shepherd | 1,112 | 13 weeks |
| Shepton | 1,105 | — |
| Lock | 1,079 | 10 weeks |
| Jones Bros. (accepted) | 1,049 | 11 weeks |
| Gough | 1,031 | 4 months |

[Smallbridge, Short, and Chivers too late.]

For alterations, &c., at the Duke of Glo'ter public-house, Seabright street, Hackney road. Mr B. J. Capell, architect:

| | |
|---|---|
| G. S. Pritchard | £4 0 0 |
| J. Anley | 377 0 0 |
| W. Shurmur | 3 9 0 0 |
| R. Marr | 365 0 0 |
| Kevan | 349 0 0 |
| Pryor (accepted) | 2 0 0 |

For repairs, painting, &c., at Duncombe road, Holloway, for the London School Board. Mr. E. R. Robson, architect:—

| | |
|---|---|
| Kirby & Chase | £171 0 0 |
| T. McCormick | 448 10 0 |
| W. Goodman | 425 0 0 |
| Knight & Waldron | 424 0 0 |
| W. Shurmur | 423 0 0 |
| T. H. Smith & Son | 377 0 0 |
| J. Grover | 365 0 0 |

For alterations, &c., at the Anchor and Hope public house, Charlotte-street, Blackfriars. Mr. F. W. Willis, architect:—

| | |
|---|---|
| J. A. Taylor | £535 0 0 |
| Wilkinson | 516 0 0 |
| Jackson & Todd | 514 0 0 |
| W. Shurmur (accepted) | 507 0 0 |

For repairs and painting at the Dyers' Hall, Dowgate-hill, for the Worshipful Company of Dyers. Mr. J. Hatchard Smith, architect:—

| | |
|---|---|
| Ashby & Horner | £175 0 0 |
| W. Shurmur | 150 0 0 |
| Kinnamont | 137 0 0 |

For the erection of ten cottages, at High Barnet, for Mr. Bruce Johnson. Mr. Walter Graves, architect:—

| | |
|---|---|
| Martin Taylor (accepted) | £2,160 0 0 |

For Stratford-upon-Avon Sewage Works. Mr. E. Pritchard, C.E., engineer, Westminster. Contract No. 3, for construction of pumping-station, pipe-laying, and other works:—

| | |
|---|---|
| Perkins & Sons, Dudley | £7,083 15 11 |
| G. F. Smith, Milverton | 5,660 0 0 |
| B. Cooke & Co., London | 5,500 0 0 |
| Holme & King, Wigan | 4,777 0 0 |
| Roberts, Stratford-on-Avon | 4,750 0 0 |
| Hilton & Sons, Birmingham | 4,433 0 0 |
| Carrall & Lewis, Birmingham | 4,318 0 0 |
| Cunliffe Leigh, Lancaster | 4,067 0 0 |
| George Law,* Sutton Coldfield | 3,917 0 0 |

* Accepted.

For alterations and additions to stabling, and erection of coach-house, &c., at Chessingham House, Denmark-road, Carshalton, Surrey, for Mr. J. H. Davis. Mr. Thos. Lockwood Reward, architect:—

| | |
|---|---|
| Hazell, Bedlington Corner | £193 0 0 |
| Sanders, New Malden | 187 0 0 |
| Stewart, Wallington | 178 0 0 |
| Evans, Carshalton | 169 0 0 |
| Smith & Bence, London | 165 0 0 |
| Howe & White, Wallington | 165 0 0 |
| Clarke, Croydon | 153 0 0 |
| Aldous, Carshalton (accepted) | 126 16 0 |

[Architect's estimate, £160.]

For new warehouse, in Suffolk lane, City, for Sir Francis Wyatt Truscott. Mr. Wimble, architect:—

| | |
|---|---|
| Brass (accepted) | £8,500 0 0 |

For the erection of oven and bakehouse, and other works, at the Workhouse, West-end, Southampton, for the Guardians of South Stoneham Union. Mr. W. H. Mitchell, architect, Southampton:—

| | |
|---|---|
| John Witt, Bitterne | £164 8 0 |
| Mears, Freemantle | 165 0 0 |
| D. Haines, West end, Southampton | 161 0 0 |

* Accepted.

For building a new warehouse, Sunderland, for Mr. Wm. Burns. Mr. J. E. Prosser, architect and surveyor. Quantities supplied:—

| | |
|---|---|
| D. & J. Rankes, Sunderland | £375 0 0 |
| M. Howarth, Sunderland | 349 18 0 |
| J. Huntley, Sunderland | 339 0 0 |
| R. M. Fairclough,* Sunderland | 315 10 0 |

* Accepted.

For painting and repairs to the Paragon-buildings, Walworth, for the Fishmonger's Company. Mr. Thos. Chatfeild Clark, architect:—

| | |
|---|---|
| Phipps & Bisiker | £216 10 0 |
| Heeps | 197 0 0 |
| Holliday & Greenwood | 167 0 0 |
| Harman (accepted) | 163 10 0 |

For road and sewer at Paul's Clay. Mr. J. Cowell, surveyor:—

| | |
|---|---|
| Taylor & Son | £515 0 0 |
| Capon | 502 0 0 |
| Beadle Bros. | 488 0 0 |
| Trueman | 375 0 0 |

For proposed additions to the Home of the Marist Fathers, Paignton, Devon. Mr. George Soudon Bridgman, architect, Torquay:—

| | |
|---|---|
| Mountstephen, Torquay | £1,737 10 0 |
| King & Son, Paignton | 1,659 0 0 |
| Goss, Torquay | 1,654 0 0 |
| Lamacraft, Dawlish | 1,553 0 0 |
| Bovey, Torquay | 1,490 0 0 |
| Fouden, Ashburton | 1,481 17 6 |
| Bridgman, Paignton | 1,372 10 0 |
| H. Webber, Paignton* | 1,437 0 0 |

* Accepted subject to minor alterations.

For New School accommodation for the Congregational Building Committee, Dawlish. Mr. George Soudon Bridgman, of Torquay, Architect:—

| | |
|---|---|
| Mountstephen, Torquay | £502 10 0 |
| Goss, Torquay | 485 17 6 |
| Friend, Dawlish | 485 0 0 |
| Hawkins, Dawlish | 444 0 0 |
| Loveys, Dawlish | 344 0 0 |
| Early, Dawlish | 390 0 0 |
| Cundy & Stoyle, Dawlish (accepted) | 365 0 0 |

*Houses, Roslyn Gardens, Hampstead.*—Mr Stephenson wishes us to say that his tender for all the work which Mr. Russell has contracted for at £3,490 was £4,633, so that he was not the lowest.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

C. C. H.—"Starting and setting gangs of men or addresses of Mr. J. H. Artificers" (which?)—E. H. M.—(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41)

# The Builder.

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## *Architecture in Paris and London.*

WITHIN the compass of a small and very neat volume of some two hundred pages,* Mr. W. H. White, the Secretary of the Royal Institute of British Architects, has endeavoured to sum up the broad distinction between the relation of architects and architecture to the State and to educational bodies in the French and English capitals respectively. As many of our readers are aware, Mr. White has some special advantages for treating such a subject. For a considerable period he resided and practised professionally in Paris, and was, in fact, essentially a French architect; and his position as secretary of the leading constituted body of English architects since then, must have enabled him to hear and see a great deal in regard to the relations of architects and architecture with the State, and in regard to the condition of architectural education in this country.

The general purport of the book is a summary of the condition of things in the two capitals, greatly preponderating in favour of Paris; and though the well-worn *mot*, "They manage these things better in France," might very well have been taken as the keynote of the volume, the less hackneyed and proverbial quotation which is given on the title-page perhaps expresses the philosophy of the matter with equal point and more novelty. It is a remark of Blondel to Louis XIV., whence quoted we are not told,—"Vous sçaviez, Sire, que nous n'avons point d'amour pour les choses que nous ignorons, et qu'il falloit que l'on connût ce que vaut l'architecture, pour estimer autant qu'elle le mérite." If the Grand Monarque required that caution at the time it was given, it has, at all events, borne fruit in the attitude and conduct of successive French rulers, monarchical or republican, towards architecture, in succeeding times down to the present day. The contrast between the attitude of public men and public bodies towards architects and architecture in France and England seems to become more marked and more obvious as time goes on. The interest in and respect for architecture on the part of English Governments and governmental officials is continually on the decrease, till we have arrived at a point when it seems to be almost a matter of course that architectural design or architectural beauty should be contemned by popular politicians as trifles of no moment and not worth spending money upon, while indifference or absolute disrespect to the profession of architect has become a recognised tradition among those departments of Government which are most immediately concerned with matters that come within the province of architecture. Of course there remains the question whose fault this is, and whether the fault is all on one side, a matter on which, perhaps, there may be a little more to be said than our author quite recognises But the main truth in regard to the difference of things in France and England is that to which the quotation of Blondel's remark points. To care for a subject one must know something about it, and the French Governments have taken some trouble to know something about architecture, or to appoint as its guardians those who do, whereas the English Governments, in their corporate capacity and through their individual members alike, seem really to take a certain pride in contemning and ignoring the subject.

"The contrast between the great works of architecture in Paris and London is startling, even when regarded from a material and not an æsthetic point of view. On one side are conspicuous the evidences of method, refinement, and care; on the other, of inexperience, hurry, and confusion. A superabundance of knowledge perplexes both communities, but in Paris exuberance of fancy is subordinated to scholarly judgment; in London, it is morally and materially uncontrolled. This country, it is true, has an advantage in the possession of what is called public opinion, which in all national matters, except those relating to science, literature, and the higher arts, is of value, and English public opinion, though anything but dumb in difficult questions affecting architecture, is incoherent. But even if public opinion had the power of arriving at any decision in such questions, no organisation sufficiently representative to collect its suffrages, or record the result, is at disposal in London. The authorities of Paris, on the contrary, have definite artistic views. They possess a standard of taste and a power of initiation, of which Londoners are wholly devoid; and throughout France there is an abundance of carefully-prepared professional talent at the service of the State, for the design and execution of national monuments and buildings. During my ten years' consecutive residence in Paris, the authorities seemed not only to know what the inhabitants wanted for the alteration and adornment of their city, but also to obtain for them what was wanted; during my ten years' consecutive residence in London, the authorities seemed not only to ignore the prevalent desire for improvements, but also quite unable to carry to completion the alterations they devised,—alterations which, in almost every case, have been deemed inartistic by experts, and unsatisfactory by the public."

That this statement of the general conditions in the two countries is true cannot, we fear, be denied by any who have taken a sufficiently broad view of the subject of modern architecture to be able to stand aloof, as it were, from insular prejudices, and exercise something like a cool and impartial judgment. The sketch of the history of architectural education and what may be called architectural statesmanship in France, given in Mr. White's pages, furnishes in a brief and comprehensive manner a great deal of the explanation of the more systematic and enlightened manner of dealing with architectural subjects on the other side of the Channel.

The architects of both countries, as Mr. White observes, started on pretty equal terms. Before the fourteenth century they worked much together, and the buildings of the age, though larger, richer, and more refined in France, were strangely similar in design and execution. But in the Renaissance period France had a series of kings, to begin with, who took an enlightened interest in architecture; and none so much so as the Grande Monarque himself, who showed in his treatment of Bernini and others how highly he valued their services and their talents, and left behind him a tradition which probably was not without influence on the ruling spirits of France ever since. Wren, who visited Paris in 1665, called the Louvre a school of architecture, and noted that an academy of sculptors, architects, and the chief artificers of the Louvre, met every first and last Saturday of the month. The "Academy of Architecture," formed irregularly and by a spontaneous movement in the first instance, became a recognised institution, with a charter, some time later, in 1717. We must refer the reader to Mr. White's pages for a short but comprehensive sketch of the academical element in connexion with French art, which achieved its greatest result in the formation of the École des Beaux-Arts. But there are two special institutions now existing in France, and which have been long established and have grown up into their present condition by degrees, which are more especially important in their influence upon architectural education and architectural opinion and criticism in France. One of these is the *Conseil du Bâtiments*, originated by Colbert, who, in 1663, suggested the formation of a small council, to be consulted by him on all matters relating to buildings, a council which should meet twice

b

* Architecture and Public Buildings; their Relation to School, Academy, and State, in Paris and London. By William H. White, architect, Secretary of the Royal Institute of British Architects. London: P. S. King & Son. 1884.

a week at the minister's house. This "Council for Buildings," the principle of which was then first proclaimed, exists at the present day in a highly developed form, and in some fashion or other it has always existed in Paris since the days of Colbert. It went through various modifications, the last important one being in 1795, when the Home Minister, Benezech, organised a *Conseil d'Examen du Bâtiments civils de la République*.

"The duties of this Council, which met twice a week, were divided under three heads:—(1) To prevent the execution at the cost of the nation of any work the uses, necessity, and advantages of which had not been ascertained; (2) To insure that all works, the execution of which had been authorised, were properly carried out; (3) To inquire into the accuracy of accounts and regulate payments in regard to building works. Thus the *service* or department of *travaux des bâtiments civils*, composed of the Council before-mentioned and the *Agences* (the organisation of which was completed in 1808) for all works executed at the cost of the State in Paris and some other parts of France, or for those executed at the cost of the City of Paris and some provincial capitals, grew out of the great Revolution. It was, after all, but a constitutional development, and, at this moment, in the matter of works and public buildings in France, a Minister of State is advised thereon by a council, just as the Chief of the State is advised by a Parliament.

The new Council (11 Dec., 1795) consisted of three members, one secretary, and six divisional reporting-inspectors (now called Inspectors-general). Attached to these were six surveyors of accounts, who composed what was called a central office of *vérification* and *réplement*. In 1798 the Council, under the administration of the Home Minister, Letourneux, took for a time the name of *Assemblée centrale des Architectes*, consisting of seven architects, presided over by one of themselves, and until 1812 the chair was occupied by some one or other distinguished architect. Later on, a Councillor of State was appointed President, but the Vice-President was always an architect. In 1838 six young architects, chosen by preference from among the *pensionnaires* or students of the Academy of France at Rome, were first attached as assistants to the Inspectors-general, and accompanied them in their tours of inspection throughout Paris and the provincial cities. By the fourth section of this Decree of 1838, the titular members of the Council were not to be permitted to design or execute any new works coming within the powers of the Administration. By the fourteenth section, designs submitted in competition for public buildings were referred for final judgment to the Council, the members of which had to report thereon. They had also to recommend and advise as to the selection of architects competent to design and superintend the construction of new works, and to give opinions upon works in progress."

Not much essential change has been made in this *conseil* since that period, but it was one of the first acts of the present Republic to recognise it so as to form a permanent *service d'architecture*, as thus:—

"At the present moment the supreme direction of works is divided between the offices of (1) the Minister of Public Instruction and Fine Arts; (2) the Minister of Justice and Public Worship; (3) the Prefect of the Seine; and (4) the Prefect of Police.

The Minister of Public Instruction and Fine Arts is advised, in the matter of civil buildings and national palaces, by a council, whose duty it is to examine designs and to inquire into the accuracy of estimates, to assist in the final settlement of accounts, and be present at the handing over of works when the buildings are completed. In fact, the advice of the council is asked in all matters relating to the construction and keeping in repair of civil buildings and public monuments. All the members are architects of distinction in their relative positions."

We may beg the reader to observe this last statement as to the constitution of the *conseil*. In England, on the other hand, architects are generally the very last class of men whose opinions are ever asked about great questions of public building. The professors of red-tape settle these. Now let us glance at what we are told as to the other characteristics of the condition of architecture in France, the *atelier* system, which has so important a bearing upon architectural education in France. And here again we may as well quote the author's own words, premising that the *ateliers* were first started in connexion with the State School, the École des Beaux-Arts:—

"And here, perhaps, I ought to describe an *atelier*, which is essentially Parisian, and in character quite foreign to this country. For instance, in the French capital, an architect of eminence, generally a student of Rome, directs a kind of voluntary school, consisting of, perhaps, a hundred or more young men, all of whom are either students or intending students of the School of Fine Arts. At the time of the reforms under the Second Empire, some fifteen or twenty private *ateliers* of the kind existed in Paris. That of M. Questel, who is now an academician, and also President of the Société Centrale des Architectes de Paris, was among the most famous and popular. The young men composing an *atelier* have almost entire liberty, and the master or patron visits it twice, or perhaps three times, a week. He sets work to be done in competition by the students, and assigns places of merit to the best of the designs and drawings submitted to him. A library of illustrated works is attached to the *atelier*, and the books are consulted by the students, who each contribute to its support. By such means young Parisians wishing to be architects get their first professional insight into artistic studies, having previously been taught the rudiments of the art in one of the many technical schools of design established in Paris and the provincial cities. The French students, therefore, instead of being left to pick up information anyhow in the office of a practitioner, as is the case in England, acquire the theory of architecture from some architect of distinction who devotes time and attention to teaching them, and they learn their art in the company of a large number of fellow-students who inevitably assist each other, and to their mutual welfare."

In connexion with this subject also Mr. White gives some interesting particulars about the French Academy in Rome, now occupying the Villa Medicis,—the institution long ago set on foot to enable France to plant her foot amid the remains of the Eternal City, and send her young aspirants for architectural fame to gain inspiration from amid the ruins of a great architectural past.

The result of all this is that in France there is an established connexion between the profession of architecture and the State, and a series of grades through which an architect rises to be a trusted adviser of the Government. He enters an *atelier*, subsequently goes with the "caravan" to Rome; if he approves himself there he returns at the age of thirty, still a student, to take a humble position at the Council of Civil Buildings; then he may become the subordinate to some eminent architect who is carrying out a large work for the Government. "He may rise, if he conduct himself well, to be assistant architect or joint architect upon the same or another Government building; or by the death, resignation, or promotion of his superiors he may ultimately become the architect in chief of the very work upon which he began as an *inspecteur*. He is thus placed among the few who by careful training acquire the power to design and fitness to execute buildings erected by the State from the common fund of the nation. Meanwhile the State has entrusted him with the charge of a national edifice or of some monument, such the *Colonne de Juillet* or the *Arc de l'Etoile*, for the good condition of which he will be held responsible. In course of time he will be summoned to take a place of councillor on one or other of the several Boards pertaining to the various administrative departments."

Now contrast all this with the state of things in England: and for the full force of the contrast we must refer the reader to details in Mr. White's pages which we have not space to reproduce or comment upon here. The systematised provision for the education of the architect, to begin with, contrasts strangely with the position of an articled pupil in England, who too often, we may even say generally, merely has the run of an office to pick up what he can. It is true that if he chooses he may learn much more of practical work in architecture during his pupilage, by making the drawings for and by visiting actual buildings, than the French student at the same age. The latter learns the theory first and the practice afterwards; both, however, in a systematic manner; the English student learns or may learn a good deal of the practice first, and may, but seldom does, learn or adopt the theory afterwards. In general, he works, eventually, in the style of the office in which he was articled, without considering too curiously the reasonableness or logic of such style in relation to architecture generally, and to the wants of the present day. Mr. White gives due recognition, however, to the energetic and even tolerably systematised schemes for self-instruction which have been set on foot by the Architectural Association, and by other bodies in a less complete manner. But there is, in Mr. White's view, no such thing really as an Architectural Academy, or an architectural department of an Academy in England. The Royal Academy counts for little; its students' designs are not equal to many of those made elsewhere, and the whole interest of its exhibitions centres in the paintings.

"As far as the architects go, and they are my principal concern, I do not perceive that studentship of the Royal Academy confers any advantage other than that which is the appanage more or less of all schools, public and private, namely, the emulation afforded to industry by young men working together, and competing with each other for prominence. I have never heard that the gentlemen who design some of the public buildings of this country are selected by her Majesty's First Commissioner of Works from the Gold Medallists of the Academy, or that, when he requires "temporary draughtsmen," he employs the graduates of its architectural class; nor do I think that the typical English gentleman, in search of an architect, ever intentionally chooses from among those who have taken honours there. I have before me a record of all the premiated Academy students from its foundation to the present day, and I cannot find that the honours these men have taken at the onset of their career have influenced, in recent years, either the public or private administrations of the country in their choice of architects. Yet I know well that the list contains the names of men who, if some feasible and worthy means had been open to them to use their talents in the public service,—had a wise Minister or an unbiassed civilian in her Majesty's Office of Works thought fit,—might perhaps have averted more than one blunder in the conception of recent national edifices, and mitigated public reproach."

In France, on the other hand, the whole system of architectural education is recognised and fostered by the State, and, consequently, the Government has always before it a body of rising men whose careers and capabilities are known, and who can be and are called upon to assist with their advice and ability, in an honourable manner, the architectural schemes of the Government. From among them architects are selected to represent the State in every department of the country, and the greater works, the great architectural prizes, are given to the most eminent among them. How does the State relation with architecture in England compare with this? In France there is a Government Department whose object it is to select and employ the best architects. In England there is a Government Department whose object, apparently, is to ignore architects under all circumstances, except in connexion with those very few great buildings in regard to which there may possibly be a sufficient expression of public opinion to render the employment of an architect desirable. Architecture is an art demanding special and very high cultivation for its successful practice, and an art which, because it is an art and not a mere business, it is desirable to keep out of the groove of mere official routine and red tape. But the whole interference with architecture by the State in England is in the direction of crushing out the architect, of rendering the exercise of genius on great Government works impossible, and of reducing the whole thing to a kind of surveyor's business. We will quote Mr. White again:—

"There is, it is true, a method of business in her Majesty's Office of Works and Public Buildings, but, to say the least, it is an incomplete and a topsy-turvey one. More than anything else it resembles the sort of practice in vogue among rich firms of 'Auctioneers, Surveyors, and Valuers,' who undertake architecture if solicited, and get it done by persons they take on, like extra hands at a mill; or they put it out, like washing. State protection, or rather the British compromise for it, accorded to such a system, constitutes a deterrent force. In France the State encourages the architect and aids or fosters the development of architecture. In England it opposes him, and even competes with him, not in London alone, but in every important city throughout the United Kingdom. The First Commissioner of Works is not a disinterested agent of the State, which in these days means the people. He is a practitioner, engaged in building operations throughout England and Scotland, and he monopolises those architectural works which, in continental cities, form the prizes of professional eminence. He would be regarded in France, and, in my opinion, rightly regarded, as an enemy to the State, whose aim was to render an architectural career impossible to young men of any birth, position, or education."

If we are asked for the other side of the picture, we may add that there is another side, both in regard to architectural education and State employment of architects, but it can be briefly stated, and presents little to counterbalance the preponderance in favour of France. Educationally, the French system may and probably does tend to render architecture somewhat too Academical and "correct," and leaves less encouragement to freedom of individual fancy than our unsystematic education. Viollet-le-Duc, as we know, was opposed to the Academy system. But comparing France with England, it may at least be urged that an artistic tendency based upon system and principle is better than a multifarious set of tendencies based upon habit and fashion. French architecture, thanks to her Academical system, has a path of her own; ours has none, and fluctuates from one fashion to another. In regard to the State and architects in England, it may also be urged that some large Government buildings, by eminent architects, have not been happy in result. In the case of the Foreign Offices this was partly the fault of the Government, who selected an architect for his eminence in one style, and then forced upon him another, against his will and in contradiction to his tastes and habits. As to the case of another much larger building, the Government selected one design as the best planned, and allowed another to be carried out; and they now complain, and we fear with too much justice, that they have an inconvenient and unpractical building. What is at the bottom of the whole disappointment about the Law Courts, however (which has been somewhat exaggerated), is the sentimental wave of feeling for revived Mediæval architecture which swept over this country of late, and which led to the sentimental side of architecture being unduly put forward to the neglect of the practical side. But it may well be that the very system by which, in France, the architect's work is allied with the work of the State, is the most powerful of all antidotes against the exaggeration of mere sentiment, and the breaking loose of the architect from the influence of those practical requirements which are the basis of all architecture. At all events, there is no question that the relation of the State to architects in France is such as to encourage and to honour all competent architects, and to place all responsibility in their hands; while the relation of the State to architects in England is such as to discourage, depreciate, and in some cases insult the profession, to regard them as people to be passed over and done without, whenever this can be managed without arousing a contrary public opinion. The co-ordinate result is that architecture also, as far as it is an art, is practically considered a thing to be done without, and, as the permanent irresponsible secretary had the assurance to say, any style that is ordered can be turned out of the Office of Works, only a few more draughtsmen being required, without the assistance of architectural genius, which is a superfluity. And to the English public it is so. If we as a nation cared about architecture, there would be a public protest against getting out buildings by red-tape. But "nous n'avons point d'amour pour les choses que nous ignorons."

We hope all those officially and otherwise interested in English architecture will read Mr. White's little book, which, though not free from minor defects of style and expression, contains many useful truths put in a trenchant and effective manner.

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**A New Post Office for Clapham.**—Amongst the several properties submitted for sale at the Auction Mart last week was the Baptist Church on Clapham-common, which was submitted to competition by Messrs. McLachlan & Sons. The first offer made was 600*l.*, and ultimately the property was knocked down for 1,025*l.* It transpired after the sale that the building had been purchased on behalf of the Government, and that it is the intention of the Post-office authorities to convert it into a Post-office, with spacious sorting-room and other necessary apartments, the present post-office at Clapham being inconvenient in these respects.

## THE THAMES AND THE THAMES VALLEY SEWERAGE.

THE adverse decision of the Select Committee upon the Thames Valley Sewerage scheme has come upon the promoters quite unexpectedly, for they were confident as to the merits and completeness of their measure, and, if argument could have helped their case, the opening speech of Mr. Michael, the eminent counsel, in their behalf, seemed sufficient to ensure a verdict in their favour. The proverbial uncertainty of the law has never been more truly exemplified than in this case, and the chairman of the Joint Board must, doubtless, feel greatly chagrined that the measure, over which he stated in his evidence he had been breaking his heart for eighteen years, and which was on the point of being triumphantly carried, should be suddenly consigned to a grave from which it is hardly likely to be resuscitated.

The history of the origin and progress of this ill-fated measure was very clearly set forth by the promoters' counsel, who stated that for twenty years the several districts concerned had been attempting in various ways to do away with the difficulties which beset them in respect of the disposal of their drainage, and that up to the present time, notwithstanding a sum of 50,000*l.* had been expended by the Joint Board, and possibly an equal sum by their opponents, nothing had been done with all the various attempts that had been made to divert the sewage from flowing "unpurified, unaltered, and untouched," into the river Thames, or to prevent it from aggregating itself in the vicinity of the houses to the injury of the health of the inhabitants of those houses. Commencing with Kingston, and followed by Richmond, Barnes, Mortlake, Kew, Esher, Heston, and Isleworth, inquiries were instituted and application made to the Local Government Board for Provisional Orders to acquire land for the purpose of dealing with the sewage in various ways. The first application was for 184 acres in Ham-fields, over which the sewage of the towns of Kingston and Hampton Wick was to be spread by irrigation; but this being strenuously opposed by the landowners and other proprietors immediately adjoining, the idea had to be abandoned at once as impracticable. This was followed by an application from Surbiton, whose authorities had been warned by the Thames Conservators that their day of grace had nearly expired, and that unless they could divert their sewage from the Thames by the specified date, they would be subjected to the penalties prescribed in the Act. Similarly all the principal towns, one after another, became liable to similar penalties, but up to 1876 not a single thing was done to carry out the purpose of the Act of 1867. In the meantime, in 1872, in accordance with the Report of the Royal Sanitary Commission, an Act was passed which conferred a sanitary jurisdiction on the whole of England, without any exception, and the whole country was divided either into rural or urban sanitary districts presided over by their respective boards. In 1876, in order to carry out the provisions of the Public Health Act of 1875, an inquiry was held by the late Colonel Cox, at Kingston, to try and get rid of the difficulties which apparently beset the acquisition of land for sewage disposal, and then it was proposed that a very large district, with a population approximating to 347,500 should be constructed. The inquiry, however, showed that the formation of so large a district as proposed by the Surbiton authorities was not feasible, but that it might be expedient to form five or six distinct groups of the several parishes interested, and that facilities might be given by the Local Government Board accordingly for combining certain of the districts for the purpose of jointly establishing works for the purification of their sewage; but Colonel Cox added, in a subsequent report, that in the event of a united district being formed, it would be undesirable to include therein such districts as were geographically remote from the centre. In 1877 a Provisional Order was granted by the Local Government Board constituting the limited district, and in 1878 another inquiry was held on various points, and amongst them was the proportionate representation of the various districts on the Joint Board. As soon as these preliminaries were settled, the Joint Board started on their duties, and the first attempt was to form a connexion of their district with the Metropolitan system of sewers, but without success.

They then offered three premiums for the best plan for dealing with the sewage of the united districts. The first selected out of nearly twenty plans was one for irrigation, designed by Colonel Haywood, involving the purchase of over 900 acres for the purpose, but the difficulties connected with obtaining so large a tract were so great that it, in its turn, had to be abandoned. The next effort was to get a connexion with the West Kent Main Sewerage Board, but their terms were so high and the uncertainty as to the expense so great that nothing could be arranged with them. The Joint Board were then obliged to revert to a scheme propounded by the firm of Messrs. Mansergh & Melliss, one of the successful competitors, for treating the sewage chemically. These engineers recommended three sites as suitable for the operation, viz, Barnes, Ham Fields, and Mortlake, the last being the site eventually selected, and for which the application for the Bill was made, and which has called forth so much opposition. The cost of the scheme as finally elaborated was estimated at 274,000*l.*, no small sum in itself, but its sufficiency has been called in question, for in order to carry out the works it was necessary to purchase fifty-five acres of land, the value of which, being suitable for building purposes, is annually increasing.

Considering the position of Mortlake and its proximity to the Metropolis, it is, of course, not surprising that so much opposition has been manifested to the location of sewage works there.

The experience that has been already gained in the treatment of sewage no doubt goes far to justify the expectations of experts; but the result of careful experiments in the laboratory cannot be always ensured in practice on a large scale. With whatever chances of failure, however, the scheme was a bold one, conceived in a practical spirit, and now arises the question, "What is to be done?" The Thames Conservators must perforce require the riparian districts to comply with the terms of the Act. No less than twenty-one parishes combined in the Joint Board's scheme have to provide for the purification or else the diversion of their sewage. Some of them, as, for instance, Heston and Isleworth, are already prepared to proceed without delay with a practicable and well-considered scheme, the cost of which, it was stated in evidence, will amount to little more than one-half of that which an alliance with the Joint Board would have entailed. It is believed that the clearness with which the learned counsel for those two districts, Mr. Creswell, was able to prove his client's case, added to the fact that the Select Committee found they had no power to eliminate them from the operations of the Provisional Order, helped to the final overthrow of the Bill. The remaining districts could not do better now than follow out Colonel Cox's recommendation, and group themselves together according to their obvious geographical limits, for they would then be formed into manageable units, while the principal difficulty which has hitherto attended most of the schemes, that of obtaining land for dealing with the purification of sewage will then, by being minimised as to quantity, be more easily overcome. The ratepayers of those districts may well imitate the example of Heston and Isleworth; for where there are but small interests to satisfy there will be probably but few objections to overcome, and matters which it was found impossible to arrange by such a cumbrous and discordant element as that of which the Joint Board appears to have been composed, may probably be more easily solved by a body whose interests, instead of being conflicting, are identical. It will still, however, be necessary for the ratepayers in every case to be careful

that, after the works have been executed, the persons in the employ of their respective Local Boards faithfully attend to their duties, otherwise they may at any time by carelessness find that their effluent is below the standard of the Thames Conservators, and so they may become liable to a heavy penalty, which they will not be able, and perhaps, in the interests of the general community, ought not to escape.

In regard to the state of the Thames itself, on which we touched in our "Notes" last week, the Conservators appear to consider that by widening and deepening the channel, and by facing the Middlesex bank with stone, to prevent its further degradation, the current would be diminished and a wide sheet of water would thereby be always maintained between Teddington and Isleworth. Another correspondent suggested the construction of two "half-tidal locks," at Isleworth and Putney respectively. The causes of the existing low state of the Thames was correctly ascribed, in a letter by Mr. Labouchere, which appeared simultaneously with our own remarks, to the deepening of the lower reaches in the neighbourhood of the Embankment, by which the ebb-tide is enabled to flow off more quickly, and to the abstraction of over one-seventh of the fresh-water flow above Teddington by the Metropolitan water companies. But neither of the remedies suggested is such as will effectually correct the evil. The construction of weirs and locks at Isleworth and Putney would tend to shut out *pro tanto* the tidal volume which now flows past those places, and in every tidal river a diminution of the tidal reservoir means so much less demand, and a corresponding diminution of volume at the entrance, which in time must produce a deteriorating effect on the embouchure. So far as the proposed deepening and widening of the river's bed means increasing the tidal sectional area, the proposals of the Thames Conservators will be effective in causing a greater volume of tide to flow up; but it is not likely to produce any raising of the river surface at low water,—rather the contrary; while as regards the existing fresh-water volume, the increased sectional area will cause it to flow off faster than at present. The increase to the *tidal* volume is to be encouraged by all means, and therefore works like locks and weirs, which would diminish both the volume and the duration of flow, are to be deprecated; for, though they might maintain a broader sheet of water at first, yet it would be found ere long that the bed of the river above the weirs would gradually rise, and the shoals again reappear, while evil effects would soon be made apparent lower down in the deterioration of the tidal channel in consequence of the diminished quantity which would be entering twice in each twenty-four hours.

How far the further abstraction of water by the metropolitan water companies is to be carried it is impossible to foresee, but it is quite certain that some limit must be assigned, and that soon, if the navigation of the river is to be maintained. There is but one remedy for this, and that is storage; and if the Conservators are not provided with sufficient funds to carry out such works themselves, then the companies should not be allowed to draw any further volume from the river, until they have provided for the same by the construction of reservoirs on the various feeders of the Thames, so as to restore to the river during its low state an equal volume to that which they abstract. But if the Conservators receive, as is stated by Mr. Labouchere, large sums for the sale of their water, they ought to have the means wherewith to construct the necessary storage works; and if they could only be induced to follow out the process to its logical conclusion, they would find that by the construction of a series of reservoirs judiciously planned, and carefully managed, they will have not only enough water to maintain an adequate perennial flow in the river, but they will likewise help to diminish the disastrous effects of floods, and at the same time add materially to their funds by the sale of the surplus supply to the metropolitan and other water companies now, or hereafter to be, established along the banks of the Thames.

## NOTES.

IT appears from later information that the shelving of the Mortlake Sewage scheme by the Select Committee was due not so much to disapproval of the proposed system in itself and on principle, as to a conviction that the districts concerned could apply a similar system more economically and efficiently each for itself; and, moreover, that "the oxidising power of the Thames water on the purified effluent would be most effective when the effluent was delivered at different parts of the river." There is logic in the latter statement, certainly; the former surprises us, as we should certainly have thought that economy and general efficiency in the application of the system would have been best secured by combination. The Committee, however, have some regard to the importance of the centralisation of authority, at all events, as they consider that the proper solution of the problem will not be reached "until the sewerage, from its production in the dwelling-house till it is delivered purified in the Thames, is under the control of the same authority, and, until the districts for house drainage are grouped so as to be identical in area with those for purification."

BY the courtesy of the First Commissioner of Works, we have been enabled to inspect the interesting series of drawings by Mr. Pearson for the illustration of his scheme for treating the west side of Westminster Hall, which by this time will probably have been deposited in the Library of the House of Commons, as was promised on Monday evening. Mr. Pearson's report, which, in connexion with the careful and minute drawing of the ancient work as at present existing, forms a historical document of some interest, we propose to consider more in detail in another number,—the matter gone into being of too much intricacy and importance to be disposed of summarily and after only a necessarily brief study of the plans. It will be sufficient to observe here that Mr. Pearson urges the re-covering of the exposed wall with new building as soon as possible, with a view to its preservation, and that his proposal is to build a two-storied cloister, in accordance more or less with indications in the existing wall and documentary evidence; the lower cloister open, with the arches filled in with iron grilles, the upper closed and glazed, making a gallery extending the whole length of the Hall. The reconstruction of the great buttresses of Richard II., which will form part of the scheme, "is justified on the strongest grounds, those of stability;" they are at present in a dangerous state. The scheme also includes the raising of the towers at the north end of the Hall one stage, and the treatment of them so as to render them in some degree a connecting link between the severer work of the Hall and the more elaborate architecture of Sir C. Barry. It must be remembered that no part of the stonework which covers the existing front is in reality earlier than 1820. There is, therefore, nothing authoritative about it, and its alteration interferes with no ancient work: an argument which future builders will probably apply when they feel inclined to pull down in turn the restored work of our day. The design will unquestionably be an improvement on the existing north elevation of the Hall, and that Mr. Pearson's cloisters are designed in the true spirit of Mediæval architecture, as far as that can be realised by any one in the present day, is what those who know his work will expect. Whether such a work can really be called "restoring" what was there before, or whether in any case that is what modern architecture should aim at, are, no doubt, questions to be asked.

A CIRCULAR has been sent round to the members of the Institute of Architects, intimating that it is the feeling of many members that the Institute should not any longer be without a portrait of the late Mr. Street, who had only just commenced at the time of his death what would undoubtedly have been a brilliant term of Presidency of the Institute. It is proposed that the portrait should be a bust, and that Mr. Armstead should be asked to execute it. Mr. A. W. Blomfield is acting as Honorary Secretary in connexion with the scheme, which we entirely approve, more especially as we have no doubt of Mr. Armstead producing a work that will be, from an artistic point of view, an acquisition to the Institute.

WE extract the following from the summary of the annual address of the Sanitary Institute of Great Britain, delivered last week by Professor Bartlett:—"The Select Committee of the House of Commons have overwhelming evidence of the pollution of the rivers in the neighbourhood of the intakes of some of our metropolitan water companies, and if cholera should occur in those districts, it must be distributed far and wide. No dependence can be placed in the purifying power of the ordinary filters, as I find not one in ten sufficiently well made or fitted to prevent the finer particles of charcoal from penetrating through with the mis-called filtered water. Such filters are worse than useless, and the public can use a little very fine charcoal powder as a rough test to see if the filter is in working order when new. In the course of some important experiments this simple fact was discovered, namely, that the finest particles of charcoal which pass freely through most filters before they are clogged up with deposits from the water, when used in sufficient quantity form the very best of all filtering media. Not only are suspended matters filtered out mechanically, but most, if not all of the pollutions in solution are oxidised and rendered harmless."

PITHY things were said by architects and others at the conferences last week. Architects, of course, need not be distanced by specialists if they keep on taking pains. The burden of the song as to drainage is always,—get good work done, and get somebody to keep it in order. And this is expanded to all lengths,—or, put briefly as,—lay your drains on good lines, to good falls; ventilate them thoroughly; cut off your sink-pipes from your drains by air-spaces, let them deliver on the gratings of gulleys or into hopper-heads; cut off the house-drains from the sewers by ventilating-traps, with gratings over them. An employer is supposed to listen to such counsels with a very cheerful mind. He is supposed to be welcoming the golden age. Croakers hint, however, that architects must preach a little while longer yet, and go cautiously, besides, lest they leave their pupils,—that is their employers,—too far behind them. A year or two ago a system of drainage was laid down on the most modern and approved principles. After a proper interval the client threatened the architect with legal proceedings. He complained that on one occasion there was a disagreeable smell at the disconnecting trap; that the foul water ran from the sink-pipes full in sight; that there were hopper-heads negligently and ignorantly put to some pipes, and that the leaves lodged in the autumn in the gratings of the traps!

IT is of extreme importance that daily gaugings should be taken for the next few weeks of the actual flow of water over Teddington Weir. Measurements of the volumetric flow of the Thames are at present contradictory. The escape down the channel of 16½ metric tons per second is the lowest estimate generally known; and it may be gravely doubted whether the June and July flow of this year has been as much as that moderate figure. There are so many public bodies deeply interested in the matter,—to say nothing of the riverain proprietors, and of the navigators and frequenters of the river,—that it will be a perfect scandal if they are content to remain in ignorance of the facts. Neither the Conservators of the Thames, the Metropolitan Board of Works, nor the Local Government Board are in a position to fulfil all their duties without a knowledge of this minimum flow. It would, no

doubt, be somewhat of a fresh start, but it would conduce very much to the high public estimation of the Institution of Civil Engineers if they would allot a small portion of their noble revenue to the determination of scientific facts of public importance, in the same way that the British Association has done. In France and in Italy, as well as in other Continental States, the hydrometry of all the rivers of the country is ascertained by the Government engineers, and the details are made as generally accessible as can be desired. Is it creditable to us as a practical people that questions which can be at once answered as to the levels, fall, average flow, floods, and droughts of every French or Italian river are as yet unanswerable for the rivers of the British Islands?

THE terrible railway disaster near Penistone, the report of which has shocked us in Thursday's papers, seems to have been one of those events which can more truly be called "accidents" than railway disasters often can. The sudden breakage of the engine axle illustrates indeed the occasionally treacherous nature of iron when subject to continued stress and vibration at high speeds; and though we can never hope to eliminate entirely this element of danger, it will be very desirable if the history of that axle can be traced.

THE important decision in the case of a suit of a customer against the New River Water Company, in the Clerkenwell Police-court, last Wednesday, should be noted. The plaintiff sued the Company for overcharges during past years, pursuant to the decision in Dobbs's case. The Company, through Mr. Poland, stated that they had taken no proceedings for under-charges since Dobbs's case, and if these proceedings were allowed they might have 50,000 claims against them. The plaintiff was non-suited, on the ground that he must be considered as having acquiesced in the charges at the time they were made.

THE case of Snow *v.* Whitehead, heard before Mr. Justice Kay on Monday last, raised a curious and important question as to what constitutes a house of a specified value on an estate. The defendants were assignees of a piece of land in regard to which they had entered into a covenant with the plaintiff to build no house of less value than 400*l.* The defendants had built two houses which were of less value severally than 400*l.*, and made a communication between them on the ground floor, claiming that they were thus one house of higher value than had been stipulated. The learned judge decided against them, holding that for the purposes of the covenant they were two houses. There can be no question that the law, as laid down in this case, represents the common sense of the matter (which law does not always represent). The object of a covenant of that kind in regard to building land is to ensure the erection of buildings of a certain standard in regard to appearance and value, and to permit the erection of smaller tenements arbitrarily connected together after they were built would be to invalidate the practical object of the covenant.

THE programme of the International Competition for the proposed new Exchange at Amsterdam, for which designs are to be sent in by the 1st of November, offers a remarkable contrast to some competitions nearer home. The whole of the drawings sent in are to be publicly exhibited; the best ten plans are to receive premiums of 1,000 francs each, and five of the authors of these ten plans are to be invited to enter into a final competition, in which they are to receive respectively premiums varying from 10,000 francs to 3,000 francs. A committee of judges has been formed, including eminent architects from various countries. Among them are the well-known names of Herr Cuypers (Amsterdam), M. Paul Sédille (Paris), and Professor Kerr, to represent the interests of English architects. When our own authorities see how these things are done abroad they will perhaps not feel quite so certain that they have done everything they ought to do for the architects in some of our own competitions.

IT is said that Lord Carrington's house in Whitehall is shortly to be removed,—probably next month indeed, and almost certainly not later than October. It is one of the very few houses built in London by Sir William Chambers, and remains almost exactly as it left his hand. The interior is marked by all his delicacy of design and treatment, and the detail throughout is worth study, and much of it is worthy of record. This is a hint for students who may not be able to spend their holiday out of town this year. We shall give two views of the interior shortly.

THE advantages of being, as people say, "connected with the Press," are probably hardly appreciated or realised by the outside world. Here is one example, for instance, of the paths of pleasantness in which one may be invited to walk, even in what might be thought the dull and prosaic study of sanitation. (N.B. The spelling as in the original document):—

"DEAR SIR,—We have erected a house in the Grounds at the Health Exhibition, where we show our system of ventilation." [System described.] "We are thinking of inaugurating the opening in the form of a lunch to a select number of the Press. Our modus opperandi will be lunch at the Restaurant, then adjourn to the house for Inspection Explanation and discus its Merits over a little champagne and cigars. Shall we be able to rely on your favouring us with your presence?"

Evidently the writers think, like Prince Bismarck at his recent "Früh-schoppen," that morning cups predispose us to "a more moderate and favourable view of men and things." We shall be happy, however, to "discus" their system of ventilation in a kindly though, perhaps, a more cool and impartial spirit than the suggested "modus opperandi" would be likely to induce.

A CONFERENCE was held at the Social Science Association on Wednesday, presided over by Mr. Samuel Morley, M.P., "for the purpose of considering the best means of promoting the formation of village communities, where manufactures and 'home industries' can be combined with the cultivation of cottage or co-operative farms, as a remedy for overcrowding in great cities, and want of employment in agricultural districts." The Chairman, followed by the Rev. H. Solly, strongly urged the importance and practicability of forming such communities, and carrying on various industries there, while at the same time relieving the congestion of towns. We have more than once expressed the opinion that a reaction must begin sooner or later against the enormous and almost suicidal crowding into London which has hitherto kept continually increasing; and we hope this is the thin end of the wedge.

## CAMPS, CASTLES, FORTIFICATIONS, AND EARTHWORKS OF WARWICKSHIRE.*

### HOM HILL EARTHWORKS, KENILWORTH, &c.

DUGDALE, speaking of this place, says,—"Before the Conquest it was a member of Stoneleigh, being ancient demesne of the Crown, and had within its precincts a castle situate upon the bank of Avon, in the woods opposite to Stoneleigh Abbey, which castle stood upon a place called Hom Hill, but was demolished in those turbulent times of King Edmund and Canutus the Dane." The position of this small Saxon fort is at the junction of the parishes of Ashow, Stoneleigh, and Kenilworth, and the boundary-line of the two last is the ancient road within the outer fortification towards the river. This road came from Warwick and Blacklow Hill to Stoneleigh and Coventry. The situation agrees with Dugdale's description, and the place is still known to the oldest inhabitant as Hom Hill, although its name was changed to "The Crew" 150 years ago. The word Hom is said by the Rev. J. Skeat to be the same as Holm,—flat land near a river encompassed by little brooks,—but is probably the same as ham or home, a hamlet being a cluster of dwellings in the same way as the Chartulary of Evesham (Harl. MSS. 376, fol. 60), speaks of Evesham as Ætham. Dugdale, in his "Antiquities," under "Newton," says Holm "is such grounds as are upon the whole encompassed by water."

The top of the hill (see plan on next page) is flat and oval in shape, about 200 ft. by 100 ft., formed to a surface, but there are no traces of earthen banks around it; probably a stone wall or wooden palisades encompassed the Saxon dwellings destroyed by the Danes in the year 1016. The oval is encompassed by a square-shaped outer rampart which is from 3 ft. to 15 ft. high, and its top is from 20 ft. to 40 ft. above the latter. The side of this rampart towards the river is perfect, and of a slight curve, and has the old road before mentioned running at its foot, whilst towards the Avon on the same side is an outer line of defensive bank and ditch, extending out beyond both ends of the fortifications; the road is 40 ft. above the river. The defensive works are stronger in the centre. The rampart is perfect on the south-west, but has been destroyed on the two remaining sides, partly by the construction of a new road about eighty years ago. At this point of the river old maps indicate that a ford existed at an early period. Ancient enclosures on its banks are called "Wayford Meadow," "Wayford Furlong," and "Garbridge Meadow." Thus a road crossed the river at this point, coming direct from Kenilworth by the Hom to Starton; it was evidently in use in Norman times before the monks built their abbey at Stoneleigh. The names of villages, woods, and fields hereabouts are ancient, and show that the country was to a great extent covered with forest in Saxon times, whence lawless freebooters would issue to plunder travellers on the roads and people in the surrounding villages at will. The direct road from Warwick to Coventry was not made till the time of the Edwards, and communication between those towns was then as bad as it could be. To remedy the evil hill forts were therefore probably first constructed in still earlier Saxon times at Blacklow, Hom, and Stoneleigh, to guard the roads on the Royal demesnes and for the better protection of the villagers.

There is also an ancient earthwork in the Stoneleigh deer park, between the Coach and Stair bridges, occupying about two acres in extent, situated about forty yards from the river on its north-east bank, and 80 ft. above it, having a considerable look-out towards the upper valley of the Avon, but its surface is so much disturbed by ancient quarrying, that it is now impossible to state either its nature or use. It is said to have been a defensive work, and had a mill situated on an island near it. If so, it may have been a place of assembly for the Stoneleigh Manorial Court, as it is on the same hill, and only a short distance from the Motslow mound, but overlooking another valley. Towards the river are the remains of an extensive terrace or rampart, along which an old road ran from Stanton to Chantry Heath, with similar arrangement to that at Hom. The form of the outer banks at several points favours the tradition that the place was an ancient fortified position.

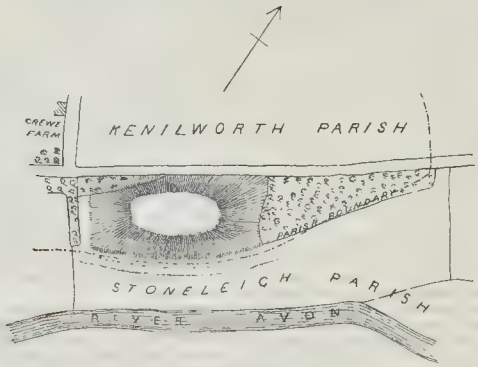
### KNIGHTLOW TUMULUS.

Five miles and a half north-east of Coventry, on the old coach road from Birmingham to London, near the Roman Fossway, within the parish boundary of Ryton-on-Dunsmore, and on the ridge of elevated flat land at the top of Knightlow Hill, stands what remains of an old wayside cross, resting upon a mound or tumulus of artificially-raised earth to the left on ascending the road, and from this mound the hill is said to derive its name. A new piece of road was made here in the early coaching-days to give easier ascent and descent to the hill; and from this high and elevated spot a good view is seen of the surrounding country, with the spires of Coventry in the distance. At this stone is still annually collected on Martinmas morning, at sunrise (November 11th), what is called "the wroth money," from various parishes in the Hundred of Knightlow. The tumulus upon which the cross was erected is about 30 ft. or 35 ft. square at the base, with sides running parallel to the road, having a large fir-tree growing at each angle, it being a tradition with the country people that the four

* Continued from p. 47. The illustrations are all to a scale of 6 chains to an inch.

trees represent four knights who were killed and buried there. To trace the history and origin of the wroth money collected here, it is necessary to go back to early Saxon times, when the Midland counties of England were covered with dense woods and forests, which are stated to have extended at that period over more than a third of the land. Alfred the Great appears to have been the first king who endeavoured to reduce the Midland communities into districts, which he did by placing about one hundred villages together, under the ruling of some local thane, for the purpose of raising universal taxes equally upon the whole of the hundred, and for the regulation of other local matters. In the forest laws of King Canute we find mention of officers appointed by the Crown for the proper preservation of these forest districts. They had over them a verderer, or chief woodsman, who had power to act as judge, and whose duties consisted of seeing that no encroachments were made or royal forest destroyed, to seize robbers frequenting the woods, the destruction of wild beasts, the stalling of beasts of venery, and to prevent cattle straying. He was empowered to hold courts every forty days, or as occasion required, in some convenient place in the district, with power to punish offenders, and of collecting fines imposed; and also to him appears to have been entrusted the gathering of the king's dues. One verderer was appointed over the forest in a district. It is probable that at that early period this officer had control not only of the royal woods which then existed of the remaining portion of the ancient forest of Arden, in Warwickshire, but also of the then greater forest of Cannock, and other woodlands in the county of Stafford. At that time the open ground, which these woods and forests afforded here and there within them was mostly uninclosed, without any boundary, ditch, or division, the thanes and people living together in one community, with the cattle of both turned out to graze together, whilst they were occupied with the rearing of swine, which were left in the forests under the care of a swineherd, appointed by the Court of the Hundred, or local thane, to feed on the beech and oak mast, and the trees were then valued according to the number of swine that could be covered with their branches; thus, the commissioners appointed to take the Domesday state that the king's woods at Stoneley were four miles long and two broad, and formed pasture for 2,000 hogs. The people had many other privileges granted them, which they obtained in course of time as their rights, often paying acknowledgments to the king, or to their lord, either in labour or remuneration, in money or kine, and to these rights and charges are attributable "wroth money," "warth moneth," "hocktide moneth," "turfdele moneth," and other old customs.

The payment of wroth money existed at the New Forest, in Hampshire, in 1670, where, in an abstract of forest claims, it is called "wrather money," "rother," "wrother," "hrythes," and "cattle money," and appears to have been paid by the inhabitants to the holders of different manors for some right of herbage, together with marking and guarding their cattle and swine, when browsing on the unenclosed lands within the township of the Hundreds. If originally collected for this purpose it would be a very useful tax in the dark ages from Rufus to Henry II., when animals were likely to be taken by the greater barons at any time, when might ruled against right, and very little security existed for the labour and goods of the thrifty husbandman, unless in some slight way protected by his lord. This fee has often been confounded with the collection of worth money, which was a charge of payment in lieu of castle-guard. The Coventry Freemen to the present day pay a marking fee annually to the Pinner, who is a person appointed by the Corporation, upon their cattle, which are allowed by right of charters granted by the Norman earls of Chester, and other lords of the manors, there to graze upon the herbage of the still unenclosed commons; and in other parts similar customs exist. At Coventry the fee appears to be exacted by the Corporation as lord of the manor, and on Martinmas morning the City Crier gives public notice that all cattle are to go to the proper office to be marked, and if found unmarked they will be impounded.




*Hom Hill Earthwork.*



*Section of Hom Hill Earthwork, from South-West to North-East.*



*Section of Hom Hill Earthwork, from South-East to North-West.*

It is probable that the different amount of charges to the various parishes would be levied according to the number of cattle allowed to the inhabitants of each township. The office of verderer in this locality, at the time of the Conqueror's survey, appears to have been vested in Richard Chinen, better known as Richard the Forester or Huntsman. He had eight manors in this county in the gift of the Conqueror, which he held by the service of keeping the forest of Cannock and other royal woods, and paying to the king ten marks annually. Thus the Conqueror, who is said to have loved the deer as if he had been their father, made good provision for his huntsman and attendants. This office, however, appears gradually hereabouts to have died out, and to have merged into that of the sheriff of the county. The square tumulus on Knightlow Hill is probably the grave of some Roman general, as it closely resembles the one at Cloudsly Bush, and is near the Roman Fossway. The stone on the tumulus, in the hollow of which the wroth money is now collected, is evidently of later date, and may have been part of the Stretton Market Cross, erected about the time of the Edwards. It appears of similar shape to those at Meriden and Dunchurch, and has on its side a mason's mark in the shape of a cross 6 in. long. Market crosses during the civil wars were much mutilated and uncared for, and the mile-stones of the country roads are, it is to be regretted, sharing the same fate now; whilst part of the Brinklow cross acts as a support to a lamp near the church in that village. The early history of the Hundred of Knightlow is very obscure. The name is not mentioned in Domesday, but the parishes are there contained within the then Hundreds of Mereton, Stanley, and Bromelaw. In the sixteenth year of Henry II. it is called Cnuchtelawa, twenty-first of Henry III. Knistelaue, fourth of Edward I. Knyhtelawe, second of Edward II. Knytelowe, ninth of Edward II. Knythlawe, and now Knightlow. According to Domesday, there were ten Hundreds at the Norman Conquest in Warwickshire. They were then reduced to six, and latterly to four. This reduction in number was not effected suddenly, but by degrees. Numerous rents and other feudal payments were made to the Crown, of which we find that in the second of Edward I. (1283) it was found by inquisition that this Hundred was yearly worth 29*l.* 17*s.* In the ninth of Edward II. (1315) upon inquisition it was found to be then in the king's hands, and in the fourth of Edward III. the king granted the baileywick of this Hundred to his well-beloved esquire, Edmund Shireford, for his life, he paying the ancient farm-rent thereof to the sheriff, after whose death it appears to have returned to the Crown, being governed by the sheriff, who accounted for it in the Exchequer. The towns within its precincts which did suit to this court up to the year 1656, were "Wolston, Lillington, Leamington Hastings, Burdingbury, Princethorpe, Hopsford, Ladbroke, Bubbenhall, Shilton, Barnacle, Napton, Stretton-super-Dunsmore, Radford-Semeley, Bourton, Draycote, Bramcote, Churchover, and Walton in the parish of Monk's Kirby," and they pretty nearly agree with the list of places liable to pay wroth money. But, by some strange arrangement, Ryton on Dunsmore, within which parish the Knightlow Hill stands, is not in the list. In the reign of Charles I. we find this Hundred in the King's hands, who, in the seventh year of his reign, granted "to Francis Leigh, Knight and Baronet, his heirs and assigns for ever, all that his Hundred of Knightlow arising from certain manors, et cetera," therein mentioned, amounting altogether to 21*s.* 4*d.*, also the rent of 37*s.* 8*d.* payable by the sheriff of the county. There are other matters granted, with a long list of appurtenances, among which occur the words "the wroth monies" and other small feudal pickings. This grant descended through his daughter Elizabeth, married to Thomas, Earl of Southampton, to the Montague and Scott families. It must be shorn of much of its ancient profits, if any, indeed, remains, as all such feudal rights and impositions were abolished on the return of Charles II. to this kingdom. The court-leet of the Hundred is still held annually at Dunchurch, and proper officers appointed, although their services are no longer required, whilst the collection of wroth money takes place yearly at Knightlow Hill on Martinmas morning before sunrise, when the steward invites the party to stand round the stone (the original custom was to walk three times round it), proceeds to read the "Charter of Assembly," which opens thus:—"Wroth silver collected annually at Knightlow Cross by the Duke of Buccleuch, as Lord of the Manor of the Hundred of Knightlow." The next proceeding is calling over the names of the parishes liable to the fee and the amount due from each, when each parish, by its representative, casts the required sum into the hollow of the stone, and payments are made as follows:—

| | s. | d. |
|---|---|---|
| Astley, Arley, Burbury, Shilton, Little Walton, Barnacle, and Wolfcote (1d. each parish) | 0 | 7 |
| Whitley, Radford-Semele, Bourton, Bramcote, Napton, and Draycote (1½d. each parish) | 0 | 9 |
| Princethorpe, Stretton-on-Dunsmore, Weston, Bubbenhall, Waverley, Churchover, and Ladbrook (2d. each parish) | 1 | 2 |
| Wolston, Hopsford, Hillmorton, and Marton (4d. each parish) | 1 | 4 |
| Leamington Hastings (12d.) | 1 | 0 |
| Long Itchington (2s. 2d.) | 2 | 2 |
| Harbury (2s. 3½d.) | 2 | 3½ |
| | 9 | 3½ |

The fine for non-payment in olden time was 1*l.* for every 1*d.* not forthcoming, or else the forfeiture of a white bull with red nose and ears of the same colour, but the fine has not been paid within man's memory.

The payments have been collected from time immemorial, excepting for a few years about the beginning of this present century, but the Scott family subsequently revived them or kept up "the charter," as it is locally called, but the

persons who pay the wroth money now are neither the lords of the several manors mentioned nor the churchwardens of the parishes, but gratuitous payments are made by the spectators in prospect of the comfortable breakfast given by the Duke of Buccleuch at Stretton afterwards. W.

*Coventry.*

## ISTHMUS OF CORINTH CANAL.

EVIDENCE is not wanting that in ancient times an attempt was more than once seriously made to pierce the Isthmus of Corinth. For the credit of antiquity it is satisfactory to find that they chose the right point for their attempt. All traces of the old works must shortly disappear entirely when the new canal is completed. M. Gerster, the superintendent engineer, deserves our thanks for remembering the old while he inaugurates the new. He publishes, in the *Bulletin de Correspondance Hellénique*, a plan, with elevations and full engineering details, of the remains he has discovered while superintending the modern works. These remains must belong to the canal of Nero. But his attempt was not the first. Periander, Tyrant of Corinth, projected a scheme, but whether his project ever took effect we are not told. The engineer of those times had some curious scruples to contend with. What the gods had made was good, let man withdraw his impious hand, nor do violence to the sacred earth. "Fence not the isthmus with towers, neither pierce it with a trench, for had Zeus desired an island himself would have made it." Such was the answer that came from the Pythian shrine to the Cnidians when they desired to pierce their isthmus, and the like response must again and again have come to ambitious Corinthians. What machinations of commercial jealousy lay behind these Pythian oracles we can easily guess. In later and laxer days, when these pious scruples ceased, difficulties scarcely less curious were raised. When Demetrius Poliorcetes planned a canal, it was objected that the level of the Gulf of Corinth was higher than that of the Gulf of Ægina, and that, were the canal effected, the water would rush down and flood the lower islands. So great was the fear, that, Strabo tells us the project was laid aside. But science advanced. Roman emperors were less credulous than Macedonian conquerors. Cæsar planned the canal afresh, and would probably have carried it into execution, but death overtook him. Caligula sent a centurion to survey the ground. At last, Nero not only projected but began the work. In September, A.D. 67, Vespasian sent him from Galilee 6,000 Jewish prisoners for workmen. For some months the work was actively pushed. It ceased only when Nero was recalled to Italy to repress the insurrection of Vindex. After Nero the idea was taken up, indeed, by Herodes Atticus, but never carried further. M. Gerster calculates that the remains he has found justify the supposition that five or six thousand workmen were at work for three or four months. The line of excavation falls into three parts; on either shore a sandy plain with alluvial deposits, between them a rocky somewhat mountainous tract. At each extremity, through these two plains, Nero had dug a trench, the joint length amounting to about half the breadth of the isthmus. In the more difficult centre part he had sunk wells. The new canal will follow the same lines.

## INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

SECOND NOTICE.

PASSING along the central avenue we notice the silver axe recently presented to Mr. Gladstone by "a few admiring friends," beside which are some chips of an ash-tree at Hawarden which was felled by the Premier. The axe is fitted with a polished black handle, and is provided with an enclosing case. There are also several examples of the tools used by the woodman in the royal forests; but some of these are not considered up to the mark by Scottish foresters.

To the right we observe two bays devoted to the display of South African products. These courts are very tastefully got up, the walls being hung with maroon drapery, decorated with horns of the gemsbach and koodoo, a wreath of native wild flowers, and a telling picture of a flock of ostriches. There is a model of a forest wagon laden with several varieties of wood, and on the tables are seen Zulu assegais, ostrich eggs, hats made of reeds, Kaffir necklaces, and bracelets made of melon seeds. There are numerous sections of the different trees indigenous to the colony, and a stand showing the various woods, polished so as to display their markings. These include the yellow wood (*Podocarpus Thunbergii*), which is well suited for making wagons and flooring. The stinkwood, which has a fine texture, and takes a good polish, displaying a rich colour similar to walnut, and is used in the manufacture of furniture. The sneesewood is of great specific gravity, and, owing to its capacity for withstanding the attacks of boreworms, is of great value for marine purposes. The stone pine, now extensively planted in this country, grows freely in South Africa, and is found useful in the construction of railways, and there are other woods more or less useful, but none of these are exported from the colony owing to the difficulty of transit, except to a trifling extent. There are no large rivers to float the timber to the sea, and there are few creeks at which vessels could load. The means hitherto adopted is to use bullock teams, but the process of transit is slow and difficult owing to the nature of the ground, but tracks are being gradually formed, and the attention of the colonial authorities is now directed to the conservation of the forest, and a superintendent has been appointed with a sufficient staff of rangers to guard the forest from the indiscriminate destruction of wood which was going on, and which in some places threatened to denude the country of growing timber. The Kuysna, or great forest, situated between Table Bay and Algoa Bay, still contains magnificent remains of the primæval woodlands. It extends for upwards of a hundred miles along the coast, with an average breadth of twenty miles, and here are found large game, as the elephant, the buffalo, and the antelope; but the Aborigines, a Hottentot tribe, the Outeniguas, have nearly disappeared. In the King Williamstown district there are also small Crown forests covering about eighteen square miles. These forests are now in process of being surveyed, so that they may be worked on a principle of rotation, and precautions are taken to prevent the scourge of forest fires. Plantations are being formed by Government on the Cape flats, and nurseries have been established, from which gaps are filled up in the Crown forests and trees, sold at a cheap rate to private planters.

## THE LION OF ST. MARK ON THE COLUMN OF THE PIAZZETTA, VENICE.

A VALUABLE pamphlet on the above subject, by Signor Boni, of the Ducal Palace, has lately been published in Venice.

There are probably few monuments of past ages of which the existence and outward aspect are better known, yet just in proportion as this is the case, does its real history seem vague. There seems to be no satisfactory documentary evidence to determine it, and I am aware of no attempt having been made, before the one here referred to, to decipher its history and the manner of its construction from a close examination of the animal itself, this, no doubt, arising from the difficulty of obtaining access to the top of the column which supports it. I venture to think, therefore, that the appended translation, which I am able by the author's permission to communicate, will not be read without interest and instruction in this country:—

"On the morning of the 18th of September, 1883, as the grass was to be removed from the top of the columns of the Piazzetta, two long ladders were tied together, so as to reach the capital, whose height is more than fifteen mètres.

I ascended by these, and as I placed my foot upon the capital, which is three mètres square, I felt quite small, so colossal did the lion, whose wings are once and a half the height of an ordinary man, appear to me.*

To accustom myself to the proportions of the lion I walked all round it.

It is made of many pieces held together by iron cramps, the square-headed rivets of which have in rusting loosened or quite separated their respective plates. Two fragments of bronze, which have been broken by the corrosion of the iron, or have fallen from the underside of the body of the lion, show that the rivet is more or less a centimètre in circumference.

The pieces which form the lion were made at different periods; fortunately the greater number are of the older period, from the time when the Doge Ziani erected the column (1176); we have then later renovations and restorations of Napoleon's time, or of that style which is recognisable by the classic modelling.* Some of these pieces seem the work of clever hands.

The right forepaw and half of the left, half of the right hind paw, and the whole of the left, are not original, and, therefore, not worth the trouble of describing. It is a pity that none of the original claws remain, because the present ones have the character of no special period; they are indifferent and academical. The tuft on the head of the lion is replaced; the gospel which he holds under his foot has been renewed in lead. Both the wings are not only detached from the other parts of the lion, but evidently belong to a recent period. Nevertheless, there were wings at first, and of these there remain traces, which we will presently examine. The tail has also been restored.

All the rest,—that is to say, the head, with the mane and the body of the lion,—is original; the modelling of some parts where the old Venetian metal-worker thought fit to preserve it is truly perfect: to convince ourselves of it, it would be sufficient to consider the muscles, tendons, and veins of the paw not entirely restored; here there is no ostentation of the doctrine of anatomy, that only is given which contributes to the majesty of a symbolical animal.

Holding on to the jaws and looking into the lion's mouth, I perceived that all the inside is hollow. The jaws are furnished with canine and molar teeth, of fairly accurate workmanship. The skin is wrinkled and hairy at the sides of the mouth, which, seen closely, altogether loses its grotesque sneer; its two moustachios (*baffi*), chased to represent hairs, but of one single piece, represent the long bristles of the feline species; the eyes are strongly accentuated, the eyelids muscular and rounded. The eyeballs appear to be of a glassy, white, and translucent substance, triangularly cut: that of the right eye reflects a reddish tint from below. They have been restored, and are probably, as they say, of rock crystal, although not transparent.

The old guides do not mention their former colour; certainly they were not white, for they would have given a strange expression to the lion's head, or, like the present ones, made him appear blind. The eyes of the feline race, like the crisolite in a poem of the twelfth century, 'dart flashes of fire' ('spande fiamme di color di fuoco'), or, like the topaz, 'have the colour of golden and resplendent light' ('ha color d'auro e splendiente lome').

If such gems were not formerly set in the lion's eyes there may have been either cornelians or chrysopraze, or other such *cat-like* crystal. The eyes may have been still more fiery, and yet not so as to take away from the effect of the bronze, if made of one or more red gems.

The tufts of the mane spring round the neck and round the ears, short and wavy, then developing into symmetrical locks, those below mingling with those above, descend down to the breast, and lose themselves half-way down the back. Each lock, formed of five or six little cords, half a centimètre in size, tapers off in spirals, and the last wave stands erect, so that the mane is all bristling with points. Other little tufts are to be found regularly disposed behind the paws and elsewhere. Where the mane descends along the shoulders of the lion it covers the feathers of the bases of the ancient wings, feathers which may be seen also on the right side. The feathers are rudely interrupted by the chace formed for fixing the new wings. The difference between the old feathers and those of the new wings is evident; whilst the first are concave, rounded, and entire, those of the restored wings are convex and carved more naturally. The old wings developed themselves at a less distance from one another, and nearer to the neck, because the original feathers are to be found where the mane descends and where the restored wings do not even com-

* See, in connexion with this article, the illustration of the lion which we give in this week's number.

* The lion was lying in pieces at the Arsenal in the condition in which it had been returned from Paris in the year 1815. It was put together again and restored by Bartolomeo Ferrari, and replaced upon the column, on the morning of April 17th, 1816.

mence. As to outline, the old wings must have participated in that severity which, inspired by the sublime, does not descend to mean details. The severe line which forms the head of the lion, with the mane and the back, may give some idea of this.

Mr. Ruskin (in 'St. Mark's Rest,' i., 22), with that perception which is peculiar to him, arrived at the conclusion that the old wings were longer than the present ones, and that they were cut out into feathers.

The practice of cutting out the wings so that the light might be seen through the larger feathers, was introduced by the Byzantines in their mosaics, and Giotto adopted it for angels' wings. He was imitated in the fourteenth century by those who painted lions of St. Mark, as Jacobello del Fiore and *Donatus Venetus*, who adhered to the symbolical form of wings.

With greater reason it might be supposed that the bronze lion had its wings divided into feathers, so that they might more readily be distinguished against the sky. But a meagre record of them remains to us in the wood-engraving of Breydenbach (1486). In the painting by Bassano in the hall of Il Maggior Consilio, where the column on the Piazzetta is depicted to a large scale, the lion is to be seen with carved out wings, and although they have been treated by him as accessories and painted roughly, still he has not passed the fact unnoticed that the larger feathers were detached one from another. The lion was gilded; I found traces of gilding in the protected parts of the upper jaw.

Under the body there is a small door,—restored,—large enough to put one's head through, but it is locked, and I do not know for what intended. I could not find any inscription or mark relating to the ancient casting, nor any that refers to the restorations. There are several initials, but they are recent and of no importance. I left the two fragments of bronze where I found them fallen on the slab of the capital.

This lion of St. Mark is admirable in its expression of boldness and magnanimous strength. It is looking into the distance, and its claws grasp the book: it seems to send a roar of defiance to the East. Mr. Ruskin, from whom 'one of the most splendid productions of Mediæval art' could not pass unnoticed, spoke of it as a work of the thirteenth century (*vide* 'Stones of Venice,' iii., 233).

There remains to us the name of an *Aurifex Venetus* of 1300 on a bronze gate of the basilica of St. Mark; and Vasari tells us that the gates of the baptistery of Florence, modelled by Andrea Pisano, were cast in bronze by Venetian masters,—'Molto esperti nel fondere i metalli.' But I believe that our bronze lion is anterior to these works, and also to the stone St. Theodoric erected on the other column of the Piazzetta at the beginning of the thirteenth century (Sansovino).

Without pretending to say that it was placed on the column immediately after its erection by Doge Ziani, we must allow that in the twelfth century there existed 'Venetian masters' capable of undertaking such a work, if they were worthy of the fame which afterwards became theirs in Tuscany."

Since the publication of the above the author has found reason for supposing that the book under the fore paws of the lion is possibly not part of the original conception.

Signor Boni will be known to many artists who have visited Venice. To those who have had the good fortune to be welcomed by him,—as he welcomes all who care to see her treasures and to learn something about them,—I need say nothing of his authority to speak on her ancient monuments. For those who have not had this fortune I may say that the author is well known beyond as well as in Venice for his untiring efforts to preserve her treasures from destruction.

To his pen was due the memorial "L'Avvenire dei Monumenti in Venezia" (noticed at the time in the columns of the *Times*) which the Venetian artists adopted and presented to the Commission which has charge of monuments, at that time when the restoration of St. Mark's was so burning a question.

His sound views upon the proper treatment of "Restoration," explained in this and many other pamphlets and articles on the same subject, would form a very profitable study for many of those who have care of ancient monuments in this country. W. D. C.

## SOME MORE NOTES ON SASH-HANGINGS AND FASTENINGS

AT THE HEALTH EXHIBITION.

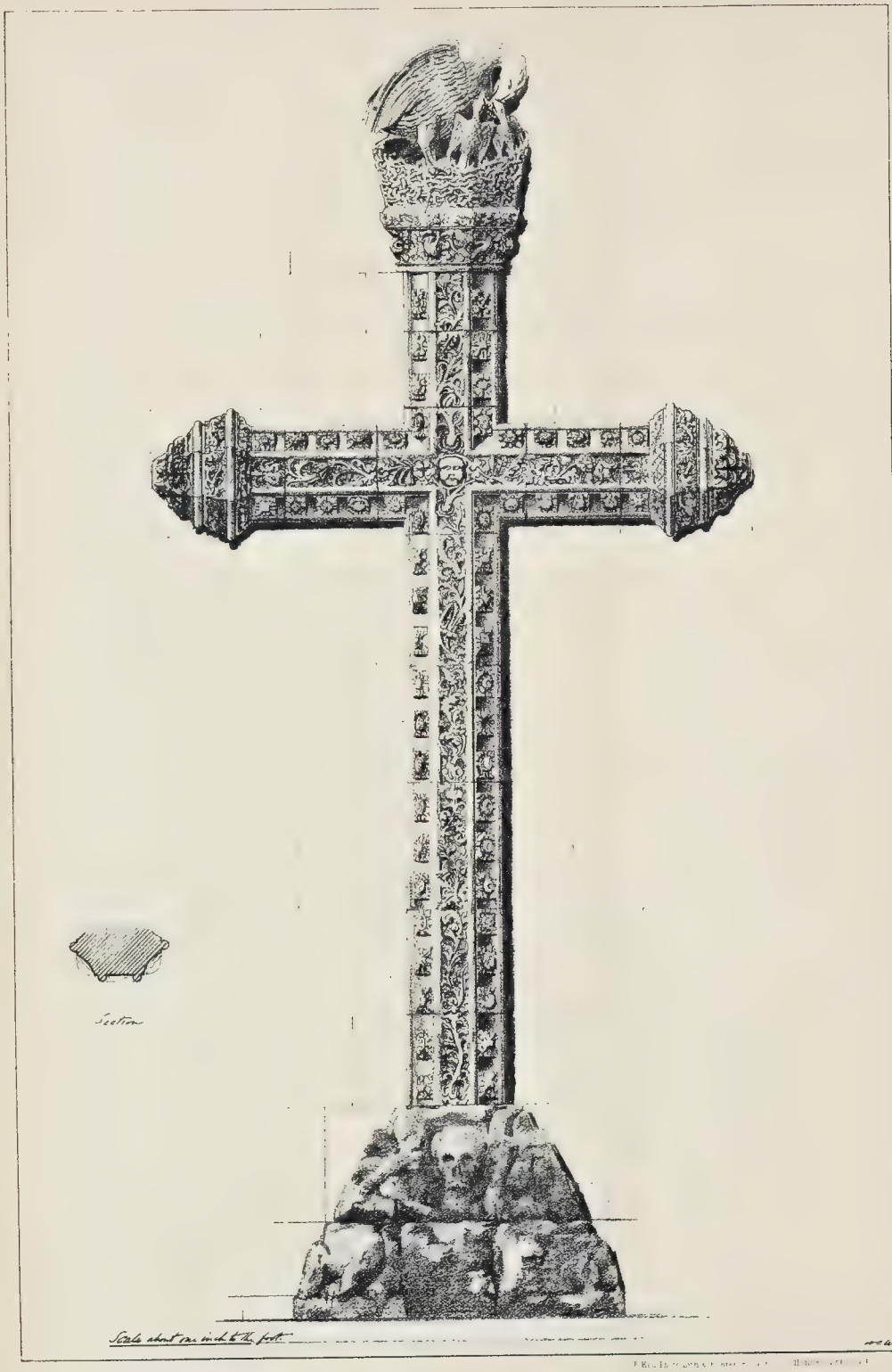
IN our notice of wood-working machinery, exhibits in wood and sash-hanging, and fastening appliances in connexion, we gave particulars of some recently-introduced methods for the ready removal or taking out of sashes for cleaning and securing the same. Though admitting that in some instances commendable improvements had been effected, yet, generally speaking, we were obliged to point out the drawbacks attending the adoption of nearly all the sash contrivances (ingenious though several of them are) on account of their non-adaptability save under special circumstances. We would rather bestow praise than dispense blame if we could conscientiously do it, but all intelligent exhibitors must be aware, as well as ourselves, that meritorious inventions or improvements are not necessarily thoroughly efficient and successful ones. Scattered through the galleries of the Health Exhibition, as we have remarked already, are a number of illustrations of what are termed "improvements" in window-frame and sash-construction, more particularly in respect to the hanging of sashes and their fastenings. Truthfully speaking, some of these "new systems" are not new, but reproductions of late eighteenth and early nineteenth-century methods, modified and re-introduced. Several attempts have been made to hang sashes on the balance principle without weights, and by the reduction of the number of weights for a pair of sashes, from four to two. In Venetian or "Wyatt" windows, that is, where there are a pair of central lights and side lights, all of which it is required to hang, the system of making two weights answer for hanging a pair of sashes has been often adopted by the expedient of fastening either end of the one length of sash cord to each sash, the looped middle behind the pulley stiles having a small sheave or pulley attached, somewhat similar to that in connexion with the weights of an eight-day clock. One of the drawbacks in this method of hanging is that both sashes cannot be equally raised and lowered to occupy a like position for ventilation with that of the ordinarily hung pair of sashes, in other words, the top or bottom sash must be either up or down and not equally open together. Adopting this balance principle of hanging, but dispensing with weights, an exhibitor hangs both sashes by passing the looped cord through a small pulley fixed at the back of the pulley stile. As friction in this case, as well as in ordinary cases, will lead to the wear and tear of the cord and its breaking, special provision has to be made to obtain access for repair or affixing, and without specifying other drawbacks, it will be seen that the system though applicable under certain conditions, cannot be generally adopted with success to the ordinary run of dwellings. The same exhibitor shows a very meritorious and ingenious system of hanging, in which he uses the ordinary sash-lines, but in the fitting and adjustment of the sashes, and in the method which he adopts for taking them out for cleaning, he makes a new departure. Here there is really no internal wooden stop to keep the bottom sash in its place. The inside casing shows a metal or zinc beading flush with the stiles of sash, behind which beading runs a groove, into which two spring bolts affixed to the top and bottom of the stiles shoot, forming, as it were, a tonguing for keeping the bottom sash in its position, and allowing it to move up and down readily. The shooting back of these bolts allows the bottom sash to be taken out, with cords attached, and cleaned on either side. The top sash, however, is not removed on a similar system to the bottom, but must be pulled down like an ordinary light, and cleaned by both underhand and overhand action. The parting slip in this system of sash-frame construction presents a T-section tonguing or passing into the groove in both sashes. The parting slip, instead of being fixed in a groove in sash-frame, is screwed on, and being in two lengths, allows half to be removed to take out the pocket pieces, if it be required, to get at the weights. The sash-fasteners (two in this instance, for sake of uniformity) are screws fixed on either side, passing through the thickness of the stile of bottom sash into a brass receiver with thread, sunk in the abutting stile of top light. There are other details which it is not necessary to dilate upon. Meritorious, however, as the system may be, and though applicable under certain conditions, it cannot be generally adopted for reasons that will occur to the experienced architect and builder. In some early nineteenth century private mansions in London and the country sash-frames will be found in which provision was made for the passing up of a portion of the bottom sash when raised, into the head, or above the head of frame. In these instances the bottom sash was made two-thirds the height of sash-frame, and the provision at top was intended for allowing sufficient head-room when lower sash was raised for a lady or gentleman or family party to walk out upon a balcony or on to a pleasure-ground or lawn. This principle of construction is being again introduced to allow for ventilation and cleaning purposes respectively,—for if the bottom sash be run up into the extent of the recess provided, into the head of sash-frame, and the top sash pulled down to its limit, an open space would be formed between both sashes to be utilised for the purposes indicated. Heavy sashes have been, and are, hung by a chain system, but save when these are sashes of exceptional dimensions, and weight, the cord or line system is still almost universally used in these kingdoms, despite of obvious drawbacks. The chief conditions of efficient sash-hanging are good materials, sufficient scantling, and good workmanship. Flimsily made sashes and flimsily made frames are unserviceable, and an annoyance from the beginning. Solid work and good fitting, accompanied by well manufactured appliances, affixed by competent workmen, will generally wear well and give satisfaction. The ambitious desire to introduce innovations is a characteristic of our age in the fields of building construction as well as in other fields. It is our province as well as duty to take cognisance of every new material or appliance likely to prove useful to the building constituency, but we must hesitate to commit ourselves to opinions which cannot be sustained. "Rome," says the old maxim, "was not built in a day." In sooth, no; and our best inventions, after all, are only blurred "first-proofs" susceptible of many revisions and improvements before the standard of comparative excellence can even be reached.

**Large Sales of Property at the Auction Mart.**—There were several sales of valuable estates at the Auction Mart last week. Messrs. Farebrother, Ellis, Clark, & Co. submitted to competition a freehold estate, with residence, on Putney Heath, containing 14¼ acres. There was a close and animated competition for the property, which was sold for 28,000*l.*, being at the rate of 2,000*l.* an acre. Messrs. Norton, Trist, & Watney offered for sale the freehold property in the Grove, at Hampstead, known as Fenton House, with one acre of land attached, which realised the large sum of 8,050*l.* There were likewise a number of sales of valuable ground-rents and leasehold properties in Regent-street and Oxford-street. Mr. Robert Reid sold the leasehold properties, Nos. 8 and 188, King-street, Regent-street, the leases having thirty-five years to run, for 5,300*l.*; also No. 154, Regent-street, lease thirty-five years, for 4,500*l.* Mr. Reid at the same time sold the freehold properties Nos. 48 and 49 in Long-acre, for 5,450*l.* Messrs. Driver & Co. sold two improved ground-rents arising out of City leaseholds in Stratford-place, Oxford-street. One of these ground-rents, of 632*l.* 10s. per annum, with renewal fines every fourteen years, amounting to 951*l.*, was sold for 14,765*l.*, and the other realised 36,300*l.* Messrs. Fox & Bousfield, in addition to the above, offered for sale the Rose Hill Park Estate, situated at Sutton, in Surrey, a freehold building property of about 102 acres, described as having a long frontage to the high road from London to Epsom, fully ripe for the erection of good-class residences, and alike eligible for a public institution or a cemetery. The property was put up at 20,000*l.*, and 23,000*l.* having been reached with no advance, the auctioneer observed that there was not a piece of land in Surrey that could be purchased for less than 300*l.* or 400*l.* an acre, but in many parts of the county 600*l.* an acre was easily obtained. The property was ultimately withdrawn at 25,000*l.*

**Hatchett's Hotel.** — Messrs. Archibald Smith & Stevens have received the order for the whole of the lifts (six in number) for Hatchett's new hotel, Piccadilly.

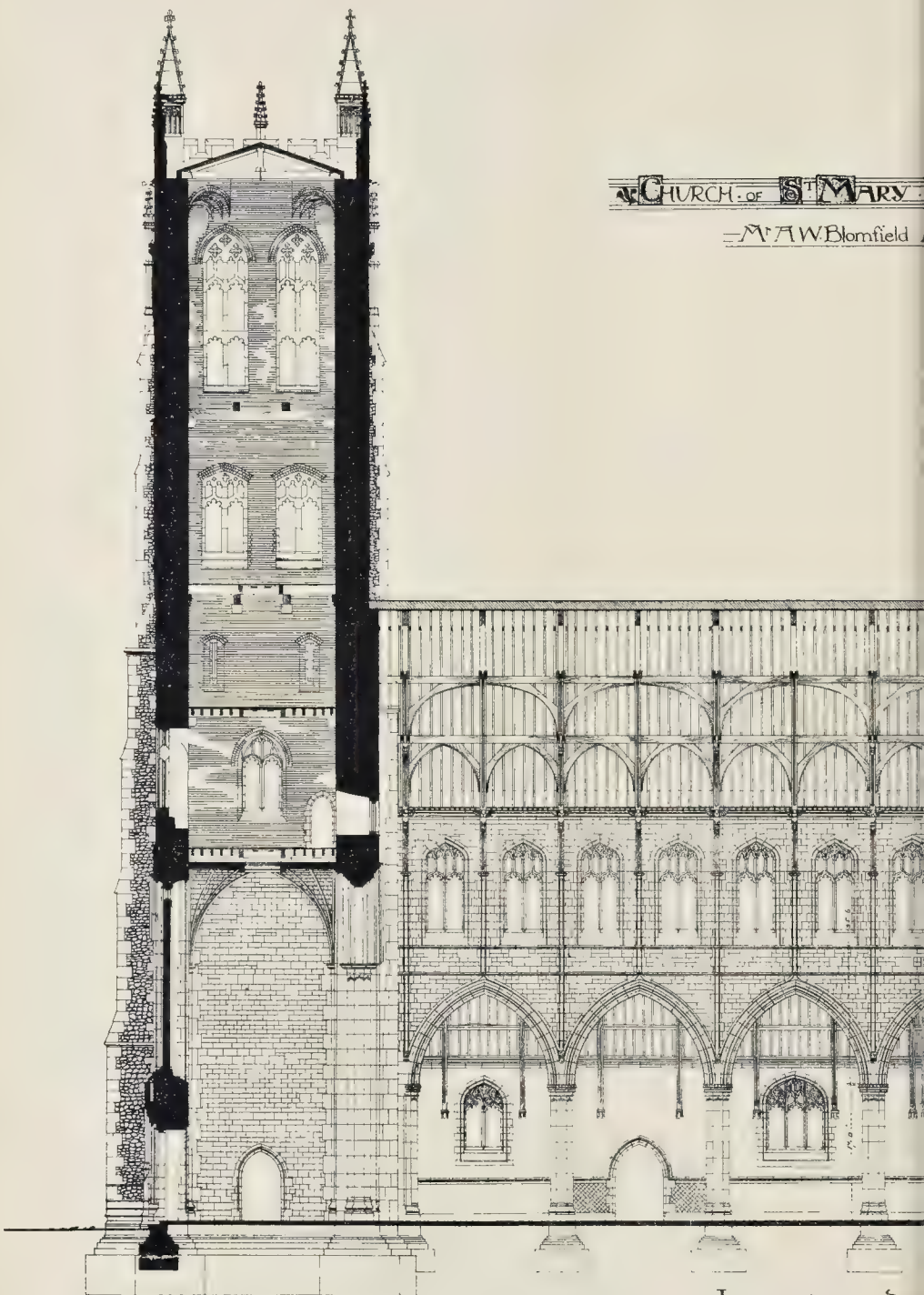


INK PHOTO SPRAGUE & Cº. LONDON




CROSS IN CLOISTERS, SAN JUAN DE LOS REYES, TOLEDO.

Drawn by Mr. W. S. Weatherley.



CHURCH OF ST MARY

M^r A W Blomfield

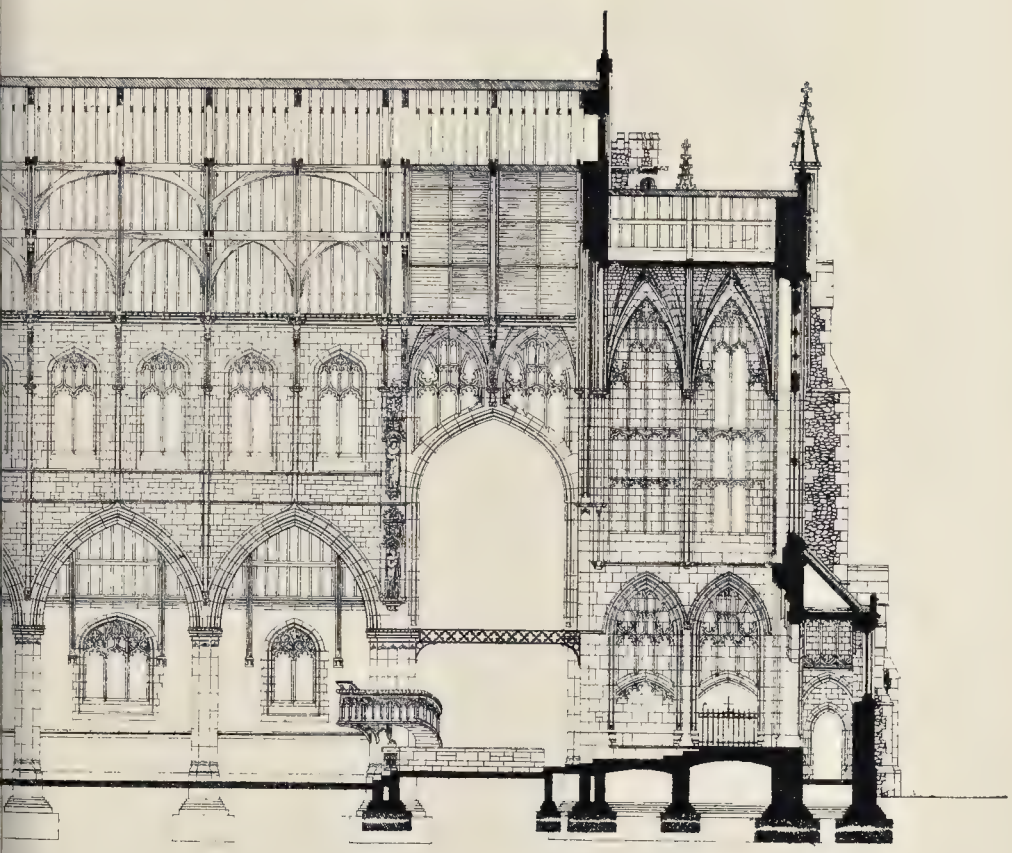
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Scale of

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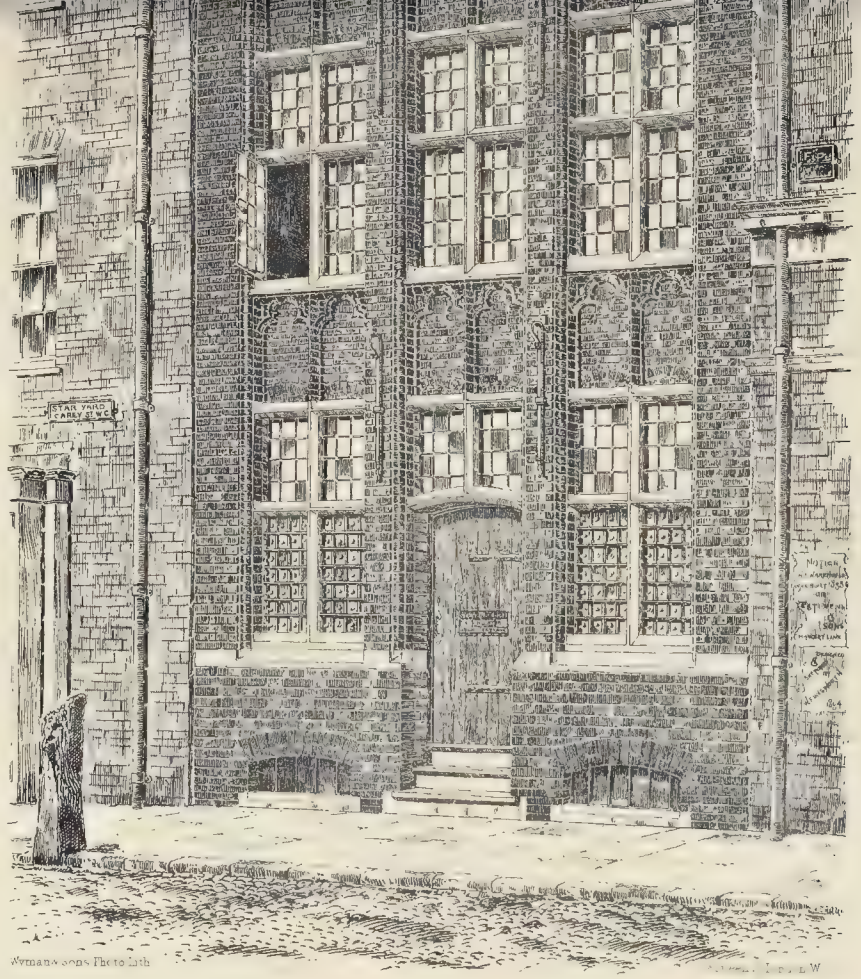
SEA

Architect



Feet

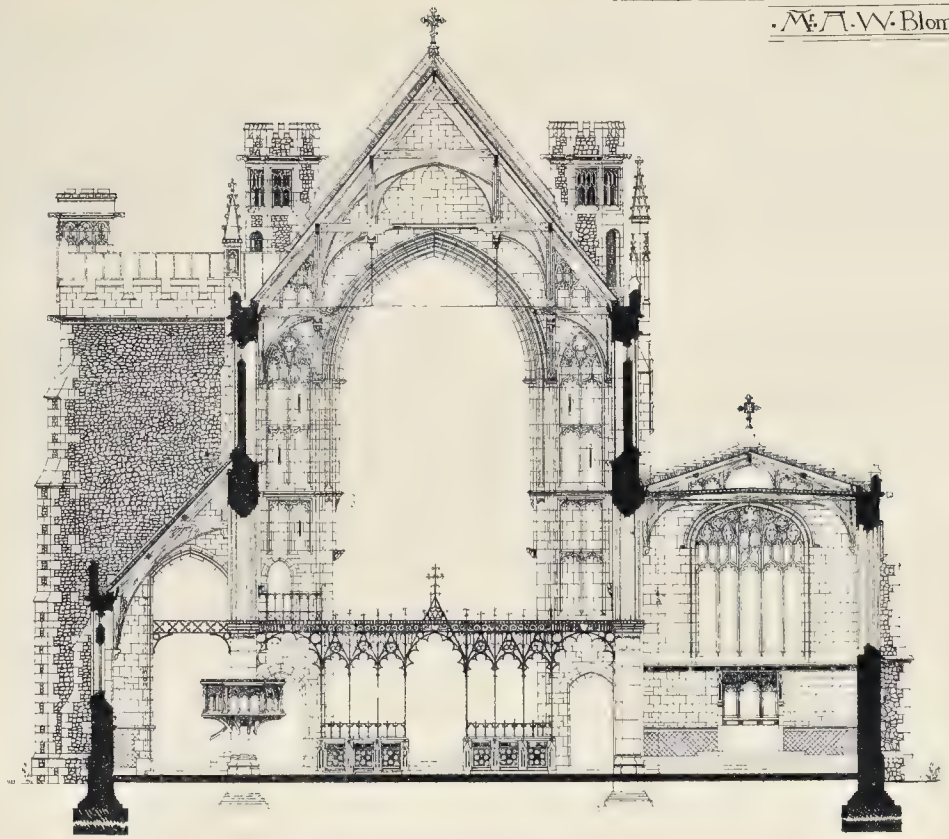





WAREHOUSE, STAR YARD, CAREY STREET.—MR. W. F. UNSWORTH, ARCHITECT.

# Church of St Mary Portsea

M. A. W. Blomfield M.A.



Cross Section thro Nave



Cross Section thro Sanctuary

Scale of 0 10 20 30 40 50 60 70 80 Feet



PRAYER NICHE EARLY ARABIC WORK

## Illustrations.

### WAREHOUSE, STAR-YARD.

THIS warehouse, which has just been rebuilt for Messrs. Stevens & Sons, 119, Chancery-lane, is of red brick and Box Ground stone, and in design and construction is of the character we see in the old warehouses of Bruges.

It is situated in Star-yard, Carey-street, just behind the Law Courts.

The contractors for the work are Messrs. Patman & Fotheringham, and the building has been carried out from the designs and under the superintendence of Mr. W. F. Unsworth, architect.

### SECTIONS OF NEW CHURCH OF ST. MARY, PORTSEA.

WE gave a fortnight since the perspective view of this fine church, which forms one of the most artistic designs in this year's architecture at the Academy. We have thought it worth while to give the sections also, as they contain several points of unusual treatment, which will probably be of interest, especially to our younger and student readers. The treatment of the sanctuary arch, shown in one of the cross-sections, is especially rich and effective.

### CROSS IN CLOISTER, SAN JUAN DE LOS REYES, TOLEDO.

THIS interesting cross forms another of the illustrations to the forthcoming work on Ancient Sepulchral Monuments, by Messrs. W. Brindley and W. S. Weatherley, which we have mentioned previously (*Builder*, May 2). It is a work very peculiar in style, combining details very much resembling Tudor Gothic (see the square leaves on the chamfer-plane), with other foliage work in the centre, partaking a good deal of Renaissance character. This is probably the real explanation of the incongruity of detail; it is a piece of work in which the spirit of the Gothic decadence is mingled with that of the Renaissance, at the period of transition.

### PRAYER-NICHE: ANCIENT ARABIC.

THIS illustration, together with some others which we shall be able to give in future numbers, represents one of the examples of Arabic art in the Museum of the Mosque El-Hakem at Cairo.

The latter institution is still in its infancy, being only four years old. In 1879-80, the Minister of Education instructed the chief architect, Franz Bey, to gather together from mosques and Arabic dwelling-houses such objects of art as might be obtained; also interesting details of architecture and fragments from numerous places of interest in the City of the Caliphs, to form the nucleus of a museum in the above-named place of worship.

Unfortunately, the decade just preceding 1879-80 was most detrimental to the prospects of the undertaking. During that period the highly-interesting monuments of Arabic art have been grievously plundered and destroyed. Wherefore, considering the enormous wealth which once was contained in the mosques, the results of collecting for the new museum have been very scant.

Still, however modest the beginning seemed to the promoters, the collection last year attracted the attention of the distinguished Orientalist and art-critic, Mr. Stanley Lane Pool; and ever since it has enjoyed the care and protection of the authorities of the South Kensington Museum. For, notwithstanding the comparative smallness of the collection, it contains products of the artistic skill of all epochs of Islam, and specimens of most varied materials from the beginning of the Transition period up to the present time.

The illustration given this week represents a Kiblah (a niche for prayer) richly carved in wood. It belongs to the Transition period. The ornamentation is almost entirely Byzantine, and the inscription is made in the characters of the first period.

The technical execution of this piece shows high finish, and certainly of workmanship. Unhappily the original has greatly suffered from varnish and painting (on the surface).

This niche was found in the Mosque of Sitte Ro'aiah, who was a granddaughter of the prophet.

We are indebted to H. E. Franz-Bey both for the description and for the photographs from which this and other illustrations have been taken.

## THE INSTITUTE OF ARCHITECTS' CONFERENCES AT THE HEALTH EXHIBITION.

*(Continued from our Supplement.)*

### HYGIENIC VALUE OF COLOUR IN THE DWELLING.

MR. WILLIAM WHITE, F.S.A., read a paper on this subject. In it he observed that it is a recognised pathological fact that colour of some sort is indispensable to the healthy condition of the eye, and that the condition of the brain, again, is greatly dependent upon the healthy action of the nerves thus affected. These nerves are affected in a way sensibly different by different colours; in other words, in obedience to, and in accordance with, the pace at which the pulsations of light reach the eye, and upon which depends the nature of the colour seen. This sensitiveness extends also to the brute creation. By red these nerves are excited. By green, in like manner, they may be soothed; or they may be rendered torpid by the presence of blue. Yellow, like light, is the colour which the most strongly attracts the eye to itself. We are affected by black and white in the same sort of way as by darkness and light. Light in moderation will produce alertness or wakefulness; in excess it may produce restlessness and languor by weakening or dissipating the powers of attention. Shade may induce a frame of mind favourable to attention, contemplation, and repose; in excess it may induce melancholy and depression.

It is undeniable that the human system is thus affected; and when, from want of proper colour, these nerves have not been duly exercised, red is the colour most acceptable to the eye, bringing into healthy action the organs that had become inert. Hence, again, it is, that after long and close application, especially within doors, the eye can repose with satisfaction upon the soft blue of the sky or of distant scenery. The change is really needed; by the colour alone the optical sense is relieved, and the eye is content to rest, in its extended focus, upon this cool and refreshing and, as it were, more distant colour,—this perfect mixture of black with white, of darkness with light. It may be of comparatively small moment to those who enjoy constant change of scene, occupation or action. But all who labour require recreation and refreshment. And it is surely difficult to understand how it is, that with all the popular outcry for light and cheerfulness in hospitals, unions, schools, homes for the poor, a similar outcry for even a moderate amount of well-disposed colour has been but rarely, if ever, heard. That the sick and the poor should necessarily be condemned to drag out their existence within whitened walls, and without a spot of colour to relieve the dulness, to cheat the cheerlessness of their monotonous life, shows that sanitation has not made the same advance in this as in other branches of the science. And herein Miss Florence Nightingale has much to answer for. In her excellent and popular notes on nurses and hospitals, she recommended the use of glazed pure white tiles for the lining of the wards, to the exclusion of buff and red, or other colours which might be more cheerful, less glaring, and less costly.

Colour may be called a plaything or luxury, but there are few persons, if any, who would be able to live for a long period in a light white-washed, or in a dark blackwashed, apartment, void of other colour, without deterioration. In the one case a tendency to idiocy might be induced, and to melancholy madness in the other. People have been blinded by the white glare of the desert sand, or of the mountain snow. They have become mad or imbecile through confinement in a dark cell. This must not be called an exaggerated illustration, dragged in as a mere sensational argument; for, as in other matters, it is mainly through the more fatal results that men can be brought to see the great danger of neglecting precautions which to them have appeared to be trifling, needless, and obscure. I have learned, by my own experiment, that in the blinding, burning snow of high altitudes the eyes and the skin may be effectually protected by a change apparently so very slight and trifling as that of wearing a brown gauze veil instead of a blue one. Special colours have been used medically in shades and glasses for the protection or preservation of the sight. The fact of some blind persons being able to feel colour with the finger shows how wonderfully their perception is connected with the whole nervous system. I remember the case of a blind boy, who described the touch of a scarlet geranium as the sound of a trumpet. It is said that many of those who are called colour-blind are not insensible to the influence of colour, although they may not have the power of distinguishing between certain complementary colours. The optic nerve may perform its office, but there would seem to be some local condition of the retina or of the cornea which interferes with the reception of certain rays.

In order to be healthy and cheerful, colour should be æsthetical; that is, in true accord with right perceptive feeling; in accord with Nature, from the study of which all our best colouring is derived. We need not, for daily use, gaudy and startling effects, nor yet a dull monotony, but colouring of such force and variety as shall be essentially cheerful and agreeable. Hence we see that the employment of colour is not a matter of mere option or of of taste, but of healthful, cheerful, and wise enjoyment.

The preservative properties of preparations of lead and arsenic, when employed in decorative work, whether internal or external, arise no doubt to a considerable extent from their antagonism, as to all organic life, so also especially to this species of vitality. But this cannot justify the continued unwholesome use of lead and arsenic for the decoration of dwelling-rooms, though the house-painter will still insist that white-lead and oil-paint forms the most efficacious covering medium that has been discovered. The trade in it has been long established, and he has been educated in its use; he is disinclined to change, and he justly hates mere experiment. But in interior painting substances are now gradually taking the place of white lead, which have ceased to be open to the charge of being experimental. The scientific investigation of their respective merits can be carried on only by those who devote themselves for the time to the subject, and many of these things will be submitted to scientific test under the auspices of this Exhibition.

Paper-hangings, again, are now made washable at the small cost of one penny per yard. It is of the greatest consequence that their colouring-matter should be free from volatile mineral poisons; and that, whatever be its composition, it shall not rub off. Only a few years ago even a medical man, a tenant of mine, who had selected his own paper for the dining-room, was made seriously ill from the imperfectly-fixed colouring, of rich yellow and brown, made with orpiment of arsenic. Other members of his household suffered, as well as the men employed to remove it from the walls. It is a satisfaction to know that, except upon the score of unscrupulous trade competition, it is needless that such goods should be sold at all, as is shown by Mr. Henry Carr's Exhibit, No. 852. Messrs. Woollams, Jeffreys, Heywood, and others, exhibit an ample variety of all colours and shades in a guaranteed harmless quality. In admirable decorative material we have also Hindley's Japanese leather papers, Lincrusta Walton, Hall's Corovellum, and others, together with a variety of damp-proof paints for interior surfaces, of questionable value in this especial respect, seeing that damp should be kept from penetrating from the outside, and not be merely covered up from sight within.

As a wholesome decorative covering for walls, a panelling of pine or fir is said to be one of the best, on account of its resinous odour. But such panelling must not be allowed to become a harbour for damp stagnant air behind it. These with other woods of a harder nature have always been popular. And a beautiful variety has been introduced in Roberts's Foreign and Colonial importations.

But unprotected panelling becomes dangerous in case of fire. There are now, however, for woodwork invaluable safeguards against fire, such as the asbestos paint, and the cyanite paint, which ought to be made use of largely for wall panelling and floors. Calamitous fires have been already prevented by the employment of them. But we cannot, with all of them, quite so perfectly preserve the charming brightness and freshness of the natural grain of the wood beneath them, and, indeed, a painted surface is more commonly implied by their use, and they need, so to say,

a fixing. Nevertheless, these paints give a good grounding for subsequent applications, whether paint, polish, stain, or varnish.

In conclusion, I will only say that we may well congratulate ourselves that we live in an age when colour is more prevalent and more really appreciated for its own sake than it had been for a long time previously. And convinced as I am that it has been ordinarily regarded too much as a mere personal indulgence for those who can afford to spend their means upon their own amusement or gratification, I would express a hope that I have succeeded in asserting its claim to be considered one of the many requisites of a healthy home.

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The discussion on this and Mr. Aitchison's paper was opened by Mr. T. W. Cutler, who considered that hard wood floors were most to be desired, and washable papers were the best to use. Bed-rooms should be made as airy as possible, and be cleared from all superfluous furniture. He suggested the use of hard polished woods for doors and panels.

Professor Kerr quoted Lord Palmerston's saying that "dirt was simply matter in the wrong place." The use of carpets, hangings, and upholstery of that kind, was a thing to be practically discouraged, and considerations of climate, comfort, and cleanliness should be of the first importance. The public did not like polished surfaces in this climate, but they should be used as far as possible. The ladies and their housemaids must be looked to as the great preventers of accumulations of dust. The people of this country were becoming more alive to the virtues of colour. Looking at the matter scientifically it appeared that colour had a direct influence, good or bad, on the nervous system, and it was the architect's duty to take this into account.

Mr. Ewan Christian spoke of the depressing effect caused by some streets of compo houses in the outskirts of London. It was better to use even extraordinary colours than to have none at all. At the same time he bore testimony to the distressing effect of a crimson wall-paper; and considered that the question of dust came into the common-sense use of a house.

Mr. Stannus said that mention had been made of want of ventilation causing dry-rot. In Manchester it was customary not to fasten the floor boards until the house was plastered. The consequence was that the draught through the joists did away with the chance of dry-rot. It had been said that a liking for magenta and mauve indicated colour-blindness, but he believed they would yet be able to harmonise these two colours. All colour, he believed, came under the law which Mr. Ruskin had laid down, that colour must be varied. Colour which was flat was objectionable, but when varied it was delightful.

The Chairman, in closing the discussion, said he was delighted with the decrease in the use of compo. White brick was only a little less abominable than cement, and the effect of the white brick used in Cambridge was dreadful in the extreme. With respect to floors, he advocated the the use of parquet or mosaics. It was not enough to denounce brick, and hunt down housemaids; but he believed that with impermeable floors and tiled walls they might have a wholesome and beautiful æsthetic architecture of the future.

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Professor Hayter Lewis then took the chair, when Mr. Thomas H. Watson read a paper on "The Collection, Storage, Management, and Distribution of Water for Domestic Purposes within the House." This we are obliged to defer until next week, being unwilling to curtail it too much.

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**Water Supply Conference.**—A Conference on Water Supply, under the auspices of the Society of Arts, will be held at the Health Exhibition on the 24th and 25th inst. The Conference will meet each day at 11 a.m., and will sit till 1.30, then adjourn till 2, and sit again till 5 p.m. The proceedings will be opened on Thursday, at 11, by the chairman. The papers and discussions will be arranged under the following heads:—1. Sources of Supply. 2. Quality of Water; Filtration and Softening. 3. Methods of Distribution; Modes of giving Pressure; House Fittings; Discovery and Prevention of Waste, &c. The proceedings will be continued on Friday, and if necessary on Saturday.

## NEW METHOD OF TESTING CEMENT.

In an article contributed to the *Töpfer und Ziegler Zeitung*, Dr. Michaelis calls attention to certain inconveniences attending the existing modes of testing cement, and suggests practicable remedies. According to his remarks, all parts of a cement which have not been reduced during the operation of grinding to a great degree of fineness, do not exercise any action during hardening, but really act in the same manner as sand. In fact, the residue on a sieve of 5,000 meshes per square centimètre ('15 square inch), and even a portion of what passes through, has no cementing force. It would be interesting to know the degree of maximum fineness which a grain of cement should have in order to set, but, unfortunately, it has not been found possible to construct sieves of more than 5,000 meshes per square centimètre, and other processes for arriving at the fineness of powders do not seem to have entered the domain of actual practice.

It may therefore be said that in testing a cement the operation is performed upon a mixture of cementing substance and of inert substance. On the other hand, it is known that it is not the finest cement which, in the form of blocks of pure cement, displays the greatest resistance, but a cement with 60 to 70 per cent. of residue when tested with a sieve of 900 meshes per square centimètre, while in mortar trials the resistance with the same cement is in proportion to the fineness. It is this divergence which has induced German, Austrian, Russian, and Swiss engineers, to adopt the mortar test as most nearly corresponding with practical constructive requirements. This form of trial is, however, attended with difficulties, resulting from the use of sand, which is expensive and difficult to prepare, and from the length of the period of trial, which should not be less than a month. Under these circumstances it is argued that the trial should only extend to the really active portion in the pure cement,—that is, to the portion which passes through a sieve of 5,000 meshes per square centimètre.

Dr. Michaelis proposes to keep portions of the trial blocks in boiling water so as to expedite the hardening, thus allowing of a judgment being more rapidly formed as to the final result. The test would take place as follows:—There are taken 100 parts by weight of cement, which has passed through a sieve of 5,000 meshes per square centimètre, and 20 to 25 parts of water are added. Every five minutes two small blocks are made, which are pressed into the moulds in the same way as the mortar blocks of one part of cement to three of sand. In this manner twelve to twenty-four blocks are made (section '775 of a square inch) according to whether one or two series of trials are to be carried out. They are kept during the first day in an atmosphere saturated with steam, and at a temperature of about 59° Fahrenheit. After twenty-four hours six or twelve blocks are plunged into water of about the same temperature, while the rest are placed in a vessel kept at boiling-point. After twenty-three hours, part of the blocks are removed from the latter, and are plunged for an hour into water at 59°, after which the test by drawing is applied to them as well as to a certain number of the slabs kept in the water of moderate temperature. The latter would give an initial resistance after having set, while the former would have a resistance about equal to that of the same cement after seven days. Finally, the remaining blocks are kept in boiling water, and in ordinary water during six days, at the end of which they are tested by the drawing test. Those which have been six days in boiling water have a resistance which nearly approaches that of the final hardening.

The value of the cement would, therefore, be determined according to the fineness of the grinding and the tests for drawing, within less than a week. The hardening in boiling water could only be supported by cements without any defects, all those in which the mixture is not homogeneous falling into pieces after a few hours. On the other hand, those cements which have resisted this test may be employed without fear that any inconveniences may result from their use. In this way a new and valuable indication is arrived at of the value of cements, the principle being that none can be considered first-class products, except those which not only stand the test of boiling, but also become rapidly hardened during that process. The blocks made with the most powdery portion of the cement being liable to be injured by the appliances used in the drawing test, it is suggested to place a small piece of leather or indiarubber between the cement and the metal.

The new system of tests is thus based upon two methods, which have not as yet been adopted:—1. The employment, for blocks to be tested, of only the active part of the cement,—that is, of the part which passes through a sieve with 5,000 meshes per square centimètre ('15 square inch). 2. The obtaining of a rapid hardening by keeping the blocks in boiling water; the final resistance being thus ascertained at the end of a week.

In reproducing the above details, the *Journal du Céramiste et du Chaufournier* remarks that the first-named method will not probably meet with general concurrence and adoption, by reason of the somewhat arbitrary nature of its fundamental principle. The sieve referred to has been chosen because it is the finest to be found, and the radical division of the cement into two parts (cementing and inert) is not considered as being in accordance with reality, for, in considering grains of cement of greater and greater fineness, it is clear that the cementing force (which is at first *nil*) increases until a maximum is attained, without it being possible to exactly determine the transition. Besides, doubts are expressed as to whether the physical or chemical quality of the portion remaining on the sieve should be absolutely without any influence upon the resistance.

On the other hand, it is admitted as probable that the acceleration of hardening induced by the operation of boiling, and the new indications which this process affords as to the quality of cement, may prove of material utility where it is desirable to economise time in making trials.

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## FIRE PROTECTION OF MANSIONS.

We gladly avail ourselves of the opportunity which the publication of a little work with the above title* furnishes us of calling attention to the necessity of protecting country mansions against a danger to which they are especially exposed. The time of year is approaching when the "family" will return to their ancestral homes for a short season, and the cleaning process will be gone through. The plumber will be there, and the usual risks will be run with the too frequent result. Every one must remember some charming old mansion,—the delight of his sketching days,—which is now a heap of blackened ruins, or has given place to a modern substitute which has none of the charms of its predecessor. It is grievous to call to mind the long list of historic houses which have in recent years been wholly or partially destroyed by fire. Belvoir Castle, Wynnstay, Warwick Castle, Hatfield House, Fryston Hall, Duncombe Park, Ingestre Hall, Blenheim Palace, Clumber, Wrotham, Spern, Llandydroc, and many others can be counted up, all of them more or less full of priceless art-treasures which can never be replaced. "Insurance" is no security against such losses as these, which are incalculable and irreparable. And our vexation is intensified by the reflection that all or nearly all might have been saved by ordinary care and precaution.

What the necessary precautions which will insure safety are, and how they should be employed, Mr. Merryweather explains clearly and succinctly in the work before us, the result of practical training and a long experience.

The prime necessity is, of course, the provision of an ample and accessible water-supply. The many uses to which this can ordinarily be turned reduces the expensiveness of the provision; for, "apart from ordinary domestic duties, it can work coal, luggage, or passenger lifts; turn the spit in the kitchen, the lathe in the workshop, and blow the organ." Valuable calculations as to the quantity to be provided are given, and wise cautions against wasting the power of the fire-engine in overcoming unnecessary friction in the hose by drawing water from a distant source, instead of from a special reservoir at hand.

Instances are given of mansions where all that science can suggest has been done for their protection from fire, and one ominous case in which an undue delay in considering the matter resulted in the loss of the house and its contents. The new house of the Empress of

* Fire Protection of Mansions, by James Compton Merryweather, M.I.M.E. London: Merritt & Hatcher.

the French is apparently a model in this respect; no precaution has been overlooked, and the author adds, with the touch of a true artist in his craft, "the fire-buckets are beautifully emblazened with the Imperial crown." As the work was carried out under the advice of Mr. Merryweather, we may just ask why the rubber-lined canvas hose, which he does *not* recommend, and which will only last five or six years, was used in place of the leather hose, which he *does* recommend, and which will last twenty years? We hope the difference in cost was not spent in emblazoning the fire-buckets, which would, at a crisis, be a poor compensation for a leaky hose.

It is soothing to learn that Hampton Court Palace is now, humanly speaking, proof against an outbreak of fire; and we must leave the Office of Works to settle with the author for his statement that the handsome new fire-engine house is "more or less" in keeping with the old buildings.

The remarks on saving life in case of fire should be read by all, though we fear that in an emergency few would be likely to remember them. An outbreak of fire, the author truly says, is generally accompanied by an outbreak of temporary insanity, and it is rarely that the frightened inmates can be prevailed upon to be "calm and avoid confusion and noise." Still, what it were well to do under the circumstances may, if once learned, recur to the mind at the right moment, and few are so well qualified to advise as the writer of the book before us.

We commend it with a clear conscience to all whom it may concern, and in one way or another it concerns us all. It is a pleasure in this age of silly "high-falutin'" publications to meet with a plain account of a practical matter unaffectedly written by a man who really understands what he writes about; and such is Mr. Merryweather's "Fire Protection of Mansions." *Verbum sap.*

## THE TURNERS' COMPANY.

THE Worshipful Company of Turners propose to give this year their silver medal, with the Freedom of the Company, to any workman, whether master, journeyman, or apprentice in the trade, in the United Kingdom, who may send in the best specimen of hand turning in wood, pottery, and precious stones. The competition in wood includes turning in both hard and soft wood. The qualities which will be considered in awarding the prizes will be the following, viz.:—1. Beauty of design, symmetry of shape, utility, and general excellence of workmanship. 2. Exact copying, so that two objects produced (such as two cups, vases, boxes, or other articles) may be facsimiles in every part, or exact measures of capacity. 3. Fitness of the work and design for the purpose proposed (for instance, turned wood for portions of domestic or church furniture). 4. Ability to turn, whether circular or oval, in both classes of wood. 5. Novelty in application of turning, or in design. 6. Carving and polishing are admissible, and, if skilfully done, any additional effect produced will be considered, but it must be subsidiary to the turning. The work must be all hand-turning, produced in the lathe without special rest or tool apparatus, and the carving must be the work of the exhibitor. The competition in pottery includes terra-cotta, stoneware, earthenware, and porcelain. In this competition a bronze medal will be given to the competitor second in merit in each class, also certificates of merit and money prizes will be awarded according to the discretion of the judges. In the competitions for works in precious stones, and for engraving in intaglio and cameo, specimens will be divided into classes as follows, according to the material and the character of the work. Class A. Ruby, sapphire, emerald, and spinel. Class B. Topaz, aquamarine, crysolite, jargoon, amethyst, rock crystal, garnet, peridot. Class C. Cabochon work of all kinds in regular or fancy shapes, including coral cut for mounting carved garnets, turquoise, onyx, &c. Class D. Diamonds, brilliants, and roses. Class E. Intaglio and cameo. In each class a medal will be given if the specimens entered are considered worthy; the chief medal and freedom or medals will be adjudged to those candidates who, in the opinion of the judges, show the highest excellence of workmanship, combined with the most general ability in the other branches of their trade. In making their award, the qualities that will be chiefly considered by the judges will be (1) symmetry of form and proportion, (2) brilliancy of polish, and accuracy in the finish of facets; (3) form and relative proportion of facets, perfectness of edge; (4) skill in overcoming difficulties inherent to the material; (5) judgment displayed in choice of style and arrangement of facets, so as to hide natural defects in the stone, and still produce its maximum beauty; (6) in Class C, particular attention will be paid to the design shown in shape and arrangement of series of stones to form particular ornaments. Further particulars may be had on application to Mr. Edgar Sydney, hon. sec. to the Competition Committee, 4, Hare-court, Temple.

## CAN THE NEW GOVERNMENT OFFICES BE DURABLE?

SIR,—I have read with attention Mr. H. Travis's letter on this subject in the *Builder* of the 5th inst., p. 9, and would recommend to consideration the use of Belgian granite for the new Government Offices as referred to by Mr. Gough in the *Builder* of the 9th of February. This material can be delivered in London, ready worked, prepared for fixing, at 70 to 75 per cent. cheaper than Aberdeen granite. The new Palace of Justice at Brussels will satisfy any one as to the good work which can be executed in Belgian granite, and it has been introduced into this country in the new premises for the Capital and Counties Bank at Bristol, where it was delivered ready for fixing at a price of only 15 per cent. above that of the Bath stone quarried in the neighbourhood.

I think this stone deserves the careful attention of those who may be called on to decide the question of the material to be used for the New Offices, as it possesses many qualities calculated to commend itself to their favourable consideration.

AD. TAGNON.

## DUST-CARTS, HOGS'-WASH CARTS, &c.

SIR,—My walk to business is usually through some streets at the West End in which are many superior hotels and lodgings, besides business premises, and it is always possible to know when the country people are in town by the activity of these carts. Of course they attend in the morning from about eight or earlier till ten or later, and during these hours the visitors are not always awake or looking about, but they must surely be susceptible of smell, and perhaps they accept it as natural to London. These quarters ought to be the models of nicety, but any one who choses to try it may soon find more than he would expect in so respectable a parish as St. George, Hanover-square. If the cholera should come, something better should be arranged for disposal of refuse long before it gets so foul.

H. C.

## CHIMNEY CONSTRUCTION.

SIR,—Will you kindly allow me to ask if any of your readers can oblige with the names of works where the following tall stacks are erected, viz., Warrington, 440 ft. high; Wigan, 420 ft. high; Manchester, 410 ft. high.

R. M. BANCROFT.

*No. 3, Elm Park-road, Finchley, N.*

## SPITALFIELDS MARKET.

HORNER *v.* THE WHITECHAPEL BOARD OF WORKS.

THIS case, which is of considerable interest to public bodies, was tried in the Chancery Division, before Vice-Chancellor Sir James Bacon.

Sir H. Giffard, Q.C., M.P., Mr. Crossley, Q.C., and Mr. Vernon Smith, appeared for the plaintiff, who asked for an injunction to restrain the defendants from placing posts or other obstructions in the four roads, north, east, south, and west, leading into Spitalfields Market.

Mr. Henry Lovegrove, surveyor, produced plans of the property, and gave evidence for the plaintiff, while Mr. W. La Riviere, surveyor to the Whitechapel Board, gave evidence of the intentions of the committee. Mr. Longmore prepared a model of the streets. Mr. Finlay, Q.C., conducted the defence.

The Vice-Chancellor ruled that the special rights of the plaintiff as lessee of the market exempted him from the operation of the various Acts relating to streets and pavements, and gave judgment for the plaintiff, with costs, granting the injunction prayed for.

**Obituary**.—We regret to announce the death of Mr. Charles Marriner, A.R.I.B.A., which took place on the 16th inst., at Francis-street, Bedford-square. Mr. Marriner was for some years the valued friend and managing assistant of Messrs. H. Saxon Snell & Son. He was twenty-six years of age.

## CHURCH BUILDING NEWS.

*Manaccan (Cornwall).*—A special effort is about to be made to raise funds for the restoration of the interesting old church of Manaccan, and it is proposed to hold a bazaar for this purpose on the 25th inst. This ancient church, to which considerable interest attaches, is sadly in need of restoration. As its name, Manaccan or Minster, denotes, there was doubtless once a monastery or abbey here. Later on it was connected with Glasney College, Penryn. In the latter part of the last century Richard Polwhele, the historian of Cornwall, was the vicar. The south door of the church is one of the best specimens of Early Norman architecture in the county of Cornwall. The belfry and bells, like the rest of the sacred edifice, are in a wretched condition, and the whole requires thorough renovation, which it is thought will take about 1,200*l.* to complete.

*Brawdy (Pembrokeshire).*—The church here, which for a country parish is one of the largest in the county, and lies off the high road between Haverfordwest and St. David's, was re-opened on the 10th inst. by the Dean of St. David's after the first instalment of the restoration had been effected by Mr. E. Giles, of Carmarthen, under the supervision of the architect, Mr. E. H. Lingen Barker, of Hereford. The work consists of new windows, gable crosses, trenches round building, drainage and ventilation, open pitch-pine seats and stalls on wooden platforms, encaustic tile floors in chancel and sacrarium, with similar bordering to the stone flagging in passages, repairs to roofs and walls, and the provision of a vestry.

## ROMAN CATHOLIC CHURCH-BUILDING NEWS.

*Windermere.*—The Roman Catholic Church of St. Hubert, built at Windermere, was opened on the 24th ult. The church is designed in an early type of Gothic architecture, having nave, 42 ft. by 21 ft., sanctuary, 21 ft. by 18 ft., with sacristy, &c., on the south side. A north transept is to be added as funds permit. The roof to nave is formed with dressed pitch-pine rafters, framed in a pentagonal form; that to the sanctuary is barrel-vaulted in wood. The floors of the aisles and sanctuary are laid with Walker's wood-paving. The church will be seated with chairs supplied by Messrs. Jones & Willis. The walls are built of the local slate, with freestone dressings from Hexham. The west end is lighted by a triplet window, the lights being of equal height; and an octagonal spirelet rises from the south-west angle of the building to a height of 70 ft. The entrance to the tower is from the north side, through a boldly-designed porch, and the east end of the sanctuary is lighted with a wheel window of a very pleasing outline. The whole of the windows are glazed with antique glass in lead quarries, from designs by the architect. The church is erected upon a beautiful site, overlooking the lake, and forms a very picturesque feature in the beautiful neighbourhood. It has been built by local contractors from the designs and under the superintendence of Mr. Robert Walker, architect and surveyor, Kendal and Windermere.

*South Teddington.*—A new school-church for the Roman Catholic body was opened on the 25th ult. The building (according to the *Tablet*) is situated at the junction of Fairfax and Bushey Park roads, between Teddington and Hampton Wick stations. It is a solid parallelogram (55 ft. by 30 ft.) erection of white brick, having a bold and imposing façade, with stone facings, surmounted by a pediment and cross, and a square belfry of simple Italian character. It consists of two stories, the upper one being the temporary church, and reached from the porch by a stone staircase. It is lighted by eight windows glazed with tinted glass; there is a small organ-gallery over the entrance. The altar, raised on four steps, is of imitation marble, with the sacred heart in the centre. It has a stained open roof of low pitch. The architect is Mr. W. C. Monro, and the builder Mr. G. Constable.

*Salford.*—The Chapel of the Blessed Sacrament forms the south transept of the Roman Catholic cathedral at Salford. The decoration forms a special feature in this chapel: the roof is treated in white and vermilion, with medallions emblematic of the Blessed Sacrament, and golden coloured stars between. The decoration has been executed by Mr. J. Pippet, of the firm

of Messrs. Hardman & Co. All the marble and alabaster work by Mr. R. L. Boulton, of Cheltenham. Messrs. Southern & Son, of Salford, were the contractors for the woodwork. The wrought-iron work has been executed by Messrs. Hardman, Powell, & Co., of Birmingham. The whole has been designed and carried out under the direction of the architects, Messrs. Pugin & Pugin, of Westminster.

## Books.

*"Bibliothèque de l'Enseignement des Beaux-Arts."* Paris: A. Quantin, 7, Rue S. Benoit.

THIS series of elementary handbooks is issued under the patronage of the "Administration des Beaux-Arts," and has been crowned by the French Academy; to point out, therefore, the utility of its purpose and the excellence of its execution is almost superfluous. Since the appearance of the first volumes in 1883, a whole edition has already been exhausted; it is in the hopes that the series may circulate widely in England as in France that we note shortly the general outlines of the scheme. French educationalists have felt that, though the eight years of a course in a lycée may be devoted to the "humanities," on the subject of art education has been dumb. In every department of artistic and archæological investigation French savants have been eagerly at work, but the result of their labours has been to the multitude, even to the educated many, a sealed book. In such department of study there was wanted a treatise, brief, clear, sound, simple, and above all cheap. It is in answer to this demand that the "Bibliothèque" before us is planned. When complete the series will comprise:—1. Certain general volumes on the principles of art, *e.g.*, "Æsthetics and the History of Art." Painting, sculpture, architecture, engraving, ornamentation, music. 2. Special volumes devoted to the history of particular branches and special periods, *e.g.*, "Mythology in Art," Oriental archæology, Egyptian archæology, Byzantine art, numismatics, manuscripts, and miniatures, artistic anatomy, perspective, and a host of other kindred subjects. 3. A series of dictionaries of artists and art terms, guides to collectors, biographies of artists. 4. A series devoted to the discussion of special handicrafts bordering on arts such as ebonising, lock-making, carriage-making. In fact, glancing down the prospectus of the series it is difficult to recall any subject of interest connected even remotely with art or handicrafts to which a volume is not devoted. The series will appeal as much to the intelligent workman as to the artist, the beginner in archæology, and the general art-student.

Each volume is confided to a specialist of note. Such names as those of M. Chipiez, M. Collignon, M. Maspero, M. Martha, M. Rayet, are sufficient guarantee of the quality of the work. Each volume is abundantly illustrated. In a series issued at the price of 3 francs per volume the illustrations are necessarily a weak point, but we may say at once that they are no worse than those current in books issued at five times the price. Fourteen of the series appeared in 1883, including "Archéologie Grecque," "Gravure," "Tapisserie," "Mosaique." Peinture Flamande. For 1884 are promised nineteen volumes, among them l'Architecture, by M. Chipiez; "Bijoux et Joyaux," by M. Falize; "La Céramique," by M. Henri Havard; "L'Archéologie Etrusque et Romaine," by M. Martha. This volume, the first to appear in 1884, now lies before us. In a series embracing so wide a field the execution of each individual volume must necessarily vary much. The volume before us is an excellent specimen of clear, popular, and, so far as is possible in an incomplete subject, complete treatment. To most of us the Etruscans are a people of vague, mysterious association. We have been, perhaps, to Bologna, and seen some odd bronze *repoussé* work; to Volterra, and wandered through a museum of architects; to Florence, and, possibly, picked up some fragments of "*bucchero nero*," with queer Assyrian designs; to Corneto, and gone down deep into the earth, risking the perils of malaria to see terrible, painted demons on the walls of tombs that we know to be Etruscan. We carry away a general impression of grotesqueness, of coarse realism, but few of us would care to be questioned closely as to dates or processes. Some of us, who might know better, still talk of the beautiful pottery that Greece has left us as "Etruscan" vases. The small volume before us will save us from much uncomfortable ignorance in future wanderings, and give us in outline all that is certainly known of "Lars Posrenna of Clusium" and his ancestors and his art tendencies. It tells us of the contents of "Terramares," those curious pre-historic mounds abounding in the basin of the Po; of the influence of Phœnicia and the early immigrants from Corinth; of the wonderful polygonal walls, the gates, and stone façades, many of which still remain to be the marvel of tourists. The Etruscans never seem to have advanced beyond the merest rudiments in sculpture in stone; terra-cotta and bronze were the materials they loved best, no doubt, because these materials most readily lent themselves to a certain photographic realism which always beset Etruscan art. The art of portraiture in bronze, the Etruscans probably taught to the Romans, an art eagerly affiliated by a people whose historical instinct was strong. The more ideal art of sculptured stone they must borrow later from the Greeks. All this interesting story of the fusion of art elements in Italy M. Martha sets clearly before us, and then passes to the more familiar topic of the sculpture and architecture of Rome, carefully separating in each the indigenous from the foreign elements.

It is in such volumes as the present one on Etruria and Rome that the peculiar merit of the series is seen. Where the subject is obscure, and such facts as are ascertained are recorded only in the monographs of the learned, the necessity for the middle man,—the populariser,—is doubled. If, as is the case with M. Martha, he is both *savant* and populariser, his merit and the merit of the work is enhanced. Such a series is much needed in England, but in a country which trusts its art education much to private endeavour, little to State organisation, it can scarcely as yet be looked for. When it comes, we can only hope it may rival in excellence the existing volumes of the French issue.

*Handbook of Sanitary Information.* By ROGER S. TRACY, M.D. London: Trübner.

THIS is a compilation, but it is a compilation by one who understands the subject dealt with, and which cannot fail to be useful to all into whose hands it may chance to fall.

Drainage matters are never safely conducted without the advice of experts, and the householder who should attempt to put his house in order under guidance of the wisest of handbooks only would probably do almost as much harm as good. But there are circumstances in which professional advice cannot be had, and then this little book would be a friend indeed. The chapter on disinfectants and their employment concerns every householder, and just now more than ordinarily. The chapter on foods is comforting, if its statement that the adulterations of trade are rarely deleterious may be relied upon. The book, as a whole, is clear and concise, and there is but little in it which is debatable. Exception may perhaps be taken by some to the statement that fresh air should enter a room at the ceiling, and the foul air leave it at the floor level; but if we can only persuade the fresh air to come in and the foul air to go out, we are not disposed to inquire too curiously into the "order of its going."

The handbook is an evidence of the increased attention which the Americans are giving to sanitary questions; not before it is time if other writers are to be believed.

*Drainage and Sewerage of Dwellings.* By WM. PAUL GERHARD. London: Trübner & Co.

THIS is an American work, we are happy to say, and that it is of American and not of English houses that the author speaks when asserting that "Bath-rooms and water-closets are frequently located in the centre of a house with no other light but that from a window opening into the staircase hall." If, as the author says, it is *not unusual* to find water-closets and urinals in dark closets lighted only by a gas flame, with no outlet except into the hall or *a bed-room*, all we can say is that the appropriateness of his admirable treatise is beyond question. If the above be true, we can well believe that the "most remote, ill-lighted, and closely-confined corner of the basement or cellar is selected for the servants' water-closet," and that it often proves the *pest* of the house.

To awaken an apathetic public to the serious risks they run unnecessarily by their neglect of the securities of modern sanitary science, and to enlighten them as to the easiest and most effectual remedies for the defects of American houses, is the object of the author. His book is avowedly a compilation from the works of other labourers in the same field; but it is compiled with judgment, brought down to the latest date, and copiously and clearly illustrated. We are glad to note the recommendation to dispense with the ordinary joinery about baths, sinks, and water-closet apparatus, limiting the woodwork about the latter to the seat; and we cordially endorse the extract he gives from "The House that Jill Built." "I don't believe," she says, "that there would be half the trouble with plumbing, either in the way of danger to health or from dishonest or ignorant work, if it had not been the custom to keep it as much as possible out of sight."

The book, like most American books, is well written, and the Americanisms which occur in it are piquant and expressive.

The labours of Dr. Simon and others, and the inventions of the late Mr. George Jennings, Mr. Hellyer, and other Englishmen are used and acknowledged by the writer, whose work on an increasingly important subject may be consulted with profit by all engaged in sanitary matters.

## The Student's Column.

### HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—III.

HAVING disposed of the insulated styles of architecture, we now approach those recognised sources from which all the other styles throughout the known world are said to be derived. Before following the threads from the beginning onwards through the web, and treating the subject *synthetically*, it may be well to reverse the process and treat it *analytically*, in order to know what we are going to talk about.

Thus, the architecture of the present day, taken as a whole, is a general jumble of all the styles that have existed, the threads having sometimes got into an inextricable knot, owing perhaps to the use of various architectural sewing machines, purchased for the purpose of saving honest hand and brain work, but betraying their users into unexpected complications. Here and there, honest efforts are being made to lay in fresh threads, starting from some way back so as to derive strength from their neighbours, and with the full intention of leaving their individual mark on the web. But it is not so very long since dabs of colour, closely imitating those of certain former periods, were blandly sewn down upon and proudly exhibited as part of the pattern. It will, therefore, save confusion to go back until we find the pattern running more evenly, let us say to the sixteenth century, in Europe. Here we shall find some of those elements generally known as "Classic" not unpleasantly mixed with others known as "Gothic." We shall observe that the Classic threads have joined the rest from a side direction starting ever so far back, while the Gothic threads have gradually acquired their colour and texture from Romanesque threads with perhaps a tinge from Byzantine ones. These two find their source, some in a straight line and others in a detour by the East, from Rome, and here we shall pick up that thread that added its colour to the sixteenth century. From Rome the threads may be traced back to Greece, and from Greece to Egypt and Assyria.

#### EGYPT AND ASSYRIA.

It is difficult to say Egypt from Assyria or Assyria from Egypt. It takes at least two threads to start a web (other than a spider's web), and the only question is, which is the older thread of the two? This is too serious a subject to tackle lightly, so we will take refuge behind Fergusson, and begin, as he does, with those West Asiatic styles which include Chaldean, Assyrian, Babylonian, and Persian architecture. We shall thus also be in harmony with the Bible record, which places the cradle of the human race in their locality, namely, in Mesopotamia, or the country,—as its name implies,—*between the rivers* Tigris and Euphrates. This is merely the central portion of an extensive area to which Fergusson, on page 161 of his Handbook, allots the architectural section which he calls Assyrian. He says that the three typical races of mankind, the Tartar, the Semitic, and the Aryan, are found living together in the Valley of the Euphrates, but

hat the architecture of Assyria was that of a Semitic people, and especially interesting as exhibiting actual examples of that style with which we have long been familiar from the descriptions in the Bible of the buildings of Solomon. Other references for study of this West Asiatic architecture are as follows:—Fergusson's "History of Architecture," vol. i. p. 130; Smith and Slater's "Classic Architecture," p. 43; Gwilt's "Encyclopædia," p. 15; Ramée's "Histoire Générale de l'Architecture," vol. i. p. 273; Rosengarten's "Handbook of Architectural Styles," p. 37; Viollet-le-Duc's "Habitations of Man in all Ages," p. 135; Viollet-le-Duc's "Lectures on Architecture," vol. ii. p. 178; Gailhabaud's "Monuments Anciens et Modernes," vol. i., plates 43 *et seq.* There are valuable works, specially on this subject; notably Layard's "Nineveh," two vols. 8vo., published in 1850, and Layard's "Nineveh and Babylon," one vol. 8vo., published in 1853; and the Institute Library also contains the very fine work, Place's "Ninive et l'Assyrie," three vols. fol., published from 1867 to 1870. There is also an interesting article in the *Builder*, of Oct. 15th, 1881, on "The Recent Discoveries in Chaldea."

But the subject can be studied in a more tangible form at the British Museum, which contains a large collection of the actual sculptures brought from Assyria, which were discovered by Layard, and are described in his works. These sculptures are all bas-reliefs carved on huge slabs of stone,—Fergusson, in one instance, calls them of alabaster,—which clothed the lower portions of the walls of certain magnificent *palaces* built on mounds overlooking the river. With the exception of these slabs, the structures appear to have been of a perishable nature, that is to say, that the upper story consisted of wooden posts supporting flat roofs of earth, made enormously thick to keep out the heat of the sun; that such posts were an easy prey to fire, and that the consequent fall of the roof would bury the sculptured slabs. Moreover, the walls behind the slabs were composed of mere sun-dried bricks, and being thus exposed, would soon crumble away again, so that in a very short time an enormous palace would become a grass-grown heap, and a tempting site for villages to be built on its breezy height.

This very concealment of the ruins has, however, led to their preservation in as perfect a state as at the time of their erection, about 2,600 years ago, or even more, the earliest described by Fergusson being from the north-west palace at Nimroud, about 900 B.C., of which he says the sculptures exceed in beauty those of the later palaces at Khorsabad and Koyunjik, built in the eighth century B.C. In Smith and Slater's "Classic Architecture," p. 48, will be found a complete plan of the palace at Khorsabad, from which the great winged bulls now in the British Museum were taken. The student will not fail to notice the *five* legs with which these bulls are provided. The Assyrians were accustomed to sculpture in relief, seen from one direction only, and not in the round, and therefore felt that both the front and side "elevation" of these animals should each appear with its proper number of legs. The bas-reliefs from the palace of Koyunjik, arranged in the basement at the British Museum, and representing lion-hunts, exhibit a very high order of art, and may be taken as models (as they were by the late William Burges) for the proper treatment of sculpture in low relief. In Redford's "Manual of Sculpture," p. 105, it is remarked that "neither in Assyrian nor Persepolitan sculptures is the female figure to be found, and that thus we can readily see how it happened that the Assyrians never had any high ideal such as distinguishes the art of the Egyptians and Greeks." A statement nearly but not *quite* correct.

Botta, the French Consul at Mosul, is credited with the discovery of Assyrian sculpture, but his book on the subject is not in the Institute Library. Place's work, however, is to be found there, and is most interesting on account of the arrangement of the plates, namely, with an illustration of the actual state of the ruins at the bottom of the page, and above it, a conjectural restoration of its former state. Here the semi-circular arch is frequently shown, and its existence is borne out by some original bronze gates of Shalmaneser II., dated 859 B.C., to be found in the British Museum, on which a town gateway is represented with two semi-circular headed openings.

Before leaving the subject of Nineveh, it should be remarked that the Egyptians are said to have overrun Assyria from the nineteenth to the fourteenth century B.C., and Fergusson says they have left no monuments in the subject land. There are, however, some ivory carvings, in the Nimroud Gallery at the British Museum, from the north-west palace, which bear a strong resemblance to Egyptian work. On the destruction of Nineveh, says Fergusson, Babylon rose from its ruins with renewed splendour during the reign of Nebuchadnezzar, whose name is found impressed on every brick of the buildings, including the remarkable Birs Nimroud, a pyramidal structure surmounted by a temple, somewhat in the manner of the Mexican buildings but square in plan, whereas they are oblong. "From Babylon we pass to Passargadæ, which was adorned by Cyrus and Cambyses between the years 560 and 523 B.C., and thence to the far more magnificent capitals of Darius and Xerxes, who have left on the platform of Persepolis remains of architectural magnificence unrivalled in the country, and which may be considered as the culminating form of the earlier architecture of the Assyrians and Babylonians."

Now, it is chiefly to Persepolis, in Persia, that we must look for the source of one of the features of Greek architecture, namely, the *voluted capital*. Here we find it in connexion with a column, which is also a feature not actually found in earlier Assyrian examples, though it is represented in their sculpture. In those sculptures the volute is laid horizontally, whereas on the actual Persian columns it is placed up on end. There has been more discussion about the origin of the volute than about almost any other decorative feature of columnar architecture. We have seen it in Indian stonework, evidently copied from wooden construction; and Viollet-le-Duc, in his "Habitations of Man in all Ages," considers it the natural way of ornamenting the ends of a wooden cross beam. The spiral is a form frequently found in nature, and anyone with a taste for lightness and grace would, almost involuntarily, trace such a curve on any object he wished to ornament. Look at the bas-relief of the little fishing pavilion from Khorsabad on p. 179 of Fergusson's Handbook, and the curling waves of the water, with which the voluted capitals harmonise; or look again at the wonderful curly locks of the Assyrian men and bulls at the British Museum. The fingers of their sculptors must have been always "on the curl."

Another origin of the volute is attributed by Skidmore to the spiral treatment of metal work.

Why, then, do we find no actual Assyrian stone columns with voluted capitals until we come to the date of Persepolis? Probably because the only columns used at Nineveh were, as above mentioned, of wood, for supporting the superstructure, and have, therefore, perished; while at Persepolis they are of stone, and have survived. These columns are closely fluted, and stand on a base,—two points which must be borne in mind when the Greek Ionic order is considered. Indeed, this word "Ionic," so far as it means Asian or Eastern, is more or less connected with Assyrian art. With which hint, and a passing allusion to the Lycian tombs in Asia Minor, closely imitated from wooden construction, and of which we have a splendid example in the British Museum, we must pass on to the other main source of Greek and subsequent architecture, namely, Egypt.

So far as the antiquity of existing buildings is concerned, Egyptian architecture is said to surpass all others. Egyptian chronology is too large a subject even for Fergusson to enter into, as he points out on p. 214 of his "Handbook of Architecture," that the actual *difference* between the best authorities, for the date of the Great Pyramid is no less than 2,400 years. All seem agreed, however, that the Pyramids of Gizeh, in the neighbourhood of Memphis, not far from the modern Cairo, and therefore near the mouth or *lower* part of the Nile, are the oldest buildings in Egypt. Moreover, these Pyramids, of which there are a great number, and all, apparently, royal sepulchres, are on the western or left bank of the Nile. The appearance of them is too well known to need description, but an idea of the size of the largest may be obtained by comparing its area with that of Lincoln's-inn Fields. They are entered from the north side by a passage sloping downwards, from which it *may* have been intended to watch the polar star. But this is a mere speculation.

Besides the various handbooks that have been referred to, and in which Egyptian adjoins the chapter on Assyrian architecture, there are a great number of special books on Egyptian art. The library of the Institute possesses a copy of Lepsius, twelve huge folio volumes, some of which should certainly be studied, while the latter ones are more especially devoted to the painting, sculpture, and hieroglyphics of this wonderful nation (observe the difference between the latter and those of Mexico). Other works in the Institute Library are:—Lesuer's "Chronologie des Rois d'Égypte," 1 vol. quarto; Brugsch's "Egypt under the Pharaohs" (no architectural plates), 1879, 2 vols. 8vo.; Belzoni's "Narrative of Operations," 1821; G. Long's "Egyptian Antiquities in the British Museum"; Col. Vyse's "Pyramids of Gizeh," 3 vols. royal quarto; Sir Gardiner Wilkinson's "Topography of Thebes," 1835, 8vo.; Sir Gardiner Wilkinson's "Architecture of Ancient Egypt," 1850, text oct. and plates fol.; Sir Gardiner Wilkinson's "Egyptians under the Pharaohs," 1857, 1 vol. 8vo. (This is a popular work, written as a guide to the Egyptian Court at the Crystal Palace. There is also Jones & Bonomi's "Guide to the Crystal Palace Courts.") Hoskin's "Travels in Ethiopia," 1835, 1 vol. quarto; Marriette Bey's "Monuments of Upper Egypt"; Withen's "Arts and Antiquities of Egypt," 1843, 1 vol. 8vo.; Frith's "Egypt and Palestine," photographed and described, 1858, fol.; Arundel and Bonomi's "Gallery of Antiquities," treating of Iconography; Prisse d'Avenne's "Antiquités Égyptiennes du Musée Britannique," 1846; and there may be other works added since the above were consulted, so there is no lack of means to study the subject.

We have mentioned the Pyramids in reference to the antiquity of Egyptian buildings; there is not, however, much about them that can be called architecture, and we are more interested to arrive at some feature in which a source of Greek architecture can be recognised. Such examples occur in very early times, as far back as what is known as the Twelfth Dynasty, and in the form of *columns* supporting the entrances to a series of tombs cut out of the vertical face of the rock at Beni-Hassan. At first, such supports were square piers, then octagons, then sixteen-sided, and so on, as has been described in the case of columns in the Indian rock-cut temples, but with this difference, that whereas the Indian examples have all the changes of form exhibited in one column, the Egyptian ones are either square, octagonal, or sixteen-sided, &c., from bottom to top. Moreover, these sides (with the exception of one left for hieroglyphics) were sometimes hollowed or fluted, and in some instances the columns taper from bottom to top, and are surmounted by a flat slab of stone to help them in carrying the weight of the architrave over them. The result is a striking similarity to a Greek Doric column, but that there is a base which the Greek example lacks, and that the "echinus" is lacking which the Greek examples always have. This is a cushion, as it were, interposed to soften the abrupt change of form between the circular column and the square surmounting slab or abacus.

In John Pennethorne's "Geometry and Optics of Ancient Architecture," which will be referred to in the next article, there is given, on page 113, illustrating the southern temple at Karnac, an Egyptian capital with the echinus, and if this rare example actually *was* seen by a Greek, the origin of the Greek Doric column would be entirely settled.

The limits of this article permit no more than a passing allusion to the magnificent Egyptian temples (as distinguished from the Assyrian palaces), with their various orders of peculiarly Egyptian columns, their massive propylons with a roll up each of their sloping sides (which roll is by some thought to be derived from a bundle of reeds tied together, and which sloping sides are by Freeman referred to the natural slope of a *rock*), their obelisks, their colossal figures, their hieroglyphics, painting, and bas-relief sculpture showing the most wonderful power to conventionalise natural objects that the world has ever seen. We know from the Bible, Acts vii. 22, that "Moses was learned in all the wisdom of the Egyptians," and we may infer that there was a good deal for him to learn.

For actual examples of Egyptian architecture, the British Museum may be visited with much profit. There is a complete "lotus

bud" column, and there is a separate bell-shaped capital. There is also in a glass case an original model of an Egyptian house, which is especially interesting on account of the masonry joints being represented to sag from the four corners, bearing out a theory of Viollet-le-Duc's, in his "Habitations of Man," and corresponding with the masonry of the Japanese walls before mentioned.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*July* 4, 1884.—9,744, T. Telford, Newcastle-on-Tyne, Chimney Tops.—9,747, W. Kennedy, Glasgow, Translucent Plates for use as a Substitute for Glass in Roof Lights, &c.—9,770, J. H. Johnson, London, Stop Attachment for limiting the Movement of Doors, &c. Com. by MM. Varicl6 & Cie and MM. F. Moulin, Paris.

*July* 5. 9,781, W. Fearenside, Liverpool, and R. Baynes, Liscard, Automatic Disinfecting and Deodorising Process.

*July* 7.—9,850, J. B. Coleman, London, Cooking Ranges.—9,857, F. Cuntz, Karlsbad, Austria, Intermittent Flushing Apparatus.

*July* 8.—9,877, A. Downing, Birmingham, Casement-stay Fastening. — 9,885, D. E. Langham, Wimbledon, Venetian Blinds.—9,886, T. W. Helliwell, Brighouse, Fixing and Supporting Sheets of Glass for Covering Greenhouses, Railway Stations, &c.—9,887, H. M. Smith, London, Coating or Surfacing Bricks and Tiles.—9,888, L. E. A. E. D de Liebhaber, London, Colouring Stones for Building purposes, &c.—9,894, B. Whitehouse, Birmingham, Blind-cord Pulleys.—9,926, W. R. Lake, London, Bridge-piers, &c. Com. by A. Cottran, Naples.

*July* 9.—9,939, W. Finch, Burnham, Roofing Tiles.—9,954, A. B. Milne, Birmingham, Opening and Closing Fanlights, Skylights, Ventilators, &c.—9,955, C. H. Holmes, Derby, Manufacture of Houses.

*July* 10.—10,014, H. K. Bromhead, Glasgow, Wind-guard or Chimney-top.—10,018, H. Saunders, Brighton, Pavements or Coverings for Streets, Floors, &c., in Wooden Blocks.

### SPECIFICATIONS ACCEPTED.†

*July* 8.—11, W. J. B. Graham, Charlton, Fire-resisting Compound.—5,014, A. J. Boult, London, Venetian Blinds. Com. by J. Querre, Toulouse.—7,261, J. F. Wiles, Old Charlton, Fire-lighter.

*July* 11.—2,614, J. Donkin, Bournemouth, Combining Earth and Water Closets.—5,811, W. Devoll, Erdington, Double Syphons for flushing Water-closets.—6,727, G. Clutterbuck, London, Water-waste Preventer.—7,342, C. Toope, London, Protecting the Joists of Buildings from Fire.—7,672, J. W. Brown, Leamington, Cooking-ranges.—7,730, A. B. Brady, Maldon, Combined Sewer Ventilator and Manhole Cover, &c.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending July* 12, 1884.

5,432, A. Hildesheimer, London, Fire-screens, &c. (Nov. 17, 1883, price 4d.)

A light frame is made in the form of an easel, and across each side of this frame is stretched a sheet of pasteboard or sheet-metal ornamented as required, and supports are placed across the frame where necessary, whereby a series of hollow chambers are formed inside the frame.

5,526, H. Hancock, London, Fastenings for Doors and Windows, &c. (Nov. 26, '83, 6d.)

The handle is placed in the centre of the door, and on the inner end of its spindle is a pinion, which gears into racks on the rods of the bolts in such a manner that by turning the handle all the bolts are simultaneously shoot out of or retired into the edges of the door. These bolts are preferably placed on the top and bottom edges, and on the side edges of the door.

5,616, G. Hand-Smith, London, Production of Colours, Marks, or Designs in Marble, Wood, &c. (Dec. 3, '83, 8d.)

This is an improvement on the patent granted on the 29th of September, 1877, in subjecting the articles, when they have been marked or coloured as required to dry heat in a closed chamber first, and then afterwards admitting the vapour at a temperature of 200° Fahr. When the articles are treated sufficiently the heat is then gradually lowered.

5,621, G. W. von Nawrocki, Berlin, Wood Pavement. Com. by R. Albrecht, Tilsit, Germany. (Dec. 3, '83, 2d.)

To dispense with the usual concrete foundation, and yet to keep the blocks level notwithstanding the traffic thereon, strips of metal are passed through grooves made in the two adjacent side faces of the blocks whereby the several rows are locked together. *(Pr. Pro.)*

5,659, W. P. Thompson, Liverpool, Seal-traps for Wash basins, &c. Com. by A. Edwards, Asbury Park, U.S.A. (Dec. 6, '83, 6d.)

These seal-traps are formed of iron, and the mercury by which the seal is effected is held in a small separate cup, which is screwed on over the trap. As the iron in which the mercury is held is in its plain state oxide of mercury is formed in the trap, which entirely prevents the growth of all vegetable organisms. The induction and seal-pipes above the mercury are coated with porcelain.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

## Miscellanea.

**Cast-Iron Columns as Principal Supports.**—The employment of cast-iron columns as main supports has, we understand, been greatly restricted at Berlin by a regulation issued recently from the architect's department of the police authorities of that city, causing great consternation amongst builders. The cause of the new order is said to have been a discovery in connexion with a fire last winter in the Alte-Jakobstrasse, when it was found that the hot cast-iron columns had been cracked by the effect of the cold water jet playing upon them, so that the upper stories of the house were as near collapsing as they could possibly be. The state of the buildings in the Leipziger-strasse and other localities where shop property abounds has also contributed towards the issue of the regulation. It happens almost uniformly that the whole ground story, and frequently also the first-floor, forms one open space, above which are inhabited floors, which have besides a plan quite different from those beneath them, when, of course, no account is taken of the old principle of "pillar upon pillar." The dividing walls of the upper floors rest uniformly upon cast-iron columns, and the safety of the family inhabiting those floors depends entirely upon the soundness of those iron supports, which, as has been pointed out above, have proved to be unreliable in case of fire. The Berlin police authorities insist upon it that, where partition walls rest upon columns, the latter are either to be bricked in or covered with a patent plastering in such a manner that an air-space remains between the iron and the brick or plastering. In many cases a brick pier or granite pillar is prescribed.—*Iron.*

**Madame Tussaud's Exhibition of Waxworks** has just been removed from Baker-street (where it has been located for fifty years) to a new and extensive building specially erected for it in Marylebone-road. The new building was designed by Mr. F. W. Hunt, architect and surveyor to the Portman Estate, and built by Mr. H. W. Williams. It is in red brick, having six large glass domes. It has a frontage of nearly 400 ft. and an average of 60 ft. depth. The style is modern Italian, and the staircase originally stood in Baron Grant's mansion at Kensington. It is entirely of white marble, and supported by caryatides, modelled from those in the Louvre. The walls of the staircase have been lined with marble and alabaster by Messrs. Burke & Co., and otherwise decorated by them in the Venetian style. They have also supplied the mosaic pavement. The new building is almost immediately adjoining the Baker-street Station of the Metropolitan Railway.

**Mr. Bailey Denton.**—There is no one whose name is better known in English agriculture, though his own experience might well induce him to suppose that he was better known in foreign countries than at home. We are very much interested in hearing of the distinction which has come to him from the French Government, who have conferred on him their cross for "Mérite Agricole." Mr. Bailey Denton has a large share in the history of the greatest agricultural improvement of modern times,—the power given to tenants-for-life to charge their estates for agricultural improvements. Not only in the original urgency by which this great legal change was carried, but in the actual work of improvement effected under it, there is no one who holds a more prominent place in recent agricultural history. And it is satisfactory to find that this is recognised, if not by the authorities at home, at any rate by the Governments of other countries.—*Agricultural Gazette.*

**Sanitary Institute of Great Britain.**—At the anniversary meeting, held at the Royal Institution, Albemarle-street, on Thursday, July 10th, the Right Hon. Earl Fortescue, Vice-president of the Institute, in the chair, an address (as elsewhere mentioned) was delivered by Dr. H. C. Bartlett, F.C.S., on "Some of the Present Aspects of Practical Sanitation," and the medals and certificates were presented to the successful exhibitors at the Exhibition held at Glasgow in September, 1883. At the close of the address, the Chairman proposed a vote of thanks to Dr. Bartlett, which was seconded by Mr. R. B. Grantham, M. Inst. C.E.; and a vote of thanks to the Right Hon. Earl Fortescue for presiding was moved by Dr. A. Carpenter, and seconded by Prof. F. de Chaumont, M.D., F.R.S.

**Birkbeck Building Society.**—The thirty-third annual meeting of the Birkbeck Building Society was held on the 10th inst. in the Theatre, 29 and 30, Southampton-buildings, Chancery-lane. The report, adopted unanimously by the meeting, states that the receipts during the year ending 31st of March last amounted to 6,815,812*l.*, making a total from the commencement of the Society of 77,379,431*l.* The deposits from members and others were 6,107,851*l.*, and the payments on shares were 180,543*l.* The gross profits on the year were 134,113*l.*, of which 112,414*l.* have been appropriated to the payment of interest to shareholders and depositors, and defraying expenses of management, leaving a net profit of 21,699*l.*, making, with the balance brought from last year, a sum of 106,869*l.* to be appropriated at the next division of profits. In addition to this, the Society possesses a reserve fund of 60,000*l.*, the whole of which is invested in Consols. The balance-sheet shows a sum of 2,713,960*l.* of surplus funds, which are temporarily invested in Consols and other securities. The total liabilities of the Society are 3,179,083*l.* and the assets 3,345,951*l.*, leaving a surplus of 166,867*l.* The proportion of convertible securities and cash to liabilities to depositors is stated to be upwards of 94 per cent. There are 43,706 shareholders and depositors, and the number of shares in existence is 38,964.

**The Rating of Nutfield Priory, Surrey.**—On the 8th inst. Mr. Lumley Smith, Q.C., with Mr. Muir, appeared at the Surrey Sessions to support an order of the Reigate Union Assessment Committee that the poor-rate assessment of this mansion should be fixed at 750*l.* (gross) per annum, the sum set thereon by their valuer, Mr. Charles F. Jones, F.S.I., of Temple-chambers, Fleet-street. Mr. Grantham, Q.C., and Mr. Ernest Baggallay were counsel for the appellant. The Bench affirmed the order of the committee, and dismissed the case with costs. The professional gentlemen engaged were, for the appellant, Messrs. Tewson, Clutton, & Pym, and for the Committee Messrs. J. W. Penfold, Frederick Venables, William Wood, of Crawley, and John Lees, of Reigate, together with Mr. Jones.

**Trade Festivities.**—The *employés* of the firm of Oldis Bros., builders, of Finsbury-pavement and Wilson-street, Finsbury, celebrated their annual holiday on the 5th inst., at Caterham. Among the toasts that of the "Firm" was very cordially received.——On the same day the *employés* of Mr. John Smeaton, sanitary engineer, of Brighton and Ludgate-circus, held their annual beanfeast at Brighton. Mr. Smeaton, in a lengthy speech, especially addressed himself to the younger men in his employ, and gave them, as an old plumber, a few words of kindly advice. Mr. J. D. Moylan, manager of the Brighton branch; Mr. Alexander McKay, foreman of the plumbers; Mr. Smith, foreman of the brass finishers; and Mr. Broadbridge, were among the other speakers.

**Ashton-under-Lyne.**—On the 28th ult. the foundation-stone was laid of extensive new schools for Holy Trinity Parish, Ashton-under-Lyne. The schools are being erected by the trustees of the late Mr. George Heginbottom, J.P., and will complete a scheme of church, parsonage, and schools, the realisation of which the deceased gentleman had greatly at heart. The school has been designed to harmonise with the church and vicarage, being Early English in style, in red brickwork with stone dressings, enriched in places with ornamental bricks. There will be numerous class-rooms and a large room above, and accommodation will be provided for 650 children. The architects are Messrs. John Eaton & Sons, Ashton, and the contractors Messrs. Storrs, Stalybridge.

**The London and North-Western Railway Company: Costly Extensions.**—The London and North-Western Railway Company are about to carry out very extensive new works at some of their metropolitan stations, and also at no fewer than fifty-two stations and other points on their lines in the provinces, for which they have just obtained Parliamentary powers authorising an expenditure of 1,000,000*l.* The intended new works in London include the enlargement of the Broad-street Station for increased accommodation to the goods traffic. Under the legislative powers which have been granted, the Euston-square Station is to be enlarged, the work involving the purchase of some property on the south-west side of the Company's main line; also property situated in Cardington-street and in Hampstead-road.

**The American Petroleum Industry.**—A retrospect of the past condition of the American petroleum industry, compared with its present state, discloses some interesting facts. The first American petroleum was exported in 1852. Charles Lockhart, of Pittsburg, sent nearly 600,000 gallons to Europe in that year, and sold it for 2,000 dols. less than the cost of transport. In 1883 nearly 400,000,000 gallons were exported, for which 60,000,000 dols. was returned to America. At the present day there are 20,000 producing oil wells in Pennsylvania, yielding 60,000 barrels of oil a day. It requires 5,000 miles of pipe-line and 1,600 iron tanks of an average capacity of 25,000 barrels each to transport and store the oil and surplus stocks. There are now nearly 38,000,000 barrels stored in the oil region tanks. Besides the 5,000 miles of pipe line in use in that region, there are in operation 1,200 miles of trunk pipe lines connecting the region with Cleveland, Pittsburg, Buffalo, and New York, and lines building to Philadelphia and Baltimore. In the line between Olean and New York 16,000 barrels of oil are transported daily. These are all the property of the Standard Oil Company, except one between Bradford and Williamsport, Pennsylvania. The Standard employs 100,000 men. The product of its refineries requires the making of 25,000 oak barrels, of forty gallons each, and 100,000 tin cans holding five gallons each, every day. The money actually invested in petroleum production since 1860 is estimated to be more than 425,000,000 dols., of which 200,000,000 dols. was capital from New York city. Since 1880 more than 12,000,000 dols. has been used in building iron tanks, and nearly as much in pipe lines, all by one corporation. The tanks cost on an average 8,000 dols. each.—*Iron.*

**Camberwell.**—On Tuesday last new parish rooms, &c., in connexion with St. Bartholomew's Mission, Camberwell, were opened by the Bishop of Rochester. These rooms, which are built in connexion with the Bishop of Rochester's Ten Churches Fund, and will be used for services until the church of the new parish is built, are placed in the midst of a large and increasing population. They consist of upper and lower parish rooms, with class-rooms, kitchen, &c., all substantially built, and so arranged (the site being limited) as to form part of a group of buildings of which the church will be the principal one. The work has been carried out by Messrs. Lawrance & Sons, of Wharf-road, City-road, London, under the direction of the architect, Mr. Ravenscroft, of Reading.

**The State of the River Lea.**—The condition of the river Lea is causing great anxiety to the London sanitary authorities whose eastern boundaries it defines. At the last meeting of the Hackney District Board of Works, Dr. Tripe, the medical officer of health, made a statement regarding the dangerously impure state of the river. Mr. Gane said that from Lea Bridge-road to Tottenham the river was simply a common sewer, the stench being so intolerable that it was almost impossible to walk along the towing-path. Mr. Runtz, the local representative of the Metropolitan Board of Works, said the Lea Conservancy Board had no power to disinfect the river, and if they spent money on such an object the auditor would most probably surcharge them. It was resolved that a petition should be addressed to the Home Office and the Local Government Board "to save the neighbourhood from the consequences of the pollution of the river Lea." In the Poplar district the sanitary officials report to the Local Board that the Lea Cut is in an extremely offensive state, more particularly between Bromley and Old Ford locks. The Poplar District Board resolved to serve the Lea Conservancy Board with a summary notice to remedy the evils complained of.

# CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Making-up Street | Wands. Dis. B. of W | *Official* | July 22nd | ii. |
| Cut and Fat Stores, Foreign Cattle Market, Deptford | Corporation of London | do | do. | ii. |
| Hay Stores ditto | do | do. | do. | ii. |
| Sewerage Works | Vestry of St. Mrylbne | do. | July 24th | ii. |
| Foundry Bridge | Norwich Corporation | P. P. Marshall, C.E. | July 28th | ii. |
| Paving, Kerbing, &c. Roads | Beckenham Local Bd | Geo. B. Carlton | do | ii. |
| York Paving | Vestryof St. George, Southwark | *Official* | July 29th | ii. |
| Foundations, &c of Bridge | Hull Corporation | J. Fox Sharp | July 31st | xx. |
| Painting, Whitewashing, &c. Work | Guardians of St. Mary, Islington | Wm Smith | do. | ii. |
| house School | Midland Railway Co. | A. A. Langley, C.E. | August 1st | ii. |
| Repairs and Painting to Statn Bldgs | | | | |

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Blue Guernsey Granite | Romford Local Board | *Official* | August 2nd | xxix. |
| Patent Victoria Stone, & laying same | Aldershot Local Bd | W. L. Coulston | August 4th | ii. |
| Fire Brigade Station, Bishopsgate st. | Met Board of Works | *Official* | do. | ii. |
| Stoneware Pipe Sewers | Brentford Local Brd. | — Lacey | August 5th | ii |
| Granite | Reigate Town Council | *Official* | do. | xx.x. |
| Brick and Pipe Sewers | Willesden Local Brd. | G Claude Robson | August 6th | ii. |
| Engineer's Work | Hackney Union | Leo & Smith | do. | xx. |
| Alterations of Levels, and New Station Liverpool | Lan. & Yrks. Ry. Co. | *Official* | August 25th | ii. |
| Ironwork for ditto | do. | do. | do. | ii. |
| Wesleyan Church, Herne Bay | | Chas. Bell, F.R.I.B.A. | Not stated | xx. |
| Wesleyan Sunday School, E. Molesey | | do. | do. | xx. |
| Purchase of Buildings | West Ham School Bd | J. T. Newman | do. | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Inspector of Nuisances | Banbury R. S. A. | July 24th | 130*l.* | xviii. |
| Clerk of Works for Sewer Works | Sheffield Town Council | do. | 3*l.* 3*s.* per wk | xviii |
| Clerk of Wks. for Sewage & Wat'r Sup. Wks | Cor. of Stratford-on Avon | July 26th | Not stated | xviii. |

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| County or District Surveyors in Ireland | Civil Service Commis. | August 1st | Not stated | xviii. |
| Assistant Superintendent of Furniture | Civil Service Commis. | August 2nd | do. | xviii. |

## TENDERS.

For School of Science, Kidderminster. Mr. J. M. Gething, architect, Kidderminster:—

| | |
|---|---|
| J. Howard & Sons | £3,834 0 0 |
| R. Thompson | 3,767 18 0 |
| Jno. Guest | 3,572 0 0 |
| H. Smith | 3,421 0 0 |
| J. Binnian & Son | 3,350 0 0 |
| H. Dorse & Son | 3,195 8 10 |
| W. T. Bennett, Birmingham * | 3,134 0 0 |

* Accepted.

For building a pair of semi-detached villas at York Town, Surrey, for Mr. Christmas. Messrs. Harrison & Cooper architects:—

| | |
|---|---|
| Watson | £1,995 0 0 |
| Kemp | 1,674 0 0 |
| Garland | 1,493 0 0 |
| Catchpole | 1,245 0 0 |

For building a cottage at Sandhurst, for Mr. Scott. Messrs. Harrison & Cooper, architects:—

| | |
|---|---|
| James | £243 0 0 |
| Binsted | 235 0 0 |
| Wigmore (accepted) | 185 0 0 |

For alterations and additions to the Parish Church, Llangranog, Cardiganshire. Mr. E. H. Lingen Barker, architect:—

| | |
|---|---|
| Davies & Son, New Quay | £685 0 0 |
| Shepherd, Cardiff | 688 0 0 |
| Davies & Jones, Cardigan | 674 0 0 |
| Giles, Carmarthen (accepted) | 669 0 0 |

For alterations to the King's Arms Public-house, Old Kent-road. Messrs. Wilson, Son, & Aldwinckle, architects, 2, East India Avenue, E.C. Quantities supplied:—

| | |
|---|---|
| Hancock | £1,933 0 0 |
| Lusk | 1,769 0 0 |
| Hearle & Son | 1,649 0 0 |
| Shurmur | 1,593 0 0 |
| Staines & Son | 1,592 0 0 |
| Drew & Cadman | 1,588 0 0 |
| J. & H. Mills | 1,495 0 0 |
| Jackson & Todd | 1,470 0 0 |
| D. D. & A. Brown (accepted) | 1,350 0 0 |

For alteration to the Cranbourne Tavern, St. Martin's-lane, for Mr. Garnon:—

| | |
|---|---|
| Schlater (building work) Helling (pewterer's work) (accepted) | £233 0 0 |

For Isolation Wards in connexion with the Lincoln County Hospital, Lincoln City. Mr. Wm. Watkins, architect. Quantities supplied:—

| | |
|---|---|
| Martin & Sims | £625 0 0 |
| Baines | 613 0 0 |
| Hatcliffe | 605 0 0 |
| Crosby & Sons (accepted) | 569 0 0 |

For the erection of new schools in the Military-road, Northampton, to accommodate 1,164 children, for the Northampton School Board. Mr. Chas Dorman, Northampton, and Mr. W. Talbot Brown, Wellingborough, joint architects:—

| | |
|---|---|
| Fisher | £8,969 0 0 |
| Cosford | 8,900 0 0 |
| Woodford & Son | 8,350 0 0 |
| Dunckley | 8,211 10 0 |
| Brown | 8,198 0 0 |
| Green | 8,180 0 0 |
| Ireson | 8,157 0 0 |
| Archer & Bransom | 8,040 0 0 |
| Martin | 7,688 0 0 |
| Watkins | 7,590 0 0 |
| Wingrove (accepted) | 7,127 0 0 |

For providing and fixing fire-extinction appliances to the Workhouse, Harrow-road, Paddington, for the Guardians of Paddington. Messrs. A. & C. Harston, architects, 15, Leadenhall-street. Quantities not supplied:—

| | |
|---|---|
| Merryweather, Greenwich | £560 0 0 |
| Isaac, Liverpool | 449 14 0 |
| Morris, Salford | 442 19 0 |
| Crittall, London | 429 17 0 |
| Gardner, Strand | 420 0 0 |
| Simpson & Co., London | 398 0 0 |
| Shand, Mason, & Co., London | 397 0 0 |
| Stidder, Southwark Bridge-road * | 360 0 0 |

* Accepted.

For providing and fixing wrought-iron bars to the twenty-three windows at the St. George-in-the-East Infirmary, for the Guardians. Messrs. A. & C. Harston, architects. Quantities not supplied:—

| | |
|---|---|
| Deacon | £150 0 0 ! |
| Hobbs | 98 0 0 |
| Flint | 74 15 0 |
| Stewart | 57 10 0 |
| Whitford | 55 0 0 |
| Castle | 49 0 0 |
| Aldridge & Co. | 48 15 0 |
| Johnson Bros. | 48 10 0 |
| Vigor | 46 0 0 |
| Faulkner, Hersham, Walton-on-Thames * | 45 10 0 ! |

* Accepted.

For providing and fixing office fittings to the new offices of the Chelsea Guardians, King's-road, Chelsea. Messrs. A. & C. Harston, architects. Quantities not supplied:—

| | |
|---|---|
| Coffin & Co. | £196 0 0 |
| Heming | 191 0 0 |
| G. H. Spicer | 159 10 0 |
| Panter & Powditch | 155 0 0 |
| Trent Bros. | 149 13 0 |
| Burrell & Norton | 148 10 0 |
| Building, Fitting, and Furnishing Co. | 145 0 0 |
| G. King, Brompton-road (accepted) | 134 0 0 |

For painting, distempering, and other work at the Casual Wards and Workhouse, &c., belonging to the St. George-in-the-East Guardians. Messrs. A. & C. Harston, architects. Quantities not supplied:—

| | Casual Wards. | Workhouse. |
|---|---|---|
| Deacon | £160 0 | £250 0 |
| Richards | 60 0 | 233 0 |
| Hobbs | 65 0 | 220 0 |
| Castle | 49 0 | 238 0 |
| Gibben | 70 0 | 194 0 |
| Vigor | 67 0 | 184 0 |
| McCarthy | 59 0 | 175 0 |
| Pereira | 47 0 | 174 0 |
| Stewart, 22, Chapter-road, Walworth (accepted) | 44 15 | 170 10 |

For alterations and additions to No. 49, Nelson-square, Blackfriars-road. Mr. C. N. McIntyre North, architect. Quantities supplied:—

| | |
|---|---|
| Baguley | £998 0 0 |
| Richardson Bros. | 878 0 0 |
| Josolyne, Borough (accepted) | 849 0 0 |

For decoration and sanitary work at the Kensington High School for Girls, 153 and 154, Cromwell-road, for the Girls' Public Day Schools Company. Mr. J. Osborne Smith, architect:—

| | |
|---|---|
| W. A. Rhodes, Hyde Park (accepted) | £169 0 0 |

For alterations and additions to the South-Eastern District Hospital, Deptford. Messrs. H. Jarvis & Son, architects. Quantities supplied:—

| | |
|---|---|
| Tyerman | £13,900 0 0 |
| Robson | 13,790 0 0 |
| Adcock | 13,755 0 0 |
| Dennett & Foale | 13,570 0 0 |
| Croaker | 13,248 0 0 |
| Lorden & Son | 13,188 0 0 |
| Howell | 12,898 0 0 |
| Holloway | 12,835 0 0 |
| Mowlem & Co. | 12,691 0 0 |
| Evans | 12,680 0 0 |
| Wall Bros. | 12,477 0 0 |
| D. D. & A. Brown | 12,470 0 0 |

For counter and bar-fittings at the Joiners' Arms, Denmark-hill, for Messrs. Truman, Hanbury, & Buxton. Messrs. Williams & Son, architects:—

| | |
|---|---|
| Marr | £197 0 0 |
| Schlater | 182 0 0 |

For paving dust-shed at Phœnix Wharf, Commercial-road, Lambeth, for the Vestry of Clerkenwell. Mr. William Iron, surveyor:—

| | |
|---|---|
| Carey, Sons, & Co. | £226 12 6 |
| J. Mowlem & Co. | 189 0 0 |
| J. J. Griffiths (accepted) | 186 0 0 |

For the erection of three new shops, with dwelling-houses and store-rooms, at Calne, Wilts (exclusive of smith's work and ironmongery, which will be supplied by the proprietors), for Messrs. Wilkins & Son. Mr. Fred. Bath, architect, Salisbury and London :—

*Excavator's, Bricklayer's, Mason's, Slater's, and Plasterer's Work.*

| | | | |
|---|---|---|---|
| John Weston, Calne | £965 | 0 | 0 |
| George Weston, Calne | 840 | 0 | 0 |
| Edward Weston, Calne | 654 | 0 | 0 |
| John Sutton, Calne | 635 | 8 | 0 |
| Thomas Beazley, Calne (accepted) | 635 | 0 | 0 |

*Carpenter's and Joiner's Work.*

| | | | |
|---|---|---|---|
| George Chivers, Calne | £580 | 0 | 0 |
| William Drew, sen , Calne (accepted) | 395 | 0 | 0 |

*Plumber's, Painter's, and Glazier's Work.*

| | | | |
|---|---|---|---|
| Henry Fortune, Calne | £98 | 0 | 0 |
| William Stanley, Calne | 85 | 17 | 0 |
| W. J. Stevens, Calne (accepted) | 65 | 18 | 0 |

[Total of accepted Tenders, £1,095 18s ]

For boundary and fence walls extension of Fisherton Anger Cemetery, Salisbury. Mr. Fred. Bath, architect. Quantities supplied :—

| | | | |
|---|---|---|---|
| H. J. Rite, Salisbury | £730 | 5 | 8 |
| John Wort, Salisbury | 720 | 0 | 0 |
| Gilbert Harris, Salisbury | 710 | 0 | 0 |
| T. Dawkins, jun , Barford St. Martin, Salisbury | 710 | 0 | 0 |
| George Dolman, Salisbury | 700 | 0 | 0 |
| Philip Tryhorn, Salisbury | 698 | 0 | 0 |
| W. J. & C. S. Young, Salisbury | 650 | 0 | 0 |
| Edward Hale, Salisbury (accepted) | 630 | 0 | 0 |

For new Board School, Broad-street, Ratcliff. Mr. E. R. Robson, architect. Quantities by Mr. Ch. W. Brooks :—

| | | | |
|---|---|---|---|
| Wood | £19 683 | 0 | 0 |
| Oathwaite | 19,294 | 0 | 0 |
| Shurmur | 18,954 | 0 | 0 |
| Downs | 18,671 | 0 | 0 |
| Tongue | 18,666 | 0 | 0 |
| Kirk & Randall | 18,637 | 0 | 0 |
| Patman | 18,600 | 0 | 0 |
| Perry & Co. | 18,513 | 0 | 0 |
| Bangs | 18,450 | 0 | 0 |
| Scrivener | 18,405 | 0 | 0 |
| Grover | 18,380 | 0 | 0 |
| Priestley & Gurney | 18,374 | 0 | 0 |
| C. Wall | 18,340 | 0 | 0 |
| Wall Bros. | 18,307 | 0 | 0 |
| Jerrard | 18,291 | 0 | 0 |
| Cox | 18,267 | 0 | 0 |
| Holloway | 18,250 | 0 | 0 |
| Atherton & Latta | 18,2 0 | 0 | 0 |
| Wm. Olrey | 18,000 | 0 | 0 |

For Woodford Main Drainage Works, for the Woodford Local Board. Messrs. Lewis Angell & J. D. Hooper, engineers :—

| | | | |
|---|---|---|---|
| Bottoms Bros. | £15,500 | 0 | 0 |
| Holme & King | 15,327 | 0 | 0 |
| Cook, Bennett, & Thew | 14,998 | 0 | 0 |
| W. J. Botterill | 13,279 | 0 | 0 |
| C Kellingback | 12,983 | 0 | 0 |
| J. A. McKenzie & Co. | 12,915 | 0 | 0 |
| Jesse Jackson | 12,600 | 0 | 0 |
| Russell & Co. | 12,387 | 0 | 0 |
| J. Robson | 12,330 | 0 | 0 |
| G. Bell | 11,985 | 0 | 0 |
| E. Wilson | 11,900 | 0 | 0 |
| E Wood | 11,755 | 0 | 0 |
| E. Bentley | 11,600 | 0 | 0 |
| Hy Potter | 11,500 | 0 | 0 |
| J. W. & J. Neave (accepted) | 11,440 | 0 | 0 |
| Cook & Co. | 11,050 | 0 | 0 |

For making up, kerbing, paving, macadamising, and completing Maybank and other roads, for the Woodford Local Board. Mr. J. D. Hooper, C.E., engineer :—

| | | | |
|---|---|---|---|
| Eli Wilson | £5,554 | 0 | 0 |
| Russell & Co. | 5,162 | 0 | 0 |
| A. T. Catley | 4,943 | 0 | 0 |
| Cook & Co. | 4,705 | 0 | 0 |
| J. Robson | 4,336 | 0 | 0 |
| Jesse Jackson | 3,999 | 0 | 0 |
| Wm. Porter | 3,876 | 0 | 0 |
| J. W. & J. Neave (accepted) | 3,684 | 0 | 0 |
| Hy. Potter | 3,645 | 0 | 0 |
| Cook, Bennett, & Thew | 3,622 | 0 | 0 |

For making roads and sewers at Markhouse-road, Walthamstow, for the Clacton-on-Sea and General Building and Investment Company, Limited :—

| | | | |
|---|---|---|---|
| Chas. Lloyd | £823 | 0 | 0 |
| James Jackson | 657 | 17 | 6 |
| Geo. Rayner | 615 | 0 | 0 |
| John Reeves | 612 | 0 | 0 |
| F. Johnson | 590 | 0 | 0 |
| Eli Wilson (accepted) | 535 | 0 | 0 |

For new road and bridge over Grand Junction Canal. Mr. Hubert Thomas, civil engineer :—

| | | | |
|---|---|---|---|
| D. Laine & Co., Westminster | £3,920 | 0 | 0 |
| R. Finnegan, Northampton | 2,843 | 0 | 0 |
| Kellett & Bentley, London | 2,745 | 0 | 0 |
| George Bell, Tottenham Hall | 2,598 | 0 | 0 |
| James Honour & Son, Tring | 2,500 | 0 | 0 |
| J. J. Robson, Sharesbrook | 2,396 | 0 | 0 |
| E. C. Knight, Tring | 2,340 | 0 | 0 |
| B. Cook & Son, Batterseas | 2,263 | 0 | 0 |
| Martin Wells & Co., Aldershot | 2,212 | 0 | 0 |
| Thomas White, Croydon | 2,127 | 0 | 0 |
| Rowland Bros., Fenny Stratford | 2,099 | 6 | 4 |
| T. Redhouse, Baldock | 1,949 | 4 | 0 |
| Thomas & Cardus, Old Oak Wharf, Willesden (accepted conditionally) | 1,824 | 0 | 0 |
| Charles J. Corrie, Lichfield | 1,710 | 0 | 0 |

For new additions and sundry work to the Coleman-street Ward Schools, London-wall, E.C. Mr. J. E. Saunders, architect :—

| | | | |
|---|---|---|---|
| Heeps | £531 | 0 | 0 |
| Richardson | 524 | 0 | 0 |
| Minchin | 514 | 0 | 0 |
| Woodward | 480 | 0 | 0 |
| Colls (accepted) | 470 | 0 | 0 |

For the enlargement of four class-rooms and other works at South Hallsville Schools, for the West Ham School Board. Mr. J. T. Newman, architect. Quantities supplied by Messrs. Curtis & Sons :—

| | | | |
|---|---|---|---|
| J. Morton | £1,275 | 0 | 0 |
| A. Reed | 1,224 | 0 | 0 |
| North Bros. | 1,223 | 0 | 0 |
| J. Catley | 1,132 | 0 | 0 |
| G. J. Hoskings (accepted) | 1,095 | 0 | 0 |

*Special Notice.* Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

"Baths" [illegible] had better address a firm engaged in the manufacture. It is hardly [illegible] to explain trade processes, which often involve trade secrets.—F. C. (Mr. received).—W. B. (many thanks).—C. C. H.—F. B. (next week).—G. B. G. (next week).—J. R. (the evidence we saw of its "Repeat Electric Lighting Railway" [illegible] referred to Spain.—W. and L. (trade circular).—R. H. B.—W. J. C. (had four from us).

All communications respecting literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other such business matters should be addressed to THE PUBLISHER, and not to the Editor.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications [illegible] news items which have been duplicated for other journals, are NOT DESIRED

## PUBLISHER'S NOTICES.

THE INDEX and TITLE PAGE for Volume XLVI (January to June, 1884) were given as a Supplement with the Number of July 12.

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Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT

**Box Ground Stone**
Is the Best for Use in all Exposed Position being a well-known and tried Weather Stone.
50,000 feet cube in stock.
PICTOR & SONS, BOX, WILTS.
[ADVT.

**Doulting Freestone and Ham Hill Ston** of best quality, in blocks, or prepared ready fo fixing. An inspection of the Doulting Quarrie is respectfully solicited; and Architects an others are CAUTIONED against inferior stone Prices, delivered to any part of the Unite Kingdom, given on application to CHARLE TRASK, Norton-sub-Hamdon, Ilminste Somerset. — Agent, Mr. E. WILLIAMS, 7 Charlotte-street, Portland-place, W. [ADVT

**Doulting Free Stone**
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
For prices, &c., ad dress S. & J. STAPLE Quarry Owners, Ston and Lime Merchants Stoke-under-Ham Ilminster. [ADVT

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**Asphalte.**
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Office:
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MANUFACTURERS OF IMPROVED
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OFFICES AND SHOW-ROOMS:—
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PHOTOGRAPHS SENT ON APPLICATION.

Supplement to The Builder,
JULY 19, 1884.

# THE ROYAL INSTITUTE OF BRITISH ARCHITECTS: CONFERENCES AT THE INTERNATIONAL HEALTH EXHIBITION.

THE first of a series of Conferences on the subject of "The Construction of Houses with regard to Sanitary Arrangements," organised by the Royal Institute of British Architects, was held on Thursday, the 10th inst. Mr. Ewan Christian, President of the Institute, was the chairman for the day, Mr. Charles Barry, F.S.A., being vice-chairman. There was a large attendance.

The Chairman, in opening the proceedings, referred to the great importance of the subject before the Conferences, and stated that the Institute did not, of course, hold itself responsible for the opinions of any individual speaker. The general question of house building was one of the most important questions of the day, and people should bear in mind Lord Bacon's wise aphorism,—"He that buildeth a house on an ill site committeth himself to prison." The same might be said of him that buyeth a house on an ill site.

## ON THE CONSTRUCTION OF HOUSES WITH REGARD TO SANITARY ARRANGEMENTS.

The introductory paper was on this subject, and was read by Professor T. Roger Smith, who commenced with a brief historical review of the history of the English habitation. He said:—From the best preserved of the Mediæval castles, such as Conway Castle, we may learn that the elementary principles of sanitation were understood, and pains and care taken to secure comfort and even luxury, so far as they can be enjoyed within the restricted boundaries of a fortified dwelling; while the semi-fortified houses, of which a few remain in tolerable preservation, such as Penshurst, Ightham, Warwick Castle, and Haddon Hall, were many of them so complete that they continue habitable even by this fastidious generation.

Monastic buildings, from a time long before the Conquest down to the Reformation, afforded a series of admirably well-planned and well-built dwellings, for the residence in common of a large number of inmates, the general idea of which survives in the colleges of Oxford and Cambridge. The neighbouring detached but dependent buildings, such as the abbot's house, the mill, and the grange belonging to a monastery, were each and all of them good specimens of small dwelling-houses. They were, however, in all probability, far better than the houses which surrounded them, if we may credit a curious but by no means flattering account of the ordinary English dwelling-house at the close of the Middle Ages which has been lately made public in Brewer's "Henry VIII." It is from the pen of Erasmus, who, writing to Wolsey's physician on the dwelling-houses of England in the early years of the reign of Henry VIII., says:—"First of all, Englishmen never consider the aspect of their doors and windows; next, their chambers are built in such a way as to admit of no ventilation. Then a great part of the walls of the house is occupied with glass casements, which admit light, but exclude the air, and yet they let in the draught through holes and corners. The floors are in general laid with white clay, and are covered with rushes, occasionally removed, but so imperfectly that the bottom layer is left undisturbed sometimes for twenty years, harbouring abominations not to be mentioned. I am confident the island would be much more salubrious if the use of rushes were abandoned, and if the rooms were to be built in such a way as to be exposed to the sky on two or three sides; and all the windows so built as to be opened or closed at once, and so completely closed as not to admit the foul air through chinks, for as it is beneficial to health to admit the air, so is it equally beneficial at times to exclude it."

After the time of the confiscation of church property, under Henry VIII., a large amount of house-building on a great scale occurred. Of the vast Elizabethan and Jacobean mansions we are justly proud; and it is very doubtful whether the influence of Italian and French examples in the seventeenth and eighteenth centuries was not on the whole disadvantageous. Certainly some of the Palladian mansions of about a hundred years ago are less carefully disposed for health, decency, and comfort than the Elizabethan ones which preceded them.

If we try to form an estimate of our actual condition, it will soon become clear that, with our present habits of life, the influence of the dwelling on the health of its inmates is very great. I am inclined to believe that it is much greater than at any previous period. Indoor occupations, for men, are far more common than they used to be, and probably though women have to a large extent lived in the house for several centuries they now do so more than ever.

After enumerating briefly some of the most important points which have to be considered in house sanitation, such as adequate ventilation, sufficient means of warming, ample windows, sound construction, protection from noxious compounds in the paint or paperhangings used for the dwelling, complete systems of drainage and of ventilation for the drains, and an ample supply of pure water, hot and cold, the Professor said he proposed to conclude by a reference to the share which *the architect* may properly claim in the duty and privilege of promoting public health by improving the construction of dwellings:—

In other words, I propose to ask how far all this is an architect's question. It is not sufficiently known to the general public, but well known to ourselves, that the actual direct control possessed by architects over the majority of the dwelling houses built in England is extremely small. In ninety-nine cases out of a hundred the dweller in or near one of our towns, especially this metropolis, never dreams of building his own house, and looks out for one ready built by a speculator, and puts up with untold inconveniences and even dangers from its many defects. But notwithstanding all this, the opportunities which we possess of influencing the buildings of this country are very great; they are such as no other body of men enjoys. We can do a great deal to secure that the homes of England are healthy; and if we fail to do all that we can, we shall be failing in a great public duty.

In the first place, I think it may be safely affirmed that whatever may be the case in towns, the country house of a person of influence and importance is now never built without an architect. From parsonage houses upwards we have the designing and superintendence of all the houses of the clergy in their parishes, and the rich when they are living on the estates. These, then, we can make as fit to promote health and to avert disease as we are able, and they ought to be as healthy as any buildings can be. Collectively they provide for a vast number of residents, including a great proportion of the most important men and women of the country; and, in addition to this, they are conspicuous as models. The dwellings of the highly-placed should be perfect, not only for their own sake, but because such buildings are sure to be imitated, and their owners are most likely to promote sanitation when their own dwellings teach them what it means.

Next perhaps in importance from our present point of view are our countless residential institutions, if that term may be used to denote public buildings where persons live temporarily or otherwise. Every college, school, hospital, workhouse, &c., has its architect, and we have even seen military barracks erected by civil architects. The very purpose of these buildings renders attention to their sanitation one of the most positive duties of the architect.

At the other end of the scale the very numerous model dwellings erected in London and other cities for the urban labouring population, and not a few agricultural labourers' dwellings, are almost always put into the hands of architects, and are buildings in which sanitary excellence is often the only good quality that the architect has an opportunity to impart. Between these two extremes lie the numerous dwellings of the middle class, which, as has been said, are far less under an architect's control than the buildings above or below them; yet it must not be forgotten that from time to time an individual house is commissioned, and ought to become a model. I trust I have shown sufficient reasons for our recognising that this is pre-eminently an architect's question, and, if that be admitted to be the case, it will hardly be necessary for me to bespeak your best attention to those of our professional brethren who are to address us on some of the details of the subject, and ask you to contribute to its elucidation by joining with spirit in the discussions.

## THE SANITARY ARRANGEMENT OF HOUSES IN LONDON DURING THE LAST 120 YEARS.

Mr. Frederick W. Hunt read a paper on this subject. He said that in speaking of the sanitary arrangements of houses in London during the past 120 years, the points that present themselves for especial consideration are:—

1. Drainage, and the appliances in connexion with it.
2. Water-service, and its supply and arrangements.

And also the general arrangement of the houses during that period, and the use of the several parts and their ventilation.

Before the commencement of this century there was not any system of public or general drainage existing, the so-called sewers being provided for the purpose of carrying off surface water only, or for conducting fouled streams along their old courses. As new squares and streets were laid out and houses erected, sewers were formed under the new roadways; but these were still only for surface water, and it was illegal to conduct any fœcal matter into them. In the formation of these sewers, therefore, the questions of a proper fall, or construction with a view to proper cleansing, do not seem to have been considered essential by the engineer or builder. When, after 1815, it was allowed to carry the overflows from cesspools and other foul drains of houses into sewers, the existing sewers, constructed for the purposes before mentioned, were used, and some have continued in use until the present time, being sometimes only elongated cesspools with the outfall higher than the upper end.

When there were not any sewers for the reception of house drainage, each householder, large or small, had to provide for the reception and storage of all soil or refuse upon his own premises, until it could be removed with as little annoyance to himself or his neighbour as possible. The arrangements of houses, therefore, in the metropolis differed but little from those in the country, with the exception that those in town had not the space or accommodation the country afforded for the conveniences required.

Cesspools or cesspits were the means provided for the reception of all soil and sewage matter. These were usually constructed in the yards or gardens of the larger houses.

House-drains, similarly to sewers, were originally constructed to take the waste and surface water, and being for this purpose only, they were not very carefully laid, and were generally square in section, and frequently without any

paved bottom. These drains were connected with the sewer if one existed within reach, otherwise they had to go to a cesspool. In houses built after, or only immediately preceding, the commencement of this century, when the introduction of a water-closet into houses was becoming general, the drains were made of brick, circular in form, and such as are now called brick-barrel drains. These drains were constructed with mortar as a rule, though sometimes a portion of the bottom was laid in cement, and they still discharged into cesspools from which overflows were carried away. No doubt the overflow was frequently connected with the public sewer, but it was not until 1815 that the penalty against such connexion was removed. With means of overflow, and drainage allowing as it did of the use of a greater quantity of water, and at the same time obviating the necessity for emptying cesspools so frequently, water-closets, instead of privies, were generally provided for houses built at and after the commencement of this century, not only internally but externally. The difficulty that then presented itself to the builders was the keeping back of foul smells, which was provided against by traps in soil-pipes and dip-traps at the bottom of pipes, frequently so large that they might be called cesspools.

Previous, therefore, to this century, and for the first quarter of this century, we find a gradual suppression of privies, and the introduction into houses of water-closets, using the old flat bottom drains, or such drains as had been originally laid down, and these discharging into cesspools. It appears to have been considered that a drain would do for any purpose the needs of the occupier might require it to serve, and when all fœcal and offensive matter could be washed away out of sight, and traps were supplied to keep back offensive smells, it was sufficient to allow this refuse to find a lodgment in cesspools under the floors of the house, or for that matter on the surface of the ground under the floors. When one cesspool became no longer serviceable, rather than cleanse it a new one was made, and the drain directed to it. The site selected for the new cesspool was one that was convenient for the drain rather than for the health of the house.

Much has been done during the last few years in advancing sanitary knowledge, and I think I may summarise the principles gradually accepted, and now more generally acted upon as being,—increased fall to drains,—perfect water-tight joints,—the abolition of dip-traps, —keeping all drains outside the house,—disconnecting them from the main sewers,—the efficient cleansing of drains and the quick removal from them of all obnoxious matter,—the separation of surface water and sink and other wastes from soil drains,—and a continual free current of air through the drains from near their entrance to the sewers along them and up the soil-pipes.

One hundred and twenty years since, water-closets, as such, had scarcely been introduced. The form of such closet at first in use was no more than a receptacle capable of being washed out, from which a pipe was carried to the drain, having a plug to close the upper end, somewhat like a hopper-pan without a trap. This was fitted up in a cupboard or in a room, where convenient to the occupier, and provided with a seat.

Between 1770 and 1780 the first on record of several patents were taken out for an improved apparatus. The earliest were on the principle of a valve-closet, but the kind of apparatus known as the pan-closet, with a large container, came into use very generally at the commencement of this century.

The pipes from the apparatus to the drains have usually been made of lead. Other materials, such as earthenware pipes and iron pipes, have been used, but each of these were found to have faults greater than lead pipes. When it was found necessary to keep back foul smells, D-traps, and traps of various kinds, were introduced. These were formed in connexion with the pipes, and a dip-trap was built at the bottom of the descending pipe. As offensive smells were more and more objected to, the traps were increased in number and size, but the acceptance of the principles now acted upon, and referred to above, has gradually led to the abandonment of the dip-traps at the bottom of the pipe altogether, and to constructing one trap in connexion with the apparatus as small as possible.

After some remarks on wastes, sinks, and baths, Mr. Hunt proceeded to the subject of water-supply, mentioning the dates of the formation of some of the leading water companies:—The Lambeth in 1785; the Vauxhall in 1805; the West Middlesex in 1806; the Kent in 1809; the Grand Junction in 1811.

The water-supply to houses was generally to one or more cisterns in the basement, according to the size of the house, one being placed in the front area; and when there was a second, it was placed at the back part of the house. At first, as the facility for a high service was very restricted, and the cost great, it was seldom used. A small cistern was afterwards placed over the water-closet, as such an addition was made to the house, and the water companies were able to give a higher service.

The service in the house was at first by a tap in the side of the cistern, but it was soon extended to the sinks for convenience. The waste from the cistern was generally by a trumpet-mouthed waste led direct to the drain, or to the trap under the water-closet apparatus, as the case might be, without any further trap or disconnexion, and the supply was taken from the same cistern for all purposes.

The general position for the water-closet in the earliest days of its introduction was designedly in the centre of the house, near the best bedrooms, and where the descending pipes conveying the rain-water from the roof was available for use as a soil-pipe. Light and ventilation there was none, except by a fanlight or small window on to the staircase. Water-closets continued to be placed in this position until near 1850, and in large houses there were two or more so placed on the different floors of the house, and some that could have been as readily lighted and ventilated from the outside were not. The position of the water-closet for the use of the servants, and those in houses of the middle and lower classes, was frequently in the front vault, equally without light.

Houses formerly occupied by single families of the middle classes, but since becoming occupied by a family in each room, have remained without any improvement in this respect. They are still only provided with one water-closet, with a hopper basin and a defective supply of water, placed in a vault in perfect darkness, and where cleanliness is really a difficulty to attain.

*Ventilation.*—In houses built about 120 years since and later, the reception-rooms in large houses, and even generally, do not call for any special remark in this respect, but the offices and bedrooms were arranged rather to give the greatest accommodation than the best.

Borrowed light and borrowed ventilation was not considered to be undesirable, and the height and dimensions of the sleeping-rooms generally were of the smallest. The changes gradually adopted have been to make all sleeping-rooms higher, and give them all direct external light and ventilation, and to add other means of ventilation besides open windows.

As a concluding remark, I would say that the alterations in the sanitary arrangements of houses, during the period I have referred to, have been gradual, and until recently very reluctantly adopted. It has been, and still is, a difficult matter to persuade people of the necessity of making such alterations to their houses; and some prefer to ignore the fact that their houses are in an unsatisfactory state. There is a very prevalent idea that officers of health and inspectors of nuisances have had all objectionable arrangements done away with, and that no one would think of allowing any such to exist; whereas, I think it is rather a fact that those officers never interfere until the arrangements have become most defective, and are a serious nuisance felt by all in the neighbourhood, and that they seldom think of inspecting or interfering with the arrangement of houses of the middle and upper classes.

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In the discussion which followed,

Professor Kerr remarked that it was not so very long since there were none of the appliances which had been referred to to be found inside our houses. The upshot was that there had been created underground an immense ramified world of filthy canals most favourable for the generation of poison. With this abominable underground world they had connected almost every room in their houses, admitting the poison which was generated there. As his contribution towards a solution in part of the great difficulties with which they had to deal, he would state a few propositions which had been in his mind for many years. He would first lay down the following preliminary observations:—(1.) The atmospheric air has for perhaps its principal function, the universal work of cleansing. It performs this work automatically and indefatigably wherever it can force an entrance, but, wherever it is excluded, its work of cleansing cannot be performed. (2.) Decomposition in the open air is comparatively innocuous; but, when the air is excluded, it is poisonous. (3.) A house in this climate is a closed box, from which the cleansing air is apt to be excluded. (4.) Besides its own vitiated air, there ascend into the house foul vapours from the ground beneath. (5.) The house is also in communication with an underground world of sewers, in which the gases of decomposition are constantly being generated while the cleansing atmospheric air is primarily excluded. (6.) All communications from the house to this underground uncleanness are communications to the house therefrom. (7.) The cleansing atmospheric air will find its way into the house if it can; but the sewer air forces an entrance with still greater energy. Now there were three ways in which to meet the difficulties. One plan it was impossible to suggest, viz., the doing away with the appliances altogether. Another plan was to improve the appliances by increasing their complexity, which, he believed, was a mistake; and a third plan was to separate the appliances from the rest of the house, which was the scheme he had now to submit. He would, therefore, make the following proposals:—(1.) To form a separate vertical compartment or *annexe* at the rear of the house, extending from bottom to top, and thoroughly open to ventilation, to contain all water-closets, all sinks, all cisterns, the bath-room, the lavatory, the housemaid's closet, the scullery, and the butler's pantry in connexion. This *annexe* not to communicate with any of the living-rooms, but only with the staircase. All water-closets to have an intervening lobby well ventilated. (2.) To form in connexion with this *annexe* a vertical shaft, extending from bottom to top, and open at the top; to contain the water-supply and service pipes, the gas-supply and service pipes, the flow and return heating pipes, all waste-pipes, all soil-pipes, all ventilation-pipes from the rooms, and the ventilation-pipes from the drains. This shaft to be accessible at several stages, and to be large enough for a workman to ascend and descend by a wall ladder. (3.) To form in continuation of this shaft a subway under the basement floor extending from the front to the back, to contain the house drains, the water main pipe, and the gas main pipe. This subway to have a manhole at each end in the open air. The disconnexion of the house drain from the public sewer, and the provision of all requisite traps, &c., are taken for granted. The efficient ventilation of the public sewer by appliances of its own is taken for granted. (4.) All requisite branch pipes for water, gas, heating, waste, and ventilation to be capable of inspection and control from the shaft, and to extend therefrom to the shortest possible distances. (5.) Every apartment to be separately ventilated by means of tubes in the shaft, and every apartment in the house and in the *annexe* to be directly accessible to the open air by windows. The effectual sealing of the bed of the house against ground air is taken for granted.

Sir Henry Acland, bart., M.D., remarked that a great many of the subjects referred to were better understood 2,000 years ago than at the present time. Some of the works of the Romans in the neighbourhood of Rome and Carthage, and especially as regards their water supplies, were worthy the admiration of the engineers of the present day. Many great cities of antiquity, such as Nineveh and Sardis, he believed, were deserted, not from political causes, but by reason of the ground becoming so saturated with filth as to render them uninhabitable. It would, therefore, take all the care of the scientific men to prevent this in the case of this vast metropolis.

Mr. Lewis Angell, C.E., said that Professor Kerr had suggested a splendid scheme, but it would be a very costly one, and could be only regulated by State control. Almost the only sanitary dwellings fit to reside in at the present time were jails, workhouses, and asylums. He suggested that the Building Act should be applied to the whole country, a fee being paid to the

Local Authority on every new building, so as to provide for an inspecting staff.

Mr. Bourne, the Duke of Bedford's agent, said that a large section of the Bedford estate was built under the conditions referred to by Mr. Hunt. They had their closets outside the house, and cesspools, as there were no other method of getting rid of the drainage, at the time of their construction. Architects could only take things as they found them, and the better part of London consisted of houses built some time ago, which had to be adapted to the present times. More legislation was required with regard to new buildings.

Mr. J. P. Seddon remarked that beauty was an important element in sanitary building. Architects should have more consideration for the work of their neighbours, and then they would not see the horrible messes which were made in London in the matter of façade.

The Chairman agreed with Sir Henry Acland's remarks on the Roman works. In the abbeys of the thirteenth century the sanitary arrangements were as good as they could be, which showed the common-sense of the men of those days.

## DRAINAGE UNDER DWELLINGS.

Mr. Charles Barry took the chair at the subsequent sitting, when

Mr. S. Flint Clarkson read a paper on this subject. He observed that however desirable it would be to avoid drains under dwellings altogether, back drainage was impossible very frequently for terrace houses,—those houses put close together which would always line the streets in the central portions of our towns. Anything which was desirable for other drains in less important situations might be considered absolutely necessary for those under dwellings, which should, of course, be as near perfection as possible.

1. *What to Avoid.*—By pointing out briefly the bad qualities of brick drains, such as used to carry away the refuse matter from dwellings, what are good qualities in drains generally may be perceived without an effort. New brick drains are rarely constructed nowadays, but plenty still exist under and round about houses, so that they are not as yet mere matters of antiquarian interest.

In brick drains (and in drains of rubble stone equally) the materials were porous, absorbing liquid foulness, and giving it out in foul air when stirred, half-dry or dry. The bottoms were too frequently of bricks laid flat in mortar; the bricks grew loose, and the bed of the channel became a row of little cesspits. In true barrel drains the round bottom was usually covered with cement, but it was applied with difficulty, and frequently not very smooth. With any slight disturbances the coating cracked, parts peeled off without anybody knowing where. Renewal was out of the question. There were thus always little pools above the porous bricks. Rats worked their way between flat covers and side walls, or enlarged any crack in a barrel. The bad air in the drain found its way into the building, and the rats, too. With bricks, barrels were not made less than 9 in. diameter, which we know is too large for an ordinary house-drain. Little streams of water turned through large flat-bottomed drains were shallow and slow; and in 9-in barrels, with rough insides, there was but little improvement. The solid matter was left behind by the liquids; flushing applied with the most extreme rigour could not cleanse such drains. They were (1) of porous materials; (2) not smooth inside; (3) with joints too frequent, and soon becoming imperfect; (4) too large; (5) difficult to cleanse.

2. *Stoneware Drains.*—All the defects noted above may be avoided if good stoneware pipes are used as they should be. They are manufactured in many places in the United Kingdom, and are not expensive, not nearly so costly as brick drains cemented inside would be. Well-burnt, hard, glazed stoneware pipes absorb no moisture; the vitrified glaze renders them as non-porous (1) as an old-fashioned brown drinking-mug; they do not corrode; they are quite smooth inside (2); once well cleansed the surface is what it was at first.

The fewer the joints the more perfect the drain. If one could be put down all in one piece we should do well, but Nature has apparently not arranged for this. In the stoneware drains joints occur at every two feet, and if properly made they are very lasting (3). [These numbers are those of the defects in the brick drains noted above; the contrast is thus pointed out, and the way in which a defect is overcome.] The length of 2 ft. is convenient for making, firing, conveying, and handling; a length of 4-in. pipe weighs about 15 lb., and a length of 6-in. about 26 lb. In each batch of pipes there are failures which must be cast aside; they should never be sent out from the works. They may be of insufficient thickness, rough on their surfaces, too brittle, fired too much or too little, not cylindrical, or otherwise defective in form. The pipes are made thicker as the diameter is increased: a 4-in. pipe is $\frac{3}{8}$ in. or $\frac{1}{2}$ in. thick, a 6-in. $\frac{5}{8}$ in., a 12-in. 1 in. If too thin or brittle, the broken pipes will saturate the soil around them with foul matter; if rough on the surface, obstructions will occur; in either case the drain will be blocked up. If they are not truly cylindrical in form (or not truly oval in the case of oval pipes), one pipe will stand above another at the joint and stop the flow. An ordinary pipe is constructed with a projecting rim or socket at one end,—a faucet into which the plain end of the next pipe fits as a spigot. The inside of the faucet and the outside of the spigot have parallel grooves to give a key to the material introduced to form the joint.

The lowest pipe is laid first, with the socket at the highest end. The plain end of the next pipe is placed in that socket, and the space between it and the socket is filled in with a mixture of cement and sand. Clay should not be used for drains under dwellings; there the joints should be as air and water-tight and as indestructible as possible. Before the cement has had time to harden the interior of the pipe is wiped out very carefully. *If this is not thoroughly done, a ridge or small lumps of cement will stick up at the joint.* Long hairs, threads, pieces of cloth, or cotton stuff will attach themselves to such projections, soil will then cling, and a stoppage be managed sooner or later. To guard against such ridges or knots joints have been treated somewhat as in iron water-mains, that is to say, strands of gaskin have been put round the upper pipe, so as to make it fit tightly in the socket, and then cement packing, put to fill up the rest of the socket, cannot reach the interiors of the pipes. Some lodgment results, however, and consequent imperfect cleansing, if the whole space between the two pipes is not solidly filled up with something as hard, or nearly as hard, as the pipes themselves.

3. *Some Defects in Stoneware Drains.*—When pipes are ordered hurriedly and arrive too late, —there is sometimes a wish to use those which have come, and not to wait further for the special pipes which ought to have been ordered before. When the changes cannot be made at the junctions,—pipes of one diameter should always be joined to pipes of another diameter by diminishing pipes, and in no other way. Patched junctions are painful shows of inefficiency; obstruction comes sooner or later when the filling-up breaks down into the pipe. Right-angled junctions cause trouble; a branch should discharge through a junction at an angle approaching the line of flow of the drain which is entered. When bends are required, but have not been supplied, straight pipes will be used with apologies, "so as to get the work done," unless there is interference. If the curve is of short radius the spigot ends will actually leave the sockets on their outer sides. Speaking generally, very bad stoneware drains will be of porous pipes, rough in their insides, broken and pieced with cement; some joints gaping, others leaking; some badly made with bad cement, some with projections of the cement inside; not sealed over; laid to curved and irregular lines, with right-angled junctions; the curves made of straight pipes, without diminishing pieces at change of size, and occasionally with larger pipes inserted in the run of smaller ones; without inspection-chambers; put on new-made or yielding ground; parts running up-hill, and the rest laid to flat and irregular gradients.

4. *Iron Pipes and Subways.*—Some architects, in certain parts of their best work, use iron pipes with yarn and lead joints, similar to those in water-mains, in preference to any stoneware drains. In Paris they are always used,—not buried in the ground, but exposed to view. In America they are common, and compulsory in some places for drains under dwellings. They are enamelled inside, or treated by the Bower-Barff (Rustless Iron) process. Mr. John J. Stevenson, the architect of the new mansions at Kensington-court, has taken great pains there, and used all the most modern sanitary appliances. He has kindly lent me a drawing showing the system pursued. Heavy cast-iron pipes, 5 in. diameter, are laid in perfectly straight lines under the houses. They are lined with Dr. Angus Smith's composition, a preparation of tar, which gives a smooth and apparently indestructible surface. Joints occur at every 6 ft., and are thus one-third of the number in a stoneware drain; there are no difficulties with defective cement or the careless use of it. Being much more costly than stoneware pipes, the iron pipes are only used under the houses.

Similar iron pipes were put by Mr. E. C. Robins on wall brackets in a subway,—a kind of sub-basement,—in the Museum of Building Appliances, in Maddox-street, Regent-street.

5. *Lines and Levels.*—Long straight lines are always preferable. It is more easy to get the levels right, and to see that they are so; there are no checks to the flow, which is a very important point with water-borne solid matter; they can be more readily tested at first, and from time to time, and more readily unstopped. At the junction of the straight lengths of the pipe drains, and at any bends, small inspection chambers are put; at the bottom of these a length of half-pipe forms the channel. When the cover is off the character of the flow of the drain is seen at once.

Having determined the lines which the drains are to follow, it is then necessary to settle the inclinations at which they shall be laid, in order that they may convey all effete matter quickly to the sewers, and be self-cleansing. Of course if there was too much fall, and the slightest check, the solids would remain and the water run away. But too much fall is the rarest thing; not being able to get enough is what we are wont to grumble about. The fall is strictly limited by the depth of the sewer below the lowest floor, and the necessity of keeping the drain well under the floor at the upper end; 2 ft. under the finished floor is considered desirable, though we have sometimes to make ourselves contented with less. The least fall approved for 6 in. drains is one in forty, that is 3 in. fall in each 10 ft. of horizontal distance. More is valued if it can be managed, certainly 4 in. drains should have more. It is desirable to have a flow of at least 150 ft. per minute, with a shallow stream of water. When drains are laid to flat gradients some special means of flushing them must be used daily.

If the pipes are laid upon yielding ground they will not keep level; some will tip one way and some another, the joints will snap, and sometimes the pipes also, resulting in hills and dales, leaking joints, and stoppages. A bed of cement concrete, carefully levelled on the top to the proper fall,—a bed of artificial rock in fact,—laid along the whole length, will give the pipes a fair chance. In this concrete grooves will be made to receive the lower parts of the pipe sockets, and the whole of the length of each pipe will then rest on an immovable bed.

Refilling the trench must be managed without disturbing the pipes. The hollows under them being very carefully filled up with concrete, it must also be put at the side of the pipes, with a thickness of 6 in. on each side, and then 6 in. over the top. Such a covering of cement concrete is usually stipulated for in by-laws for drains under dwellings, sealing up the pipes altogether as an additional precaution against evil results from defective jointing. It also serves to protect the pipes from displacement by impact on the surfaces above them.

6. *Disconnexion from sewer; ventilation; connexion with sewer.*—After the house drain has left the house, and before it reaches the sewer, a break is made, and the drain runs past an open space. On the side of this air-space next the sewer is a water-trap with a good seal, intended to prevent any bad air in the sewer from reaching the air space. If, however, this trap is neglected, or pressed upon, a good deal from the sewer, tainted air will not enter the house, but will find its way out of the air space. From the air space fresh air enters the drains under the house, and a current is kept constantly moving through them by arranging ventilating pipes at the higher ends, which shall run up to the top of the building.

Some disconnecting traps are large shaped pieces of stoneware, which shut off the sewer at one end, and receive the house drains at the other. A pipe carried up at the house end supplies the fresh air above the trap, when a grating at the surface of the pavement is

objected to. With other traps the construction of a manhole is contemplated. This is a little chamber built up under the pavement of an area, through which the drainage is carried in half-pipes of enamelled ware. The trap is a syphon or U trap put on the side of the manhole next the sewer. A grating at the surface is sometimes put when there is plenty of space; more usually a flue is constructed and filled in with a ventilator having small mica valves, which rise to admit air into the flue, but refuse to let the air come out. In time of storm there might be a set in the wrong direction,—the long upright pipe at the back of the building might carry a rush of air downwards, and it would find vent at the induct and cause annoyance. Protected by these mica valves, the flue is unsuspect, and a moment of rest allows the pent-up air to go upwards according to its wont. The manhole makes inspection of the drains easy; an air-tight iron cover is often put over it.

The ventilating pipes, at the upper ends of the house drains, are of lead or of galvanised cast iron, well caulked at the joints, and all 4 in. in diameter, or as large as the branches they start from. The soil-pipe serving the water-closet is usually extended upwards; being joined at its foot to the house drains without any trap, a current of air passes steadily through drains and pipes. Long branches must have special ventilating pipes; short ones will be cleared of air by the discharges, and supplied with freshened air from the main drain. These upcast exhaust-pipes must not finish near windows or cisterns, nor be stopped at the eaves, so that they discharge under the open joints of slating; nor must they stop just above the tops of chimney flues, nor be carried into the flues themselves. If they are, bad air will reach the insides of rooms. Wires, or a perforated finial, must be put to keep out birds, or an approved cowl.

The drain should be connected with the sewer in the upper half, above the line of flow, at the haunch just above the springing. The custom at one time was to put the mouths of the house drains below the water-level in the sewers, but this is given up now; the intention was to prevent sewer air entering the drains. Connexions must join the sewers obliquely in the direction of the line of flow of the sewer. The pipe sewer junction blocks invented by Mr. Cockrill, are a considerable improvement. Oblique junction blocks and bends are used for brick sewers. Flap-traps are railed at and still used. The hinged valve allows a passage out from the house-drain, but not into it; the flap closes by its own weight when the flow has passed through.

7. *Inspection, Flushing, and Cleaning.*—Other connexions with house-drains for sinks, baths, rain-water pipes, &c., the traps to them, and the ventilation of pipes and traps, form a branch of our subject not forgotten, but very extensive. The construction, maintenance, cleansing, and the efficient ventilation of sewers might seem another branch. Everybody is interested in it, architects specially so. It is well, however, for everybody to have his own province, and do the best he can in it; and architects are content with a province which extends, in large towns, as far as the walls of the sewers, but not beyond.

When the drains are completed, disconnected, connected, and ventilated, they must be examined keenly before they are used, so that if by chance there are defects, they may be remedied. If the lower end of the house-drain is plugged, and the pipes are filled with water, and left for a few hours, and the level of the water in the testing-bend has not sunk, it has been proved that pipes and joints are sound, that there are no vents for bad air, or cracks through which moisture will run away. The levels of straight drains can be tested by actual measurement, and the effectiveness of the gradient proved by floating down something in a good flush, and noting the time. At cast-iron terminals, with air-tight brass plugs placed in a back area at the upper end of a drain, various tests for soundness and level can easily be applied. With drains in use, water mixed with lime is poured in at the end. By the amount and character of the discolouration of the effluent water, before and after flushing, the condition of the insides of the pipes will be judged.

The beautiful arrangement shown by Mr. Hawksley (470, Class 22) for testing house drains and soil-pipes with a plumber's force-pump and gas pressure gauges, shows when there is any leakage, and localises the leakage too. The traps act as plugs; the ventilating-pipes, and the end of the house-drain next the disconnecting trap, must be thoroughly plugged up. The smoke test calls attention to important defects; little holes may, it is true, be plugged up by some chance at the moment when the test is applied. Straw burned in the drain may send smoke all along it, or smoke may be generated in a vessel and forced in by a machine. These appeal mainly to the sight. The peppermint test,—a favourite one on account of the ease with which it is applied,—appeals to the sense of smell, as does sulphur burned in a shovel at the mouth of the disconnexion chamber. Ether, oil of mint, and other strong smells have been suggested. The difficulty in actual life is in getting anybody to look for defects periodically.

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In the discussion which followed,

Mr. Thomas Worthington referred chiefly to the drainage in country districts. Mr. Hugh Lennard considered it a ticklish thing to lay down stoneware pipes which would remain thoroughly water-tight. If that were the case in new houses, what must it be in old ones? He had been long convinced that for drains under houses iron piping was the best thing to use. There was no difficulty in making an iron pipe water-tight, which would ensure people against the saturation of the under-part of their houses through leakage. Col. Prendergast referred to the confusion of mind which existed in the case of ordinary men as to whether iron or pottery piping should be employed. He had seen what was considered a most perfect iron arrangement put in, which had finally to be taken up and replaced by pottery pipes. In the iron piping they found a hole as large as one's fist, through corrosion. This statement brought Mr. Scott Moncrieff upon his legs, who said that before taking to the use of iron piping on a large scale he had made inquiries as to the experience of others, and at the present time there was a conscensus of professional opinion in favour of iron piping. Sir Robert Rawlinson, he continued, had said that as, in London, it was necessary to drain under the house, iron piping should be employed. Even the best stoneware pipes were liable to leak at the joints. Where any doubt arose as to the possibility of corrosion, a subway would enable the user to detect this. He believed the whole question would eventually turn upon the preservation of the iron.

Mr. E. C. Robins, Mr. Edwin Hall, Mr. Dawson, Mr. Fowler, and Capt. Douglas Galton also spoke, the preponderance of feeling being in favour of iron piping.

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The Conference resumed its sitting on Friday, when Mr. George Godwin, F.R.S., occupied the chair, Mr. Alfred Waterhouse, A.R.A., being the vice-chairman of the day.

Mr. Godwin made a few prefatory remarks upon the importance of the subjects under discussion. In the solution of such questions no one had more interest than the architect, and the Council of the Institute had shown their appreciation of this by convening the present conference. The more fully the public were enlightened, the better it would be for architects and for the community at large. It was a difficult matter to turn the attention of the public to the subject of architecture, and they rarely gave it a thought unless they were building a house, or had some members of their family down with typhoid fever. Architects had paid less attention to the subjects under consideration than they might have done, but a great change had set in, and ventilation and other arrangements for the protection of health received the utmost attention at the hands of the profession, as well as that covering of beauty which they had always been expected to supply.

## THE IMPERMEABLE CONSTRUCTION OF ROOFS, WALLS, AND BASEMENT FLOORS, WITH A REFERENCE TO VENTILATION AND WARMING INCIDENTAL THERETO.

Mr. Edward Cookworthy Robins, F.S.A., read a paper on this subject. He said that the enclosing walls of every house are an important factor in considering its sanitary condition; so also is the roof covering, which together with the walls, constitute its power of resistance to the winds and weather of our inclement climate. Until late years, however, the site covered by the walls and roof of any building, has been thought to be sufficiently protected by them, and the existence of such a thing as "ground air" has been ignored in constructing the lowest ground or basement floors of buildings.

But what is ground air? It is the superincumbent pressure of the external atmosphere which passes through the earth subjected to its pressure to find its escape in the direction of the least resistance, which direction is commonly that forming the site of a house.

When the earth is clean, and the house is pure, there may be no great harm in allowing this process to go on, but for one consideration, viz., the humidity of the air so passing during wet seasons. But in populous places where the earth is fouled by innumerable accumulations of refuse of all kinds, where defective drainage has rendered pestiferous the very soil upon which the house stands, it becomes a matter of enormous moment that the house itself shall not be made the safety-valve for the reception and accumulation of all these abominable impurities in the form of imperceptible "ground air."

1. *Impermeable Basement Floors.*—There are two ways of overcoming this evil. The one is by forming an impervious flooring as before mentioned, and the other is by constructing channels under the floor leading to the kitchen chimney-flue; these channels should be of porous materials, and should be 6 ft. apart, and by being carried to the kitchen chimney the ground air will be drawn off with the heated air and smoke of the chimney, and tend to increase the draught in the flue at one and the same time.

The ordinary materials for paving basement floors are all of a very porous character, but the experiments made on various materials show that hydraulic cement is almost impermeable, and a layer of cement concrete covered with pure cement, or an asphalte surface, or concrete formed of Portland cement mixed with granite or slag chippings and finished with a smooth surface, will answer the purpose desired. But for the sake of comfort and warmth to the feet, it is often desirable that wood should be the covering. This is equally well secured by the adoption of one or other of the many excellent wood block floorings exhibited in this great International Health Exhibition, to be laid on 6 in. of cement concrete. The blocks need not be more than 2 in. thick, and should not be less than 1¼ in. thick and 6 in. long by 3 in. wide. They should be dovetail-grooved at the bottom, burnetised before using, and bedded in cement. Powdered cement should be brushed into the interstices after the laying is complete, and the surface well washed with pure water and left clean.

Deal, pine, pitch-pine, oak, walnut, teak, most kinds of wood, will do, which may be planed or polished, and laid in any variety of pattern, equivalent in beauty to a parquet floor. Where there are no basements it would be better that all the rooms should be thus paved, the difference in the purpose of the rooms being expressed by the character of the design and the quality of the material used. Vitreous porcelain tiles are best for passages, being both impermeable and not slippery on the surface. But excellent tiles of every kind are now available for the purpose; and are most easily kept clean.

2. *Impermeable wall construction.*—In the second place, let us consider briefly the case of the enclosing walls of a building. Nothing but the observation of carefully-conducted experiments will enable you fully to realise the remarkable porousness of the ordinary building materials used for the external walls of dwelling-houses.

The impermeable qualities of terra-cotta give it a foremost place in the decorative construction desirable in all buildings.

In the erection of buildings of the ordinary porous materials, however, precautions may be taken to achieve a similar result.

There are a variety of systems for forming hollow walls, the inner and outer casings being connected with strips of bent iron galvanised.

But hollow walls are not always efficient, and are rarely perfectly well done, and, of course, leave a space in which bad air can accumulate, and into which vermin may some day find their way, and being unable to get out, die, and thus fumigate the building. The system is

costly too, and covers a larger area than solid walls when the walls are less than two bricks thick.

There is another system which makes a wall at once air and water-proof so far as it extends, leaving nothing but the crevices in the ill-fitting of the joiners' work of doors and windows, which only good workmanship can eliminate.

It consists of an asphalte bond between the inner and outer casing, applied in the following manner. Let us suppose a 14-in. wall, on one side 9 in. of brickwork, on the other 4½ in., with 1-in. division between, the opposite joints being left free of mortar for about three-quarters of an inch each. At every two or three courses the heated asphalte is poured in, and the crevices all filled up with this impervious material, and the result is a wall much stronger than the ordinary wall, occupying no more space, and perfectly wind and weather-proof. Impermeable water-tanks may thus be constructed, an example of which may be seen in the Parkes Museum.

3. *Preserving Solutions.*—This was the subject of an interesting discussion at the Institute many years ago, under the presidency of the late Sir Wm. Tite, and in the Transactions of the Institute the whole matter was very carefully reported.

I invariably specify that the stone-work shall receive, when in a dry state, two coats of a solution, the effect of which is to render the surface of the stone comparatively impermeable, at all events, till such a time as the stone has had time to weather and form its own skin and natural protector from the weather. Wax and gum are dissolved in a spirit, and the solution is applied with a brush on dry stonework,—the spirit volatilises, and the congealing of the rest forms a skin as thick as the stone is impregnated; two coats are usually sufficient.

At Hanover Church, Regent-street, may be seen three different processes, none of which have, as yet, shown signs of failure.

The building had become perfectly black, but very few signs of decay had taken place, except in the towers, and I was desirous of removing the soot without taking away the weathered surface of the stone, and this I achieved by the use of the wet steam jet.

I also discovered that the portions which had been treated with linseed-oil had not decayed to any extent, while the rest was so far gone that the greater part of the stones had to be replaced.

Of course a great deal of the defective stone we see arises from injudicious selection; there is good and bad stone of every kind, and unless pains are taken not only to select the quarry itself, but to mark the approved stones at the quarry, and then to see that they lie in the building on the same bed that they lay in the quarry, disappointment must ensue whatever the solution you employ; solutions should only be used to preserve good stone, not to make bad stones pass muster.

4. *The Roof.*—The ordinary house-roof is a thing that forms a hat to a building; it may or may not have projecting eaves, or a brim to the hat, but is always presumed to rise above the greater part of the topmost rooms, and to form an air space protective of the inmates from the extremes of heat and cold. That this is but a presumption is, in many cases, only too true, and the cruelty of putting servants in slate, or even metal-covered attics, within a few inches of the outer air, is often forgotten, alike by the builder who sells, and the master who buys his family residence. A sufficient air space between the ceiling and the roof is indispensable for dryness and for the preservation of the timbers of the roof.

The ordinary speculative house-builder gets the thinnest slates, often absorbent of moisture and permeable by the sun and wind, and he fixes these with common nails to sappy battens, secured to light rafters at the least available gauge.

Zinc does not last above a dozen years in the English climate, as a rule; but, if used, it should be put on with laps, and without soldered seams or anything to hinder its free expansion or contraction, and should be put in much thicker than is customary—say No. 15 gauge.

Lead forms the best and most durable roof covering, properly laid, of sufficient thickness, —say 5 lb. weight for the square foot for ridges and flashings, 7 lb. for gutters and flats. But nothing is more effective than tiles, and nothing, when well done, warmer in winter or cooler in summer. The Broseley tiles are admirable in colour and hardness.

5. *Ventilation.*—It is not my purpose to enter very deeply into the question of ventilating and warming, but it is obviously necessary to make suitable provision for ventilation, not only for the purposes of human respiration but for the sustenance of the healthful condition of the materials used in the construction of a house. Dry rot and other forms of premature decay being induced by the want of a free circulation of air about the places where it appears, the best proof of which is, that by the introduction of the air, the growth of the fungus is arrested.

As I have already remarked, the exclusion of the external air from the enclosing roofs, walls, and basement floors of dwellings, renders it necessary to provide ventilation of a simple kind.

If we have something to learn from foreigners of the scientific application of the principles of warming and ventilating great public buildings, as I have elsewhere shown, foreigners have much to learn from us of the domestic comfort derivable from the homely fireside of the English people. That it is wasteful of fuel is true; polluting to the outer atmosphere cannot be denied; nevertheless it is the best system of warming and ventilating ordinary living rooms. Every room in every home in England may be said to be provided with an extract shaft in its chimney-flue from the ever open fire-grate, carrying away in winter 200 ft. of air per minute. But few rooms have any corresponding inlets, and so to supply the omission, whizzing draughts come in through the key-hole and crevices of the doors and windows and floors, and even through the walls themselves.

A hundred years ago John Whitehurst, F.R.S., wrote a pamphlet on the ventilation of rooms by introducing fresh air from without to supply the want of it within, the full particulars of which were given by me to the Institute a few years ago in a paper "On the Relation of Sanitary Science to Civil Architecture." It consisted of tubes placed in the corners of the room, something less than half the height of the same, whose collected area was equal to or greater than the area of the chimney-flue; the air, entering these tubes through the walls below the floors, passed out at the open top with a current sufficient to carry the air to the upper part of the room, from whence it distributed itself without draught like the spray of a fountain, and fed the flue so that no pull was exerted upon the cracks and key-holes afore-mentioned, and the air was changed as many times in the hour as the size of it permitted its exhaustion by the chimney-flue.

When there is no fire the aspiration by the chimney-flue is much diminished, but might be maintained throughout the summer by the use of a ring of gas-jets just over the mouth of the register.

The Hygiastic School Board grates have recently been improved, and the fresh air (warmed in its entrance by passing under the iron hearth and fire-clay back) is brought in with a vertical current through the mantel-shelf instead of horizontally by the stove front, and rises to the ceiling and returns to feed the fire; by this means the cold air is warmed on its entrance, which is not the case in Dr. Whitehurst's plan.

Cowls may be useful to prevent down draught, but must not be relied on for creating upward currents. The best cure for smoky chimneys is Billing's throttle valve and terminal, designed by an architect, which is to be seen on one-half of Somerset House. Why the other half is not done to match it I can't tell you.

## CHIMNEYS AND THEIR CONSTRUCTION.

THIS was the subject of the next paper, which was read by Mr. J. P. Seddon, who observed that chimneys, at present at any rate, are integral and important features of most buildings in England.

It may be that they can, and will be, ultimately dispensed with, and our towns made, by the progress of science and economy, to resemble those of the East, and they may become a mere collection of flat-roofed boxes, fed with tempered fresh air and drained of foul air, by some parish pump and heating apparatus. If so they may be left to purely scientific men, to whom æsthetic considerations are questions of superfluity.

I have, however, now to speak as an architect addressing a sanitary conference upon chimneys as they exist, and I wish to show how they can, and should be, treated, so that they may be practically useful and ornamental as well.

They have been both, as witness the graceful chimney-shafts of Grosmont Castle, Southwell Priory, and those of Hampton Court, and a host of Elizabethan mansions, which are picturesque mainly by reason of these features. Alas! they seldom now are either the one or the other, as a glance at the skylines of our streets will reveal, since they are almost invariably disfigured by ugly cowls and tall-boys, which are but records of domestic misery and discomfort. Makers of such monstrosities eagerly compete for public patronage in this Health Exhibition itself, recommending them as palliatives for a disease which they assume to be universal and inevitable. I maintain that it is not the latter, and need not be the former, and that such costly and ugly excrescences may be altogether dispensed with, if proper attention be given to the constructing properly those very necessary portions of our dwellings called chimneys.

Now, why do chimneys smoke? First, because air is not laid on to houses, as water is, but rather sedulously kept out. The more sanitarily impervious (that is to say air-tight) we make our houses the more necessary it is to provide for the admission of air to them, and, unless this be done, smoke cannot ascend the chimneys. Secondly, because fireplaces are ill-constructed and gathered over in such a manner as to leave a large vacant space immediately over them, which acts as a reservoir of stagnant cold air that chills the smoke and prevents its rising to the flue. Thirdly, because flues are made too large (the ordinary size being 1 ft. 2 in. by 9 in.), and because they have no specially expanded places in which down-draughts may expend themselves; and fourthly, because the tops of the chimney shafts are not provided with any guard against the wind, which might be done in a proper architectural manner, instead of it being left to chimney quacks to supplement afterwards with their miserable metal makeshifts,—fantastic excrescences which Dickens has, however, so immortalised that I need not attempt to describe them further. I will proceed at once to consider what the proper construction of chimneys and their appurtenances should be to enable such subsequent appliances to be dispensed with. Beginning at the bottom with the fireplace itself, leaving the grate for later consideration, the first thing to be done is to provide a good and sufficient supply of fresh air from outside the building to the fireplace. This may be drawn from above the roof by special air flues in the chimney jambs.

Fresh air being brought to this point may be tempered or warmed by contact with the grate before its admission to the apartment, and it can be admitted thence without causing a draught, which is sure to occur if cold air be brought to any other part of the room, as its course thence is direct to the fire, to the annoyance of those who may be in its way. How it may be warmed will be seen when we come to the grate.

The next thing to consider is the outlet of the smoke from the fireplace. This should be contracted to the normal size of the flue, at least, or perhaps made slightly smaller, immediately over the fireplace, in order to insure a quick draught. This object is not effected at all by the usual construction of this part of the chimney, which is to put an arch in front, over the opening, and to gather the opening itself to the flue gradually behind. Arch, chimney-bar, and gathering can be dispensed with, and may be so economically, by forming in Portland cement concrete *in situ* a mantel-block extending the full width of the wall, and 9 in. longer than the opening, and 9 in. deep, with three circular holes pierced in it, each 8 in. in diameter. The central one is the outlet for the smoke from the fireplace, and the commencement of the smoke flue; the side ones are for outlets from the spaces to be formed around the grate, for warming the fresh air brought to them, and are the commencement of flues to convey the warm air to gratings for its admission to the apartment which may be arranged in connexion with the chimneypiece, or carried up to just below the ceiling or the cornice.

The construction of the flues from above this mantel-block is the next point to be considered. These are ordinarily made 1 ft. 2 in. by 9 in.,

but this size is too large; they should not be larger than 9 in. square, and are better lined with fireclay pipes, 8 in. in clear diameter; the inside surface of these pipes should not be smooth or glazed, as such are said to be found to retain soot only till rain falls, when it becomes loosened and drops suddenly, causing annoyance, whereas the ordinary terra-cotta surface is rough enough to retain the soot till the chimneys are swept.

Midway between the top of mantel-block and ceiling line of apartment, the flue should be expanded and formed in such a manner as to break the line of ascent of the smoke, and to provide a flat space immediately under the upper part of the smoke flue, in order to divert down-draughts of air impinging on it, and give them a rotary direction, first sideways and then upwards, within the expanded place provided for the purpose, without stopping the upward current of the smoke from below. When the flues are lined with fireclay pipes, special expanded pipes, which are made for the purpose, can be introduced, and more than one in the height of the flues may advantageously be used.

The construction of the chimney-stacks containing the flues above the roofs should be such as to protect them from cold and damp to which they are exposed. It is well to build them in cement and to line them with pipes; but the tops need careful arrangement, because the exit of the smoke from them is liable to be disturbed and hindered by winds. There should be at the top of each flue an expanded vacuum space, within which down-draughts may rotate and expend their force, and there should be louvred openings directing gusts of wind upward so as to assist, instead of retarding, the exit of smoke. All this may and should be executed in proper architectural materials and form, as stone, brick, or terra-cotta (the last-named material is specially suitable and easily manipulated for the purpose).

So much for the construction of the several parts of a chimney, namely, the fireplace, flues, and terminals, which need consideration as a whole, without which it is hopeless to expect success by the use of any of the numerous special appliances for the separate parts alone. I plead earnestly for these principles, as a matter closely connected with the health and comfort of the community, and specially invite discussion as to them..

There is, however, another point, which is, perhaps, not less important, but as to which what I have to say is more tentative and experimental. It relates to the grate within the fireplace.

Burning coal as we do, the main point, I think, we have to seek is the consumption of its smoke, or as much of it as is possible within the grate itself, so that the office of the flue should be to convey away the gaseous products only, and not soot. It appears to me that this is attainable by diverting the smoke after it has issued from the top of the fire, so that it should be passed again through the body or flame of the fire before it ultimately reaches the flue.

Perfect combustion is, I think, of more importance than what is called "slow combustion," and a fire should not be smothered in its own ashes.

The cheerful English open fire is not likely to be driven out of fashion by even Health Exhibitions, and I do not think that the health of the public would be improved by the substitution of the close stoves in apartments which obtain more generally on the Continent and in America. Nor do I think that any of the systems proposed for keeping up throughout a dwelling-house the same temperature, are likely long to curtail the liberty of the English subject to make the room he occupies of the temperature he pleases. I certainly should not advise the most ardent believer in such a system to expend capital in building houses at present without fireplaces, with their separate flues, or to dispense with chimneys and their construction.

The warming of the fresh air brought to the fireplace is to be effected sufficiently by its passage down the flue and round the fireplace, care being taken that no smoke can penetrate to these spaces. The object is rather to temper than to heat the air, and to direct its point of admission to the apartment, so as to obviate unpleasant draughts. The air so tempered around the kitchen fireplace would be most usefully employed by being brought to the hall of the house which supplies air to all the rooms, with means of shutting it off when not wanted in summer.

The ventilating grate or stove is, then, an essential part of the combination of appliances I would suggest for chimneys and their construction. And there are many excellent contrivances of this class in the Health Exhibition which can be highly recommended.

The best method of curing chimneys of smoking would, however, obviously be by consuming the smoke in the grate itself, and allowing nothing to pass up the flues but the heated gaseous products that necessarily remain even when the soot has been consumed.

I cannot see that this has as yet been altogether effected by any of the appliances for the purpose exhibited, although many praiseworthy efforts to do so have been made. But this is, in my opinion, the direction in which we are to look for further improvement, and to perfect chimneys and their construction.

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In the discussion which followed the reading of these papers,

Mr. Charles Forster Hayward, F.S.A. said the advantage,—not to say the importance,—of having such parts of dwelling-houses as floors, roofs, and walls constructed in a manner so that they may not be too open to the influences of atmospheric changes, might at first sight seem self-evident to every one; but this point was enforced in the first paper just read, connected, as it necessarily was, with the second paper, which referred more particularly to another detail of construction, so essential in this country and climate not only to comfort, but to the possibilities of ventilation, viz., chimneys. Their point, therefore, was to discuss the effect of permeable or impermeable, porous, impervious walls, floors, and roofs,—impermeable to (1) air, bad and good, including heat and cold; (2) water, *i.e.*, damp and rain. If time permitted, these two aspects of the question might well be separately considered, but merely hinting at the ideas expressed by Pettenkofer and others as to the extent to which walls were permeable to air, he might at once say that if we would ventilate at all scientifically, and in any but the most simple and elementary manner, we must have walls and floors impermeable to atmospheric effects. Thus, if any sudden changes of heat and cold could to any great extent affect the interior of a building to be ventilated, all special arrangements would be upset, and obviously the introduction of wet and damp through the walls would greatly militate against any artificial means employed to ventilate. Impermeable floors in the basement were best secured by asphalte in some form, either as a layer on concrete with a smooth surface, or as a bed for wood-block or other such flooring, such as small joists bedded in or on the asphalte, to which joists the flooring may be nailed. Other floors of a similar or inferior nature might be used, such as cement, &c. Impermeable floors above the basement were obtained by the use of rolled iron joists and concrete, with asphalte or cement covering, or perhaps with a wood-surface as before. But this touched on the question of fire-proof construction. So he would only refer to a modification of those impervious floors, such as wood joists filled in with concrete or pugging, and then a surface of cement or tiles, and this he had often used for school passages, where fire-resisting material was sufficient, in opposition to fire-proof construction. They might remind themselves here of the old plaster floors of Nottinghamshire and elsewhere. As regarded wood-block flooring, he would remark that in one case he used some wood blocks bedded in a substance like asphalte, in a very damp basement, which had stood perfectly twenty years, and a similar one,—a French patent,—had best borne the wear and tear of an outer entrance-door for as many as ten years already. Now it was obvious that in these floors one must give up all the contrivances for ventilation through the floor, and omit all calculation as to air finding its way into the room through the floor (charged sometimes with the dust of the carpets and other objectionable matter). Also all the need of air-brick ventilation for the floor itself to keep away dry-rot, &c. Yet these floors would be all the more suitable for laying on air in pipes bedded in the substance of the floor, this being more rigid than the ordinary wood-joist floor construction. Passing this, he came to the walls, which were obviously imperfect if built of porous material, whether of brick or stone, or with imperfect joints, or without damp-courses, either vertically or horizontally, either in basement or chimneys, where necessary. Hollow walls were well known as expedients which required careful work and some experience to make effective. Even all the galvanised iron ties, twisted and bent upwards, and the patent brick bond, were not enough unless care be taken to prevent lodgment of lumps of mortar, &c., during construction, so that in building hollow walls a space for taking out these below is best left to the last. Then the jambs of windows were difficult to manage, and other points required attention; but it was certain that two walls half a brick thick are better than a 9-in. solid wall to resist the wet; and that an outer stone construction should generally have a lining of brick a slight distance from the inner stone face to secure a wall impermeable to wet. But the best of all as against wet, though not always as against wind and draught, was vertical external covering of tiles or slate. The former obtained in such districts as Surrey and the latter in Cornwall and elsewhere. The use of substances such as Hygienic Rock cement in place of mortar for joints or as a coating internally of hollow walls, to prevent access of damp and weather was to be commended, but of the substances advertised for coating walls externally, little advantage might be expected, and less for those often mentioned as being certain specifics against damp, &c., internally. Certainly he should not think of such as affording means for what we call "impermeable" walls. Roofs might be made impervious as floors, and when so made would obviously be flat or horizontal, not sloping. For ventilation purposes this was not an unmixed advantage, for we had to give up the space between ceiling and roof so often; but for access to chimneys and for many town purposes a flat roof was in various ways desirable. Now, to ventilate and warm,—we must in thinking how best to utilise our impermeable constructions, remember that we have to feed the human lungs first, and, secondly, the fire. When warming was not required, only human beings had to be thought of; but the chimney might be of great use, or, at any rate, if it existed, could not be ignored in any system of ventilation. Ingress of air was best secured by such tubes as were well understood as Tobin's (a convenient though inaccurate name for them), because they could be regulated in height and size, and by small valves and doors; they also could be placed regularly around a room away from an outer hall, being supplied from the other side by tubes laid in the floor. The hollow channels formed in the walls, with ingress into the apartment at the cills where they were unusually high above the floor, had been found best in some cases where he had had to solve the problem practically. The same arrangement of tubes laid in the floor could be adopted to feed the fire, either in the hearth or at the cheeks at the side jambs; and, of course, the air could be brought in the same way to the back of the grate or stove, if so prepared to receive it, and there be warmed and distributed. Additional access of air could often be obtained,—indeed, sometimes only so, by spaces over the door-head, filled in with louvres, or by special ventilators made for doors, cutting into the mid rail, and avoiding, at least, the necessity for opening the doors and preventing cold draughts to the feet. One of these systems he had applied to school-rooms, and opening on to a corridor; the other to work-rooms of milliners and others. For egress of vitiated air, the chimneys come into use, with talc-valve and other ventilators, but specially-built flues were best, lined with circular or square flue piping, but with regulating valves, which were so seldom used. Either accidental or artificial heat, such as gas burning in the tubes, should be used to keep up the essential draught. If it were congenial to our notions of comfort, those Continental tile stoves with tall flues going right through the rooms to the roof might be made to afford, effective egress of vitiated air, being conducted by the heat either into some adjoining flue or other ejector. The sum and substance of all this was a strong recommendation to the householder to procure, and so, of course, be willing to pay for, what was necessary to provide good impermeable walls, floors, and roofs, if he would have a preliminary to good ventilation, or even warmth and comfort, without draught.

Mr. Ralph Nevill differed with Mr. Seddon

as to the size of the chimney-flues, his experience being in quite an opposite direction.

Mr. Wm. White considered that the size of the flue was not of so much importance as its proper construction. With regard to walls, he had seen, in the case of a storm, on the inside of 9-in. brick, the water bubbling through with the air. Felt had frequently to be removed on account of the mildew and dry-rot it created, and he was endeavouring to substitute the Willesden paper for it. At the same time, felt was one of the best non-conductors of heat and cold. To render a floor impermeable, Dr. Richardson had recommended the turning of arches over the whole of the space under the floor. He considered the wood-block flooring more durable than the Staffordshire common paving tiles.

Mr. Schmidt remarked that he had found that Tobin's system would keep rooms well ventilated.

Major Rowe, President of the Sydney Institute of Architects, said that in Australia they had greater difficulty than in this country in finding good materials. It was generally necessary there to coat the walls with cement externally to keep out the damp. The common clay brick was useless for keeping out the rainy weather, and cement was largely used for ordinary houses in Sydney, but even that was not always successful, on account of the inferior work. When not under the control of an architect the cement was only put on about three-eighths of an inch thick; but whenever it was faithfully mixed and fairly put on it resisted the weather. They could get glazed bricks, but then the cost was considerable. From experiments made by himself, he had found that the sandstone which was largely used for building in Sydney, after it had been some time exposed to the air, was more damp-resisting than any quality of bricks they produced. He had seen in the *Builder* diagrams of an impermeable mode of building, which he was strongly in favour of. He considered 9 in. by 14 in. the best size for flues.

Colonel Prendergast thought that each separate apartment in a house should be ventilated by itself. He doubted the advisability of excluding all ingress of air through the walls. The removal of the vitiated air from the top of the rooms, although it had not been touched upon, was a matter of the most vital importance. He thought architects ought, when designing new houses, to make provision by which, at some future time, the vitiated air would be drawn off by channels from the tops of the rooms.

Mr. Waterhouse, A.R.A., drew a sketch on the black-board of an idea for getting rid of the vitiated air from the upper part of a room by making use of the ordinary flue. This was simply by having an opening at the top of the room connected with the smoke-flue over the mantel-bar. The draught of the chimney drew the foul air from the top of the room, while he had never found the smoke enter the room through the opening. He was making a plan at the present time for a physician who insisted that there should be nothing but solidity between the ceiling and the floor above.

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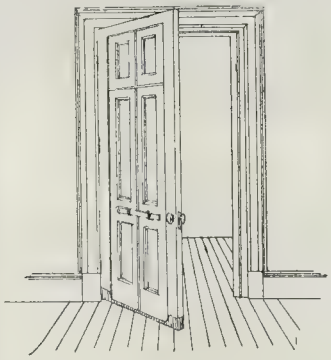
Mr. Ewan Christian having taken the chair, Mr. Horace Jones read a paper entitled

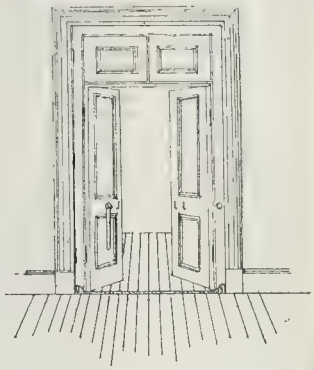
## SUGGESTIONS RESPECTING DOORS AND FIRE-RESISTING CONSTRUCTION.

He said,—A consideration of many of the unhappy occurrences during the terrible catastrophe of fire within my own memory has induced me to formulate "A Suggestion with regard to the Construction of Doors, so as to afford opportunity of Escape from Fire." I append a list of the more prominent cases in which, by the newspaper accounts, some 5,000 lives are alleged to have been lost. Supposing this is somewhat exaggerated, and there is only one-half or even a fifth of that amount, it will still be a horrible and terrible tale to record against the builders and designers of public buildings.*

Such, then, are the reasons which prompted my "suggestion,"—a suggestion applicable to the large doors of churches, theatres, concert-rooms, or other public buildings, also the street or entrance doors of mansions, hotels, boarding-houses, or any other place where numerous inhabitants are likely to be in occupation; also to the subsidiary doorways of public buildings, which are only to be in use either for egress under special circumstances, such as panic or accident, or for ordinary egress.

The diagram will almost explain itself. If the unfortunate victims crowding and blocking





the door with frenzied fear but not unnatural panic, found suddenly that this blocked door, opening inwards upon them, had a means of safety in itself, by simply opening outwards the folding wicket framed within the door, their chances of escape from almost certain destruction would be very much enhanced, and their thankfulness can be better imagined than described.

Of course if the height of the door admitted it, the upper panels would be framed solid, the wicket opening and shutting to and from the transom only.

I would here observe that the cost of the extra labour in forming doors with these wickets, as shown by the model, would not be very large, a very small percentage upon the cost of an ordinary door being sufficient; the principal expenditure, of course, would be in the additional hinges and fastening, although the latter could be of any kind, from an "espagnolette" bolt down to barrel bolts or bars. They would, of course, open only from the inside, and either by sealing or other methods ensure detection where they had been unnecessarily tampered with.

I admit that wickets are often applied to large doors or gates; these wickets are, however, very small, very inconvenient, and generally open the same way as the gates.

I will now proceed to call your attention to a form of construction, or rather an application of the different qualities of two of the best-known and most universally-used materials.

Some years ago I had occasion to visit an engineer's workshop or factory that had been then quite recently destroyed by fire,—indeed, the ruins were still smoking,—and these shops consisted principally of two or three rather lofty storeys. A curious circumstance immediately presented itself: the beams or girders were composed generally of three distinct kinds, viz., cast-iron, wrought-iron, and timber.

I found that all the cast-iron girders, of which there were several, on the ground, broken in pieces; the wrought-iron laying, or rather hanging, from the upper floors, twisted into various shapes; the wooden joists generally entirely consumed, nothing but some small remnants of charcoal indicated where they had been; but there were two wooden beams, which, for some special reason, had been cased on two, and perhaps in some parts on three sides with thin iron plates. These beams alone remained *in situ*; both were well laden, and supported heavy and massive articles.

I inferred from this that the application of the thin plates to the sides of the timber prevented the combustion of the timber, whether by preventing the atmosphere getting at the fibre of the wood, or from any other cause, is immaterial as long as the result is the same.

As a proof to myself and the engineer whose premises were burnt, he tried the following experiment, viz.:—Selecting two or three pieces of ordinary timber, about 6 ft. or 8 ft. long, and say 6 in. by 4 in. scantling, and covering half their length with thin iron, bolted through on two sides. He had them placed in the furnace of a steam engine; in a short time the uncovered or unprotected wood was entirely consumed, the parts protected had the sides charred, of course, but the middle of the scantling, desiccated thoroughly, yet quite sufficiently firm and solid to carry nearly, if not quite, its original load. Acting on this information, several floors were executed, for instance, in the Sovereign Life Office, corner of St. James-street and Piccadilly; the British and Magnetic Telegraph and Submarine Station, at the rear of the Exchange, Threadneedle-street,—one floor in each, dividing portions of the building separately occupied; in some warehouses also for the storage of valuable goods, &c.

Of course the progress of improvement would naturally adopt some of the many useful and ingenious modes of constructing fire-proof floors, such as using rolled iron joists quite covered or embedded in concrete; but there are times when a different mode of construction may be advisable and the application of a useful beam of wood rendered fire-proof by the thin covering of iron not be neglected. Of course the embedding in concrete of iron will also apply to wooden joists without the protecting iron case, and; if so, an economy will be the result. Few fireproof floors can be constructed under 6*l.* or 7*l.* per square. I am, however, informed of one in which the constructors claim they can construct it at 5*l.* 16s. 9d. per square.

I have inquired of a respectable and well-known firm of surveyors their estimate of the cost of fireproof construction according to the section given them, and also the cost of ordinary flooring; and they find that the cost of this floor would be 4*l.* 10s. 6d. per square, or about seven shillings per square less than the cost of ordinary flooring.

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In the discussion which followed,

Mr. Henry Dawson considered that no absolutely fireproof method of construction had yet been devised. The better term to use was "fire-resisting," and such substances as bricks and terra-cotta, which had been subjected to intense heat, were the best suited for this purpose. Unless protected externally with Portland cement, manufactured iron, although it had been subjected to intense heat, was unreliable. With regard to Mr. Jones's door, it should have an inscription on it stating that the bolt was to be drawn in case of panic. The want of the bottom rail, he considered, must interfere with its construction.

Mr. Jones replied that his first model had the bottom rail, but he was afraid it might prove a trap for people falling over. These doors cost 10 per cent. more than ordinary doors.

Mr. William White remarked that it was not generally known that an Act of Parliament ordered that the doors in public buildings should open outwards. In the case of a concert-room, he had designed a door, divided into two parts, one opening inwards and the other outwards.

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The last Conference of the series was held on Saturday, the 12th inst., when the Right Hon. A. J. B. Beresford-Hope, M.P., was chairman for the day, with Professor T. Hayter Lewis as vice-chairman.

The Chairman said.—It was a right and happy idea of the Institute to come forward and claim its own share in the Health Exhibition. What can be the good and the meaning of architecture

* We omit the list, most of the particulars of which have been reported in our columns.

if it is not the science of contributing to health, happiness, and longevity in the most permanent of all circumstances of a man's life, viz., his house? His boots and hats wear out, his clothes get shabby, his food perishes in consuming, but his house ought to be a part of himself, and it may be the inheritance of his family. Therefore it is our duty as architects to make our houses not merely beautiful, not simply luxurious, but healthy. And in proportion as sanitary science becomes more and more exact, and is less and less experimental, the heavier is the moral responsibility on us, to be with the physicians, the ministers of health. There is one feature in this Exhibition which I have very much enjoyed,—I mean Old London. No doubt this Exhibition is meant to be an Apostle preaching health, and this Old London has been reproduced in all its exquisite picturesqueness as a proof of how beautiful and delightful an insanitary city might be. I was almost tempted to say, "An enemy hath done this." When I go through its frowning gateway, and see its beautiful houses, I say, "What can this be for, except to show the humbug of health and the beauty of insanitation"? I think something else was wanted; some approach ought to have been made to one of the cunning framers of odours, in Bond-street, to have supplied the standard odour which the Mediæval town would probably have yielded to the passer-by. Instead of that broad footway, should there not be gurgling down the street,—not a trout stream, but one of a good deep chocolate colour, such as filled the central roadway of our Mediæval cities? And, instead of the hard path, should there not be that delicious yielding substance, composed of many materials, which was what the Mediæval ladies and gentlemen had to pick their way through? If all these things had been provided our street of ancient London would have been far more correct in its appointments. As it is, the beauty is apparent, the insanitation remains to be guessed. A short time ago,—and I am glad to have this opportunity of pointing it out to you,—I was very much struck by a print which appeared in the *Builder*, from the pencil of one who is well known as an artist and an archæologist,—I mean Mr. Brewer. It was exceedingly picturesque and exceedingly sad. It represented a Mediæval town, all capitals and carvings, clustered round a minster of exquisite Gothic proportions; but not a human being was to be seen in the engraving. In the accompanying letter-press, Mr. Brewer explained that the idea was that of a city that had been desolated by plague, and which was then uninhabited. The buildings were mainly Gothic, with some Renaissance among them, and it seemed to be a deserted city of, say 1508. And in the middle of it all there was a sluggish stream running, with some broken steps, down which the maidens had gone to get their drinking water. A little further on this stream lost itself by a low-browed archway under a house, and was, in fact, the common sewer and common conduit. I was very much struck by it; there was something so extremely pathetic about it; the great beauty of the whole, and yet the history it revealed of the sufferings and the agonies that had attended the long plague by which the city was ultimately desolated. I would say that that engraving, alike in its teaching and for its great artistic power, deserves to be perpetuated in a more permanent form than even in the current weekly numbers of the excellent journal in which it appeared. Mr. Beresford-Hope went on to say that it was important in sanitary matters to carry health into existing buildings. It was not merely the work of the "jerry"-builder they had to deal with and put right, but many of the most stately and luxurious buildings. There were no more treacherous buildings than those of the last generation, when mechanical science had attained a high perfection, but when chemical investigation had not equally advanced. He then spoke of a certain house at the West End of London, which nearly fifty years ago was overhauled regardless of expense by a man enlightened according to the views of those days, and fitted with all the most charming appointments of high London life. Among other things with which it was provided was a service of hot-water to most of the bed-rooms. In a few years this house changed hands, and the hot-water apparatus was cut off. Years rolled on, but now and then strange smells were smelt, and people felt strangely heavy and depressed in certain rooms. At length, not many years since, an investigation was made, and this disused hot-water service was found to be in reality a machine for diffusing, without trap or hindrance, sewer gas fresh and rich from the main sewer, all over the house. He advised all, therefore, whenever they bought, hired, or inherited a house, first of all to look for the lost and forgotten and hidden drains and cesspools. He believed the number of these was inconceivable, and that if they could be dealt with, it would have an important effect upon the death and disease-rate.

## SANITARY ASPECTS OF INTERNAL FITTINGS, &c.

Mr. G. Aitchison, A.R.A., read a paper on this subject. After some general remarks on the conditions of a sanitary life, he said,—I am inclined to believe, in the present state of London air, that if every house could be properly built and properly ventilated, it should be hermetically sealed to the outer air; but I fear such perfection is hardly to be looked for in our time, and I therefore say that the things we have mainly to guard against are dirt, dust, and the fouling of the air. By dirt I mean, when speaking to an audience like the present, the street mud we bring in with us, consolidated external and internal soot and dust, and such soft matters that are occasionally dropped about, such as particles of food, and the like. Every crack in a floor gets filled with this, so it is of the utmost importance that this dirt, if not to be excluded, should at least not rest for ever with us, and be liable to putrefy when exposed to damp and warmth. Every open joint between the floor-boards and beneath the skirting is usually filled up flush with dirt. Besides the dust from the streets, we make our own dust inside our houses,—particles from shoes, from wood and stone, from our clothes, oil-cloth, mats and carpets, are constantly being worn off and carried for a time in the air, together with the scales of our constantly-renewing skin; and as soon as the moving air is overladen or becomes comparatively still, everything is covered with light dust, and a great deal of this dust is what the doctors call septic, or putrefying dust. Mr. Brudenell Carter, the eminent oculist, in his letter to the *Times*, described how he had reduced this to a small amount, and that, in consequence, the health of his family had improved. As regards floors, constant wetting is not wholesome, and even scrubbing will not remove dirt far down in the crevices of boards. Nothing is better for preventing the permanent location of dirt than really good hard wood polished parquet, but if that be found too expensive, then let the joints of the boards be well scraped out, filleted with wood when wide, and let all the joints be puttied. And let the whole floor be painted or varnished; dust is then more easily and completely swept up, and a wet flannel cleans the floor; but with parquet perhaps a washing once a year is enough with clean sweeping, and the wholesome application of turpentine and bees-wax.

These remarks apply also to all open joints in woodwork, furniture, and plastering; they all get filled with dust, and should be puttied up, and the dust kept out. Smoothness of surface is also a great help to cleanliness, and certainly as few ledges and holes for dust as possible should be left where the parts cannot be daily dusted. This particularly refers to wall surfaces, and to undercut ornaments in cornices and the like; tall bookcases and cabinets always have their tops covered with thick dust.

As to woven things, whether of cotton, wool, or silk, the less there are of these about a room the better; and wholly carpeted bed-rooms are simply an abomination.

What is still worse than a carpet, which is usually beaten yearly, is tapestry or other woven hangings, which often remain in position until they are worn out. Blinds we must have, but they can be glazed, and they generally get a yearly washing; but we might altogether abolish door and window curtains, and woven mantel-shelf coverings, and such like follies. It would also be healthier if we covered our chairs, seats, and sofas with leather, instead of silk, velvet, or cotton. The gilt and enamelled leather we can get, if not quite so beautiful in point of sheen, may be of excellent design and harmonious colour.

Next to polished wood, tiles, marble, glass and marble mosaics, the best wall finish is oil paint; this can be made agreeable to the eye by simple flat tints of harmonious colour, or it can be ornamented with floral or arabesque ornament, or with the highest triumphs of the painter's art, and this last will not only mark the owner's real taste for art, but will prevent the accumulation of dust on the picture frames.

Flock papers should never be used, except when they are painted over, as they form a natural receptacle for dust, and seem to absorb the greatest quantity of foulness from the air, and when the flock is not dyed "in-grain" whenever they are touched some of the colouring matter comes off and is mixed with the air of the room.

I am greatly inclined to recommend the varnishing of all papers, they can then be cleaned with a sponge; but it is absolutely essential to varnish them in nurseries. Children will lick the papers, and neither lead, copper, nor arsenic can be good for them, and neither size nor whiting are substances you would give to children without medical advice.

Let me say here that you cannot have your windows cleaned too often. When they are dirty they not only exclude light and sunshine, but are covered with thickened human exhalations and dust. If you are wealthy enough to have a dressing-room, banish into it every superfluous article from the bedroom; half the bedrooms in London are encumbered with cupboards full of boots, and wardrobes of old clothes, with baskets for dirty linen, books, ornaments, curtains, carpets, and the like, not to speak of mouldy sponges, nail and tooth brushes; these things occupy some of the air space, and pollute the remaining air with their exhalations.

I have no doubt that beauty of form and colour have a very important effect upon our health. All of us can bear witness to the dulness of a room of one colour, in which we have to sit when we are without occupation, and the desire we then have for some beautiful and intricate pattern to relieve its monotony. When a room is adorned with pictures we have not merely occupation, but delight, and those higher emotions that are only excited by the fine arts. When we choose wall-papers, those that are more beautiful in form and colour are to be preferred. We should, however, satisfy ourselves that the patterns on the papers with which our rooms are hung have not a look of motion. Nothing is more distressing than to be in a room where the pattern of the paper seems always crawling like a bag of worms. It would be well if we could have all things about us beautiful in form, elegantly simple, and all the colours harmonious and restrained; these great qualities seem to impart to us the feelings of self-restraint, dignity, and repose.

[For further particulars of Saturday's Conference, see p. 99].

**The Sanitary Assurance Association.**—At the ordinary monthly meeting of the Council of the Sanitary Assurance Association on Monday last, Professor T. Roger Smith, in the chair, a paper on the sanitary exhibits at the International Health Exhibition was read by Mr. Mark H. Judge, by whom it had been prepared at the request of the Council. On the question of the disconnexion of house-drains Mr. Judge said:—Arrangements for providing a free passage of air into drains on the house side of the outfall traps, to form an air-break or disconnexion between sewers and house drains, are now admitted to be necessary by all sanitary authorities; indeed, the principle involved in their use is the cardinal principle of modern sanitary architecture. By means of the outfall syphon-trap, combined with air-disconnexion and outlet-ventilation above the roof, a dwelling is thoroughly protected from the ingress of sewer-air. That it is important that the admission of sewer-air to our dwellings should be prevented is universally admitted, even when no infectious disease-germs are present in the sewers; but it is often a matter of life and death. Who, indeed, would be bold enough to assert that the miles of London sewers into which every house is supposed to drain in this great metropolis, with its 4,000,000 of inhabitants, are ever free from infectious disease-germs? These sewers drain alike the palace and the worst tenement-dwelling in which poverty and ignorance breed disease and invite death.

# The Builder.

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### *The Proposed Additions to Westminster Hall.*

DURING the present week the drawings showing the scheme for the treatment of the west side of Westminster Hall, lately laid bare by the demolition of the old Law Courts, to which we referred briefly in our last issue, have been in the Library of the House of Commons for inspection by any members of the Legislature interested in such matters, though we must regret that the drawings have not been systematically arranged on screens in a regular progression, so that they could be easily compared, instead of being merely placed in the room at random. There is a great deal of matter for study in them, but non-professional men will not find it very easy to seize the main points in any case, and still less so when the drawings can only be taken up one by one in the order in which the last comer may have left them. Political men are not very prone to take interest in architecture, and should, at least, have every encouragement.

Mr. Pearson's report, which is printed as a Parliamentary paper, can be obtained by those interested in the matter through any bookseller for the sum of two pence, and a very good two-pennyworth it is. Hence we have not felt called upon to sacrifice other matter, which cannot be bought with copper coin, for the sake of printing over again a report of sixteen foolscap pages, which any one can easily get for himself. We will endeavour, however, to make generally clear what is proposed.

Probably few of the many who traverse Westminster Hall, which is now a great vestibule to the Houses of Parliament, and was for a long time a *salle des pas perdus* to the Law Courts, realise that it was originally the centre apartment or great hall for a palace, built first by William Rufus, but of which it is not clear how much more of the palatial building was realised.* The Hall as now seen is mainly as transformed by Richard II., in whose time the celebrated hammer-beam roof was added (after raising the walls slightly), which is the chief glory of the Hall. It is necessary to bear in mind this original intention of the structure in order rightly to estimate what has been and what is proposed to be done. The "Hall" of a palace or of a mansion is essentially a piece of internal architecture, not intended to present any imposing appearance externally, as it must necessarily be surrounded by other and lesser buildings, forming other portions of the residential architecture. It is improbable, therefore, that Westminster Hall was ever for any long period open to view as it is now, on the west side, any more than on the east. It was probably from an early date the centre of a congeries of lower buildings above which its roof would rise, but which would have hidden its walls for the most part from view. When in use as part of the palace, the north end of the hall would be the serving end, the screen would have been placed there, and probably the kitchens would have been adjacent on the north-west angle of the building. From the earliest date there have been considerable adjacent buildings at this point, and the remains of Early English foundations and masonry abutting on the Hall and extending westward are still to be seen. These Early English buildings extended southwards along two bays of the Norman Hall, the rest of the exterior of which displayed there the usual shallow Norman buttresses which are still to be seen. Possibly at that time the outer wall may have been altogether visible from the west, after getting clear of the Early English buildings referred to. We extract the following summary of the main incidents in the Mediæval history of the Hall from the "Report":—

4. *Henry III.:* 1217, 1221, 1224.—Throughout Henry III.'s reign extensive works were proceeding at the palace. At the same time the choir, transepts, and Lady-chapel of the abbey were being built. Extensive decoration was also in progress.

1244, 1263. Probable date of the Early English work at the north-west angle of the Hall, of which traces are now visible. See plans No. 1, 4 (d), 5 (a) (b). Fire at the palace.

5. *Edward III.:* 1297 or 1299.—Great fire, which reached as far as the Abbey. This indicates that the fire was on the west side of the palace, and, as a consequence, Parliament had to be held at the house of the Archbishop of York at Westminster.

Edward III. built, adjoining the Hall, a room for "The Hall of the Family in Parliament time," from which we gather that the great hall was used in his reign for the sittings of Parliament, and the fact that Parliament had to adjourn after the fire implies that the great hall suffered. In Edward III.'s reign, at the time of the building of St. Stephen's Chapel, reference is made to new work in connexion with the Hall.

6. Richard II., 1394-97.—It seems from Thomas Walsingham that it was customary for Parliament to sit in the Hall in Richard II.'s reign. Whether to repair the damage which may have been caused by the last fire, or to make the Hall more suitable as a Parliament House, Richard entirely transformed it to its present shape. The walls were raised 2 ft., and re-cased, and new windows were inserted. The existing roof was added; a new northern porch and towers, and the large buttresses lately uncovered were built. Also "divers lodgings" on the west side; these were mostly contained by a wall erected parallel to the Hall, and connecting together the new great buttresses. The two tiers of wall arches between the Norman buttresses were also erected at this period. See plans Nos. 1 and 6.

We had, therefore, at that time a Hall originally Norman, with a fourteenth-century hammer-beam roof on it, massive buttresses and flying buttresses of the same date added for security to the new roof, and between these buttresses a new wall built, parallel to the west wall of the Hall, inclosing the space between the buttresses. It is to the north-west buildings that Mr. Pearson seems to apply the expression "divers lodgings," though we strongly suspect that if the whole of the inclosed ground were excavated the foundations of other "divers lodgings," of one date or another, would be found between the Hall and the Abbey. Of these Early English buildings at the north-west angle the foundations and portions of the plinth may now be seen, with the new buttresses built over them; while southward of the second bay the plinth of the longitudinal walls ranges with the buttresses, showing that they were built at the same time.

We give Mr. Pearson's synopsis of the remaining stages in the alteration of the buildings:—

7. *Richard III.:* 1484.—Repairs by Richard III. No traces visible.

8. *Henry VIII.:* 1512.—Great fire, which destroyed a large portion of the Palace; never rebuilt, and in consequence of which Henry VIII. removed to Whitehall in 1529.

9. *Elizabeth:* 1570.—Large additions to the west side of the Hall. A large part of the work built at this date remained until 1822. See No. 1.

10. *Charles II.:* 1680.—Additions by Sir C. Wren. See No. 2.

11. *George II.:* 1732.—Courts of Common Pleas and doorway on west side of Hall; also committee-rooms along St. Margaret's-lane; all by William Kent. See No. 1.

12. *George III.:* 1793.—Widening of St. Margaret's-lane, whereby part of Elizabeth's work was demolished. See No. 4 (d) (c).

13. *George IV.:* 1820.—Sir John Soane began work of demolition previously to the erection of his Law Courts.

14. *George IV.:* 1822.—Restoration of north end by Thomas Gayfere, mason to the Abbey of Westminster.

15. *William IV.:* 1834-35. Re-casing of the walls of Great Hall by Sir Robert Smirke.

* We may observe that *Harper's Magazine* for August contains an interesting popular article on "The Great Hall of William Rufus," which comes rather *apropos* at the present moment.

We have, now that Soane's Law Courts are removed, got back to the Hall, with all its adjacent "divers lodgings" removed; the interior re-cased by Smirke; the north end restored by Gayfere, but the west side left with great portion of Rufus's Norman wall, of Richard II.'s large buttresses, and the foundations of the longitudinal walls between the buttresses, and of some portions of the buildings which formerly projected at a right angle to the Hall at the north-west. What is proposed is to repair and restore the buttresses and rebuild the walls between them, and to place a building also at right angles to the north-west portion of the Hall, on ground which has always been occupied by subsidiary buildings of one kind or another. The alterations also include raising the towers and some altering of the façade at the north end; but this we may regard as a separate matter, unconnected with the treatment of the western face.

The exposed western face, of course, includes a great amount of modern alteration, greatly due to Soane; and the buttresses have been cut into, pared, filled in, and knocked about in all kinds of ways, so that it would not be safe to leave them long in their present unprotected state. But amid all the modern alterations, a great deal of archæological interest remains in the old wall, and it is partly on this account that Mr. Pearson, as we observed in our "Notes" last week, proposes the restoration of the buildings which formerly ran between the buttresses, as the Norman walls will not long survive exposure, and must be either cased or covered. Of what nature was the building which formerly connected the buttresses and covered the lower part of the Norman wall? Part of the evidence on this ground we may give in the words of the report:—

"Richard II. entirely transformed the external and internal aspect of the Hall. Unfortunately the renewal of the work by Sir Robert Smirke was so complete that but few of the old stones exist in the interior. Outside we see the flying buttresses and the massive supports, which were, however, much injured by later additions. Between the Norman buttresses, with the purpose of carrying the floor and roof of the building, which he erected in continuance of the Early English work already referred to, he built arches, of which the upper tier remain, and sufficient of the lower tier to enable me to restore their exact shape. He seems to have done this in order to avoid weakening the wall, which had to carry his massive roof, by inserting corbels or timbers into it. He began his work probably in the two northernmost bays, where he cut out a shallow chace in the existing stonework to insert the arches; but, whether he found that this injured the wall, or from whatever cause, in the other bays the arch is merely set against the Norman work. He built the wall which connected his new buttresses 10 in. thicker up to the height of the floor than above; this also, no doubt, in order to carry the oor, and this I have maintained in my restoration."

Mr. Pearson therefore takes the existing remains as evidence of a two-story building between the buttresses. We can perceive no absolute evidence anywhere of an upper floor,—no trace of it in actual marks of any kind; but the double tier of wall arches and the evidence of the thinning of the upper portion of the wall between the buttresses, referred to in the above quotation, may be accepted as sufficiently probable testimony, as no other consideration will so fully account for these facts. The proposed new design shows a cloister, the arches filled in with iron grilles, on the lower story, and a closed and glazed upper story; a battlemented parapet, the buttresses and flying buttresses carefully restored, and the buttresses finished with large and heavy crocketed pinnacles. For the open cloister there is no evidence, saving a certain inherent probability based on the habits of Mediæval building. For the battlemented parapet there is probability, in the fact that the original parapet of the Hall is known to have been battlemented, and in the height of the returns of the parapet above the roof-line, which latter is marked by the chases for lead; also in a certain print by Hollar; but we have had reasons for thinking that the belief in Hollar's accuracy is a kind of popular fallacy of archæologists, and that he is by no means the authentic witness that he is currently supposed to be. However, the battlements are intrinsically probable, no doubt, and the base of the parapet is distinctly visible on more than one buttress. The pinnacles coincide in general appearance with one which existed on a flying buttress on the east side of the Hall, which Sir C. Barry pulled down, but of which there is an engraving in Brayley and Britton's "Westminster." So much for the longitudinal building between the buttresses. At the northernmost end there is to be a new two-storied building with a high-pitched roof, at right-angles to the Hall, and occupying nearly the position which the Early English building at the north-west angle occupied.

Now, in the first place, as to the uses of these new structures; for architecture, as we all know, is based on utility,—at least, we have all been told so often enough. The lower story of the new north-west building is to be put to a very good use; it is to have an open arcade towards New Palace-yard, and to be used as a shelter for horses and carriages instead of the shed or pent-house at present provided. The lower story or cloister of the other portion is to be an elongated *porte-cochère*, reached by a drive from the corner of New Palace-yard down to the south end of the cloister, turning sharp round into it. Doors will be provided with steps up into Westminster Hall from the cloister. In regard to this part of the work we have to observe that the turn into the cloister is inconveniently sharp for carriages, that the width of the roadway is 14 ft., and the clear height to the main beams of the floor above 12 ft. 6 in.; that the first dimension is a tight fit for large carriages to pass each other, which may at times be necessary, and that the height is equally a tight fit for the largest dimensions of carriage with the most imposing order of coachman. As to the upper stories, no use is suggested for them at all; there is only the general feeling that they are sure to come in useful. They would, however, come in more usefully if it had been settled for what they were to be used, and if they had been planned for that use. The fact is, the Law Courts have been removed before there was any notion what was to be put in their place, and now something must be put, useful or not.

The real use of the cloister building, in fact, according to the statement of the Report, is to preserve the old wall, and to restore what was there before. As to the first point one may ask, are the old walls to be left (the original portions of them) in their present state above and below? If so, they will look very unsightly, and the architect will be doing work in a way which no Mediæval architect would have been content with. We observe, by the way, that there is no indication in the plan of the upper floor as to what is to be done with Kent's odd-looking ogee-headed doorway, across which the new floor will cut. It is indicated below, but seems to have been forgotten above. Secondly, will the open cloister afford much better protection to the lower part of the wall than at present? We should say, not any protection worth the money to be expended (21,000*l.*), if that were the object. Then, architecturally speaking, what is the value of the idea that we are to have restored what was there before? We must entirely decline to admit any value to the proposed addition on that score. If a complete portion, a complete bay for instance, were left to go by, then the rebuilding of the rest to the same design would simply be completing a design which was incomplete. But it is not the case with this restoration. There is not a single existing bit of design for exact imitation. It is all inferential. It is a strong inference that *something of that sort* was there; that is all that can be said. It is absurd to say that we are restoring, even in design, what was there before. And therefore such so-called restoration is archæologically not of the slightest value, and to represent it as such is to "say the thing which is not." *Au reste*, Mr. Pearson's work is in true Gothic spirit, and looks solid and good. But it will not, as we are told it will, add anything to the architectural dignity of the exterior of the Hall. It hardly does so in the perspective drawing; and it will not look even as well as it does there. The level of the cloister will be far below the level of the public roads: it will stand in a hole, and be approached downhill; and it will be further hidden behind the tall and elaborate railing of the precinct, which must be continued on the same design, both for appearance and protection, but which in the drawing is artfully reduced to a low railing that a boy can look over (or climb over). That and the appearance of the levels we regard as a little bit of draughtsman's jugglery, to beguile the unwary spectator. Our conclusion is that a great deal of money is going to be spent on building which, except the shelter towards New Palace Yard, will be of little practical use or convenience; which will only half fulfil its proposed duty of protecting the exposed surface of the old wall; which is *not* a restoration, in the true sense, of what previously existed, and which, in its relation to the whole, has no architectural value commensurate with its cost. Bearing in mind that the Hall is essentially a central hall, that it was never meant to be seen all round, and that it probably was in former times hidden by buildings to the westward of it, a far more truly sensible architectural scheme would be to make use of the vacant ground for building a large range of committee-rooms and other buildings up to the street, which would be of real use, leaving a courtyard between them and the Hall, and then repairing the buttresses and old work of the wall of the Hall in a purely practical manner, rebuilding the buttresses and flying buttresses. The present scheme appears to us to rest on the assumption that the design of the Richard II. period was essential to the architectural completeness of the Hall, and was intended to be seen; whereas, we believe it was mainly utilitarian, as far as the buildings between the buttresses were concerned, and was very probably not seen, except from an enclosed courtyard.

The other portion of the scheme, the addition to and alteration of the north front of the Hall, appears to us to be desirable and an improvement. It is true, as we have seen it already well observed in a daily paper, that a "Hall" of this type has really nothing to do with a western façade and towers; but then on the north side it must always now remain open to New Palace Yard, and therefore can never again have the character of a central hall as far as that aspect is concerned. It has been all re-faced already, and, as the Report says, has "a spurious aspect," as well as looking somewhat mean in connexion with the rich architecture of the new "palace." The raising of the towers will give greater dignity to the whole, and will serve the intended object of connecting the north front better with Barry's adjacent work; and this part of the scheme, therefore, we can sympathise with and recommend.

## THE PENISTONE DISASTER.

WHAT are the lessons to be learned from the Penistone accident? The facts do not seem to be capable of much dispute. An ordinary express engine, with a four-wheeled bogie in front and four coupled wheels behind, is descending a gradient of 1 in 124, on a half-mile curve, and with a tolerably heavy train behind it. The speed is high,—something between forty and fifty miles an hour,—but not excessive. One of the cranks of the driving-axle breaks suddenly, right across the outside web. The connecting-rod flies round, digs into the ground, doubles up, and breaks off. The engine and tender are thrown into violent oscillation, lurching heavily, and the engine leaves the rails. The driver puts on his brake,—the ordinary vacuum,—and stops his engine in some 200 yards. The tender and a horse-box following it keep the rails, until the engine has nearly come to a standstill; but the violent lurching is, of course, communicated to the train and is intensified by the centrifugal force on the curve. Such an action would necessarily bring a heavy horizontal bending stress upon the heads of the draw-

bars connecting the carriages to each other. In this case the draw-bar between the horse-box and the first of the carriages yields to this stress, and is broken clean off close to the head-stock. The safety-chains fail to hold the train on the draw-bar breaking; the carriage separates from the horse-box, goes off the curve at a tangent, and takes the rest of the train with it. In a few seconds the whole is piled up in inextricable and hideous confusion at the bottom of an embankment, and a slaughter has taken place comparable to that of many combats recorded in the pages of history.

The first question to be asked is,—How came the crank to break, since this was undoubtedly the primary cause of the accident? This point also is quite clear. All the witnesses speak to the existence of a flaw in the web of the crank on the inside, extending some 2 in. into the metal. The surfaces were not rusty, showing that there was no opening to the outer air, and probably, therefore, no crack on the outside which could have been detected by the eye. The crank had, in fact, been properly examined but a short time before, and there seems no reason to suspect any neglect in the running shed. The axle, which had already run about 50,000 miles, was of "Best Yorkshire" wrought iron, supplied by Messrs. Taylor Bros., of Leeds, than whom no firm enjoy a higher reputation for this class of material. All engineers know that such flaws do occur, though rarely, in the very best wrought iron, and that no ordinary test or examination will necessarily detect their presence. Is the character of the metal itself in fault? Mr. Daniel Adamson, the chairman of the Manchester Ship Canal Company, who has written a lengthy letter to the *Times* on the subject, appears to consider that it is. He says, "The public mind should be disabused of the belief that proper security can be obtained with a very strong metal." We were not aware that the public mind had been abused by the introduction of any such belief, or, in fact, had formed any judgment whatever upon this point. But the criticism is itself a very curious one; for the metal in this case was the best and purest wrought iron, softer and more ductile than the "mild steel" with which Mr. Adamson would insist upon replacing it. Now, it is quite true that railway engineers, even in England, have very much come round of late to the expediency of employing mild steel for railway-axles. They admit that the treacherousness, the liability to hidden cavities, and sudden fracture, which were urged with much justice against ingot metal in former years, are no longer fairly chargeable to the mild steel made for such purposes as axles by our most eminent steel-makers. Still, it will be news to them that the metal is actually so far superior to the much more expensive material known as the best Yorkshire iron, that it should be in all cases substituted for it; and they are hardly likely to take a boiler-maker's dictum to that effect. In fact, the substitution of what is supposed to be a more uniform metal would be a matter of regret, if it were at all supposed to supersede the rigid system of inspection to which every axle is now subjected. What is really needed is some system,—could such be devised,—by which the occurrence of those hidden flaws which the very best metal made by the very best process will sometimes contain, should be rendered patent to the eye of an inspector. Is there any chance of such a system being devised? It is clear that chemical tests, on which Mr. Adamson would rely, are quite useless; they can tell nothing but the general composition of the metal. Electrical tests may possibly yet be used with effect. They were proposed some years ago, and have been revived lately by Professor Hughes, the inventor of the microphone. With his beautiful instrument, the "magnetic balance," he has proved that in wires or small pieces of iron, almost all peculiarities of the metal, including the existence of flaws, can be detected with ease and certainty. His invention has been freely given to the world, but hitherto the world (as usual) has been wholly indifferent to the gift. So far as we are aware no railway or marine engineer has taken any steps with a view to ascertain whether a similar system might not be applied to pieces of large size, such as those required in actual work. Failing this, mechanical tests in a proper testing machine do not seem impossible. If the axle which broke at Penistone, before having been set to work, had been subjected to a sudden cross-breaking strain, similar to that which caused its destruction, but very much below what it should be able to support with safety, we cannot doubt that the resulting deflection or bending would have been far greater than if the axle had been sound. What we would suggest, therefore, is that all crank axles, or other pieces of metal called to fill equally important positions, should be tested by strains similar to those brought upon them in actual work, and that their deflection under those strains should be recorded. A few experiments would be sufficient to show clearly how great this deflection should be in the case of a sound and perfect axle; and if any specimen showed a deflection decidedly higher than the limit, it should be rejected as of doubtful quality. The expense of such a system would not be great when it once became a regular part of the manufacture of an axle; and it appears to us the only method by which a single faulty specimen can be weeded out from a batch of sound and satisfactory articles.

The question of the use of the crank in the locomotive seems to require investigation. It is obvious that occasions of imperfection must occur in the forging of so complex a piece of ironwork as a double cranked axle, which are avoided in the manufacture of plain axles. The Returns of the Board of Trade, if duly examined, will show, or ought to show, whether in point of fact there has been any difference in the proportion of fracture of straight and of cranked axles, confining the inquiry to driving axles alone. The question of inside or outside cylinders, which is determinative of the use or the avoidance of a crank in the axle itself, is one on which much difference of opinion exists among engineers. But it is highly desirable that some authoritative decision should, if possible, be obtained as to the effect on the public safety of using or of dispensing with the cranked axle.

Leaving here the question of the crank, let us go on to consider the parting of the train at the coupling between the horse-box and the carriage. This was, in fact, the second cause of the accident, since, if these couplings had held firm, the whole would probably have been brought to a standstill with no worse evil than a good deal of shaking. Now, in the first place, it seems clear that the draw-hook was broken by a strain to which it is never supposed to be subjected. A draw-hook and draw-bar are made to resist a direct pull, such as is brought upon them in starting or running, and for this they may be amply strong. But there can be no doubt that the strain which broke the draw-bar at Penistone was a strain acting in a direction more or less perpendicular to the length of the train, and due to the violent horizontal lurching of the two vehicles connected by the draw-bar. Probably no engineer, in fixing the dimensions of his draw-gear, has ever taken account of this particular kind of strain; nor, in fact, would it be possible to say how great its amount may be. It is one of those cases which are altogether abnormal and exceptional, and, for that reason, all the more likely to be fatally disregarded. Secondly, it is well to note that a draw-bar having given way, the safety-chains should have come in to vindicate their name, and save the train from parting asunder. As a matter of fact, they failed to do so. Where they broke, and how and why, no witness seems to have thought it worth while to record. We have here a moral pointed for us which has been drawn over and over again,—the moral that safety-chains (which are well-nigh universal on the railways of the world) are in plain words "a snare and a delusion." It must be remembered that these chains are necessarily hung slack, and, therefore, whenever a strain does come upon them (which is, of course, very rarely), it is in the nature of a very violent shock. Such a shock seems almost always in practice to be sufficient either to fracture a link, or to draw the bolt from its fastenings in the head-stock. It will be well if English engineers should be taught by this terrible disaster to take heart, and abolish safety-chains henceforward; throwing the metal thus saved,—or, at least, some part of it,—into the neck and hook of the draw-bar, with a special view of rendering it secure, not only against a direct pull, but also against any cross-breaking strain, such as seems here to have proved so fatal.

Other lessons have been drawn by other parties, and may be taken for what they are worth. Thus Mr. Adamson, whom we have mentioned before, would insist on increasing the depth of our wheel-flanges from 1½ in. to 2 in., forgetful of the enormous expense which such a change would involve. Another correspondent in the daily papers lays all the blame on the fact that the horse-box had presumably four wheels; but as this horse-box kept on the line while the six-wheeled carriages failed to do so, his conclusion scarcely seems to follow from his premisses. More than one of our contemporaries has seized the occasion to proclaim once more the defects of the vacuum brake, and to imply that if the Westinghouse brake were in use on the Manchester, Sheffield, and Lincoln Railway, we should not have this disaster to deplore. We are by no means interested in the vacuum or any other brake, but considering that the draw-gear broke very shortly after the disturbance began, and that the carriages then went immediately over the embankment, we fail to see that any brake could have done much to mitigate the disaster. Other lessons will, no doubt, emerge from the details, when these are fully known and considered; but we are inclined to think that those we have touched upon will be found at least to be among the most important. They may be summed up as follows:—

First. Necessity for some method of testing, not a sample out of every lot of axles, but *every* axle which has to fill an important place, in such a way as will insure its freedom from serious defects. Secondly. The unconditional abolition of safety-chains, and an increase in the section of draw-bars, especially with a view to meeting cross-breaking strains no less than direct pulls.

## SURVEY OF WESTERN PALESTINE.

THE literary and graphic record of the survey of Western Palestine is now completed by the publication of two quarto volumes of memoirs, and an atlas of fifty plates. The volumes in question deal, one with the fauna and flora of Palestine, illustrated by beautifully-drawn and coloured plates; and the other with Jerusalem, containing upwards of eighty illustrations. The atlas, or rather portfolio, contains plans, elevations, and sections, showing the results of the excavations at Jerusalem executed from 1867 to 1870 by Captain (now Lieut.-Colonel Sir Charles) Warren, R.E.; and the amount of positive information that is thus brought before the world may be estimated by the fact that the first two sheets enclosed contain a plan showing the actual rock-contours of Jerusalem on a scale of $\frac{1}{2500}$, or 216·6 feet to the inch. Important as are all the records and descriptions of the ancient masonry, which are very clearly given in this series of plates, it is obvious that in the rock-contours we are presented with the very skeleton, so to speak, of ancient Jerusalem. The vast piles of rubbish, amounting in some cases to a depth of upwards of 70 ft., that have resulted from the successive overthrows and destructions of the city, have so far masked the original surface of the ground, that many points have been long and keenly disputed, the key to the right comprehension of which is at once given by the recovery of the ancient levels, which formed the starting-points of the early builders.

A special value attaches to the Jerusalem volume of the memoirs, from the fact that, while stating in the plainest manner the various points as to which such ardent controversy has so long raged, it does so without entering on the arena of dispute. Remarkable pains appear to have been taken to enable the

student to form his own conclusions from the rich mass of evidence now exhaustively brought before the world. The volume commences with a chronological synopsis of the history of Jerusalem, giving the chief events, from the date of the first recorded siege, or capture of the city by David, about B.C. 1044, to the execution of the Ordnance Survey, in 1864. As many as twenty sieges occurred during this period; that resulting in the capture of the city by Saladin, in 1187 A.D., being the twentieth. The last record of the walling of the city refers to the work of Soliman the Magnificent, in A.D. 1542; and the last record of destruction is that of the burning of the Holy Sepulchre Church in 1808.

The first chapter of the memoirs deals with the architectural history of Jerusalem, commencing with the remarkable scarps in the present British cemetery, which are thought to be a portion of the very earliest defences of the citadel. This chapter is exhaustive of the bibliography of this part of the subject; and is illustrated by a plate containing five plans of the Church of the Holy Sepulchre, referred to as,—1, Constantine, A.D. 335; 2, Modestus, A.D. 616; 3, Arculphus, A.D. 680; 4, Nicephorus, A.D. 1048; and 5, Baldwin, A.D. 1103.

The second chapter gives the history of Jerusalem exploration, citing the records that exist from the earliest Christian account of the city, given by the Bordeaux pilgrim in A.D. 333, down to the clearing out of the Muristan by the German Government (1872-74), and the exploration of the Zion scarp by Mr. Henry Maudslay, in 1874. This chapter is followed by a statement of the principal controversies, indicating the points relied on by the advocates of the different views. The ground is thus cleared for the historic description of "Explorations in Jerusalem," seven distinct chapters on which occupy the remainder of Part I.

Part II., on "The Environs of Jerusalem," commences with a key-map on the scale of 2 in. to a mile, showing the Arabic nomenclature, and new buildings, ninety-six indications being referred to in an accompanying table. This chapter opens by an account, illustrated by a tracing of a squeeze, of the very ancient Hebrew inscription discovered in a rock-cut tunnel in 1880. A short chapter gives copies or facsimile reproductions of the various ancient inscriptions as yet collected at Jerusalem; and Part II. concludes with a chapter on the Holy Sepulchre.

It is in this chapter, which has to be read together with that on the "Holy Sepulchre and Calvary" in Part I. (p. 112), that many persons will find the most intensely interesting result of the entire labours of the officers who have surveyed the Holy Land. With one important class of readers, to whom the weight of ecclesiastical tradition is conclusive, there is, of course, no question open. It is accepted by them almost as a matter of faith that the sites of the crucifixion and of the entombment were known to Constantine, and protected by that emperor by the church of which the successor yet stands. To those persons who do not take this view, two questions arise,—one is as to the site of the Church of Constantine, and the other is as to the reliability of the assertion that that church stood on the very site of the events which its erection commemorated. As to the first, no one but Mr. Fergusson, we are told, doubts that the basilica of Constantine stood on the site of the present Church of the Holy Sepulchre. Mr. Fergusson's view is founded on architectural considerations alone, and these are controverted by the Duc de Vogüé. It involves, among other difficulties, the rejection of all the statements of early writers on the subject, the assertion that the magnificent Kufic inscription round the Dome of the Rock is a forgery, and the theory of a change as to traditional identification of the spot somewhere about the eleventh century.

The question as to the accuracy of the indications given to, or by, Constantine, will to many people seem more perplexed than that of the real locality of the basilica reared by him. The writers on both sides are cited in the volume before us. But to those who regard Jerusalem as a military position, as well as to those also who are aware of the extreme rigidity of the Jewish law as regards places defiled by the death of a Jew, the rock-contour levels above referred to conclusively show that the site of the Holy Sepulchre Church is within the ancient, as well as the modern, city, and could not, therefore, have been the locality either of a place of execution or of a tomb. The traditional site of the place of execution by lapidation has now been recovered. It is on a knoll without the city, at a height of 2,550 ft. above the sea, or 110 ft. above the Sakrah rock in the Haram enclosure, and is surrounded by a sort of natural amphitheatre from which the entire population of the city could witness what took place. In 1881 a smaller knoll at about 200 yards distant from the former was found to contain a Jewish tomb,—of which a plan is given in the account, first published in 1881, which gives Captain Conder's reasons for suggesting that this may be the veritable site of the tomb of Joseph of Arimathea. All other proposed identifications shrink to nothing in their interest compared with that of the true Holy Sepulchre.

Plates 48 and 49 reproduce reconnaissances of the plain of Philistia, and of the Jordan valley, by Lieut. Warren, in 1867. Although superseded by more detailed work since, these sketches of the country have great historic interest, and show how, step by step, the Palestine Exploration Fund pushed forward to obtain that complete knowledge of Syria which is now before the world. Exploration east of the Jordan, as is but too well known, has been arrested by political events, but enough has been done in Moab to render clear certain points which had perplexed the officers of the survey in the Holy Land, such as the occurrence of certain hollows cut in the rocks at conspicuous stations. Such hollows have been found also east of Jordan, always associated with cromlechs, dolmens, or other megalithic remains; and the absence of the latter, but presence of the former, in cis-Jordanic Palestine, is held to point to the cleansing of the Holy Land from the structures associated with the pagan worship that prevailed before the Exodus.

Colonel Warren's plans are clear and exhaustive, and bring at once before the eye the result of an incredible amount of patient toil. The sections, as well as the plans, are drawn with that accurate skill for which the Royal Engineers are deservedly famous, and the drawings of the prodigious masonry yet standing in part of the wall of the noble sanctuary, or Temple enclosure, are beautifully finished, and faithful.

An appendix contains an account of the plain of Philistia, illustration of plate xlviii., by Colonel Warren, which was published in the quarterly statements of 1871; and one of the expedition to the east of Jordan, in July and August, 1867, illustrative of plate xlix. There is also a short notice of the pottery and glass found in the excavations, several plates of drawings of which are in the portfolio. The accuracy of the work, the fidelity of the records and sketches, the exhaustive examination of the country, and the faithful attribution to each member of the successive exploration parties, of his own work, combine with the excellence of the work of the printer and of the engraver, to make this volume a worthy monument of an exploration that does honour to our country and our era.

The excellent volume on the fauna and flora of Palestine is unhappily deficient in having neither table of contents, index, nor list of illustrations. The latter include beautiful coloured plates of the *Hyrax Syriacus* (the coney of the authorised version); the Syrian Bedin or ibex (the wild goat of the authorised version); six species of Acomys, or field mouse, and kindred species; the mole rat (*Spalax typhlus*); and the quaint little jerboa (*Dipus Hirtipes*), among mammalia.

The birds are illustrated by the white-throated robin (*Erithacus gutturalis*); the lovely Palestine sun bird (*Cinnyris osea*), cock, hen, nest, and young; Tristram's serin (*Serinus canicollis*), and the Moabite sparrow (*Passer moabiticus*); the Desert rock sparrow (*Petronia brachydactyla*), a rare bird; the orange-winged blackbird, or Tristram's grakle, a species peculiar, as far as is known, to the immediate neighbourhood of the Dead Sea; a night-jar of peculiar colouring (the *Caprimulgus tamaricis*); and a curious and admirably-drawn species of darter (the *Plotus Levaillantii*), which haunts and fishes in the Lake of Antioch. Three plates of reptiles and four of fishes, uncoloured, complete the illustrations of the volume, which is from the pen of Canon H. B. Tristram.

## NOTES.

THE Committee appointed to consider the laying-out of Hyde Park Corner have stated that they are now in a position to invite subscriptions for three specified objects:—1. The laying-out of the *place* architecturally with suitable decorations, including candelabra. 2. The completion of the arch in the manner originally designed by Decimus Burton, with bas-reliefs round the "pediment" (query—podium"?), and the erection thereon of a quadriga in bronze carrying a figure of Victory. 3. The provision of a suitable pedestal for the existing statue, and its erection thereupon at Aldershott. As to the latter item, we have already said that we consider it the best proposition that has been made for dealing with the colossal statue. As to the second proposition, having for years repeatedly urged that Burton's design should be completed according to his original intention, we are glad that this should be carried out, although we may observe that the suitability of such a termination to the arch is greatly lessened now that it is removed from its position as part of a monumental approach to London, and reduced to a mere park entrance, connected with nothing, and grouped with nothing else on the site. As to the first point, the laying out of the site, it seems to us perfectly unreasonable for the Committee to expect any subscriptions until they publish a plan showing what they mean to do, and no plan can possibly be satisfactory which does not commence by starting afresh, and obliterating all the lines of the present so-called "laying out" of the *place*, which is simply an estate agent's plan of the most commonplace description.

THE question put to the Chairman of the Metropolitan Board of Works by Mr. Gray, in the House of Commons, on Monday last, refers to what appears to be a serious defect in the law affecting the construction of large buildings in the metropolis. A large hotel is in course of erection in Northumberland-avenue, with a lofty curb roof containing two stories, and in parts three stories of rooms, these rooms being enclosed with wood covered externally with slates. Sir J. McGarel-Hogg, in reply to the question, informed Mr. Gray that the building was constructed in accordance with the Metropolitan Building Act, and that if any alteration in the law was required it could only be effected by special legislation. In America the disastrous fire in the city of Chicago called the attention of the authorities to the danger from fire resulting from the construction of several stories in roofs composed almost entirely of inflammable materials, and the employment of Mansard roofs was forbidden unless wholly constructed of fire-resisting materials. The use of this form of roof has been hitherto restricted in this country, but there appears to be a growing disposition to adopt it in the case of large buildings, and it is well that attention should be called to the ease with which fire may be communicated from one building to another by this means.

THE "Sanitary and Insanitary Houses" at the Health Exhibition will be open to the public next week, and on the method on which they have been arranged, will probably prove the most really instructive item in the whole exhibition, if visitors take advantage of the opportunities of instruction afforded them. The houses are arranged so that visitors enter

at the ground floor of the Insanitary House, and, after passing through its various attractions up to the top floor, they cross over to the Sanitary House, and descend through it. Every item in each house will have a label attached to it, and a small handbook is in preparation bearing the corresponding labels as marginal headings, accompanied by a short paragraph, giving, in plain language, the reasons why each arrangement is good or bad. The sub-committee for getting up the houses, consisting of Captain Galton, Professor Rogers Field, Professor Corfield, Mr. H. H. Collins, and Mr. Ernest Turner, have had an uphill fight to get the site and the money for erecting the houses; and great credit is due to them for the result, and for the manner in which it has been worked out.

THE current number of the *Quarterly Review* contains a readable article on Mr. Fergusson's "Parthenon" and "Temple of Diana," generally supporting his views, especially in regard to his very ingenious explanation as to the number of columns in the Temple of Diana, and the means of providing for the number specified by Pliny, to which we referred in reviewing Mr. Fergusson's work a little while since. The Reviewer calls this suggestion of the nine-columned back elevation of the temple, as supplying the uneven number (127) in the text of Pliny, "a stroke of real genius," and the expression is just. The article suggests nothing new in archæological criticism. The writer has made a very absurd slip in representing Bacon as saying that some ancient monuments were to be "chewed and digested." Bacon never used a simile which, in relation to a temple, would seem so absurdly far-fetched. He used it of the contents of books, "some of which were to be tasted, some swallowed," &c.

ACCORDING to Mr. Bailey Denton, the minimum flow of water at Teddington is 450 million gallons daily; but it is doubtful if even that quantity has been available during the last two months. Mr. Phillips Bevan, whose pamphlet was reviewed lately in the *Builder*, states the average daily supply taken in January last for the supply of the metropolis by the several companies from the Thames to be nearly seventy-one million gallons; so that Mr. Labouchere's estimate of one-seventh is below the mark; while that assumed by Mr. Thrupp,—viz., two-thirds,—is altogether beyond it. That there should be some central authority for controlling the river Thames we are quite prepared to admit; but that a dictatorship should be accorded to Sir C. Dilke for that purpose, as suggested by Mr. Labouchere, is not quite apparent. As we have already more than once advocated, the real remedy for dealing with the water question for this country is the constitution of a Government Central Authority, to whom the regulation of the entire water interests of the kingdom should be entrusted, and to whom all questions of supply, drainage, floods, or transit should be submitted. The piecemeal legislation which has hitherto characterised our proceedings in those questions has been at the root of all our difficulties, and until this has been remedied by taking up the subject of water regulation as a whole, there seems but little prospect of their being satisfactorily solved.

THE indifference of the Government to the appearance of our public buildings is already sufficiently illustrated by the additions to the National Gallery and the Old General Post-office, where the sky-line has been destroyed by mean and incongruous excrescences; but if an additional proof were wanting of the disregard of art by public bodies, it is furnished by the recent erection of an iron shed on the inclosed space in front of the east wing of the National Gallery. The so-called "finest site in Europe" has been disfigured from time to time, first by a preposterous monumental column placed in its midst, then by the addition of commonplace statues on pedestals of different heights and sizes, then by the erection of a gigantic hotel overshadowing and dwarfing everything; but the crowning abomination is the erection of this iron shed. The trustees of the National Gallery are men of culture; they are not unmindful of the appearance of the interior of the building in which the national pictures are kept; but they exhibit very little concern for the symmetry of its exterior.

THE Treasury have agreed to give the sum of 5,000*l.* towards the purchase of a site in Edinburgh for the New Museum of Antiquities and National Portrait Gallery of Scotland. The design for the new building (the cost of which, amounting to 20,000*l.*, was, as formerly stated by us, contributed by an anonymous donor), has been entrusted to Dr. Rowand Anderson. The loan exhibition of national portraits, in the rooms of the Royal Scottish Academy, continues to excite public interest. The works of Raeburn gain in public estimation both on account of their technical excellence and the truthfulness and force with which the characters of the sitters are brought out. Sir John Watson Gordon is equally happy in the latter respect, but is far behind his predecessor as regards dexterity of handling and brilliancy of colour.

THE fifth Congress of Italian Engineers and Architects will be held at Turin, from the 22nd to the 29th of September next. Foreign architects or engineers will be admitted on making application conformably to certain regulations, which may be obtained from the Secretary of the Societa d'Ingegneri, &c., at Turin. Free entry into the rooms of the latter society will be accorded, during the period of the Congress, to any architect who brings a letter of recommendation signed by the President of the Architects' Society to which he belongs. Although Turin is not one of the special seats of early Italian architecture, there will be doubtless much to learn during the Congress, by any English architect who may find his way thither at the end of September, by which time we may hope that all fear of cholera will have disappeared.

ACCORDING to a well-informed correspondent, the show of sculpture in competition for the Wallace Memorial at Aberdeen, the designs for which were exhibited last week, was of a very inferior description, confirming what seems to be pretty nearly an accepted fact, that sculptors of eminence decline entering into such open competitions, where they have little chance of gaining either honour or more solid recompense. A limited competition to a certain number of eminent artists, by invitation, and with a fee to each competitor, would possibly have produced a very different result.

A DEPUTATION from the Society for the Protection of Ancient Buildings inspected, on Monday last, by permission of H.M.'s First Commissioner of Works, the drawings prepared by Mr. J. L. Pearson for the restoration of the west side of Westminster Hall, which are deposited in the library of the House of Commons, and afterwards made a minute examination of the buttresses and the exposed portions of the west wall of the building, accompanied by Mr. Taylor, of the Office of Works. The Society have it in contemplation to prepare a memorial to the Government with regard to the proposed additions to the hall and the treatment of the western wall, the greater portion of which is the work of Rufus, the original surface and the mason's marks remaining intact. If we read aright Mr. Pearson's report, however, the preservation of the original state of the wall is precisely one of his objects.

EVEN in these days of general dispersion of heirlooms it is not often that a genuine Mediæval castle finds its way into the market. But at the present time there are two properties of, at any rate, feudal importance offered to public competition. One of these includes the extensive ruins of Middleham Castle,—a fortress peculiarly rich in historic memories. The Norman keep, built by Robert Fitz Ranulph soon after the Conquest, is almost the only part of the original structure that has survived, and is a grand specimen of massive masonry. Its dignity, however, is somewhat impaired by the great height of the buildings by which it is enclosed, and which were erected,—chiefly in the fifteenth century,—to suit the sumptuous tastes and larger requirements of the Nevilles. The castle was often the residence of royalty. Richard Neville, Earl of Warwick,—the great "king-maker,"—entertained within its walls the ill-fated Edward IV., whose brother, the Duke of Gloucester, afterwards Richard III., made it his frequent abode. It will be remembered that he married Warwick's daughter and heiress, and it is said that their only son, Prince Edward, drew his first and last breath in Middleham Castle. After this period the building seems to have fallen into decay, and its ruin was completed in 1646 by the Parliamentarian troops who did their work of destruction with characteristic thoroughness. To make the castle again fit for residential purposes is, of course, now out of the question, but there is much to be said in favour of its being acquired by the nation and placed under suitable custody. Independent of its claims to preservation, as the sometime residence of the last of the royal Plantagenets, it has an interest as having been the home of "the Last of the Barons," and, therefore, in a double sense, classic ground.

THE other property, better known to artists than to historians, is Boscastle (*i.e.* Botreaux Castle), on the north coast of Cornwall. The ruins are in themselves insignificant, and the memory of their founder is almost extinct, but the name still preserves some faint reminiscence of the baronial family of Botreaux, which was settled in Cornwall as early as the reign of Henry II., and sent one of its members as a Baron to the Parliaments of Edward III. The site is wonderfully beautiful and romantic, not far from Tintagel and other spots familiar to lovers of the picturesque and students of Arthurian lore. It may be added that Goodrich Court, which the late Mr. Blore erected for Sir Samuel Meyrick, is also offered for sale. The architect was very fairly successful in his effort to reproduce an externally faithful copy of the castellated architecture of the Edwardian era. The internal arrangements are, of course, far from being Mediæval, and the famous collection of armoury is no longer a part of the treasures of the Court. Contiguous to it, but not within the limits of the estate, are the beautiful ruins of Goodrich Castle, which every tourist has seen.

## THE CHÂTEAU OF CHANTILLY.—I.

THE complete reconstruction of the Castle of Chantilly marks a date in its history, and adds to the interest felt in it by those whose imaginations have been kindled by a visit to this famous residence of the Constable Anne de Montmorency and of the great Condé. Each of these two great commanders, at an interval of two centuries apart, took up his residence at Chantilly, and employed his leisure in improving and beautifying it. Natural conditions of the soil have given to the Castle of Chantilly a character surviving all changes of style, taste, and fashion, and have influenced even those modifications imposed by the habits and necessities of modern life. The same conditions having also necessarily dictated the architectural course which has been adopted, it will be indispensable to our present purpose to examine them, as a means of tracing the reason and origin of much that has been done.

About twenty-five miles north of Paris, and two miles and a half from Senlis, in what was formerly the Isle de France, and is now the Department of the Oise, Chantilly rises from a varied, gently undulating, park-like country, on the borders of extensive forests. A rapid stream, La Nonette, formerly flowed through the marshy tract in the midst of which there rose abruptly an irregular mass of limestone rock, doubly protected by its height and by the stream surrounding it. These favourable conditions caused the spot to be chosen as the seat of a habitation as far back as the tenth century. Without carrying our researches to so early a period, and confining ourselves to feudal times, we find proof in various charters that in 1263 the fortified castle on the rock was a dependence of the

family of the Bouthilliers, who held office under the Counts de Senlis, their feudal lords.

Through William IV. de Bouthilliers, the castle descended to Jean de Clermont, Chancellor of France, who was killed at the battle of Poitiers; and by his will it passed to Guy de Laval (1356). From Guy de Laval it came to Pierre d'Orgemont, Chancellor of France and President of the Parliament; it was in his time that the Burgundians took possession of Senlis (1422), and when the English forced their way to the Isle de France (1425) Chantilly resisted and fell, being included in the list of fortified castles which were to be occupied by an English garrison. In 1429, when Charles VIII. reconquered Compiègne, Chantilly was restored to the d'Orgemonts.

Four years after these rude vicissitudes, Pierre d'Orgemont, third of the name, dying without issue, bequeathed the estate to Jean II. de Montmorency, grand chamberlain of France; and this is the origin of the possession of the fief by the Montmorency family (1429). Jean II. was succeeded by his son Guillaume, and Guillaume by Anne, who was born at Chantilly in 1493, and who was destined to become in course of time Grand Constable of France, the builder of the Chantilly of the Renaissance.

It was the end of the period of the Middle Ages,—that troublous time when part of the soil of France was still occupied by the invader,—and before the grandson of Jean II. had come to man's estate, France was in the full current of the Renaissance, Ravenna, Pavia, and Marignan had been fought, and Charles VIII., Louis XII., and Francis I. had made those famous expeditions into Italy which were to exercise so important an influence on the progress of French art.

There is every reason to believe that from the d'Orgemonts to the Montmorencys Chantilly retained its original aspect. It was in 1538, at a time when he was estranged from the Court, that Anne de Montmorency conceived the project of rebuilding the castle. The invention of artillery had rendered the means of defence proper to the Middle Ages practically useless; the greater or less elevation of a position no longer influenced its safety, nor was the depth of its trenches of the same consequence as heretofore. Notwithstanding the religious and civil wars which desolated France up to the close of the sixteenth century, the age had become more secure; the feudal system was overthrown, and the attitude of the nobles was no longer that of defence against a more powerful neighbour; the spirit of individualism and of adventure was, in fact, extinct. Architecture, the faithful mirror of the manners of the age, reflected alike in the planning and in the construction of buildings the changes which had come over the social conditions of the country.

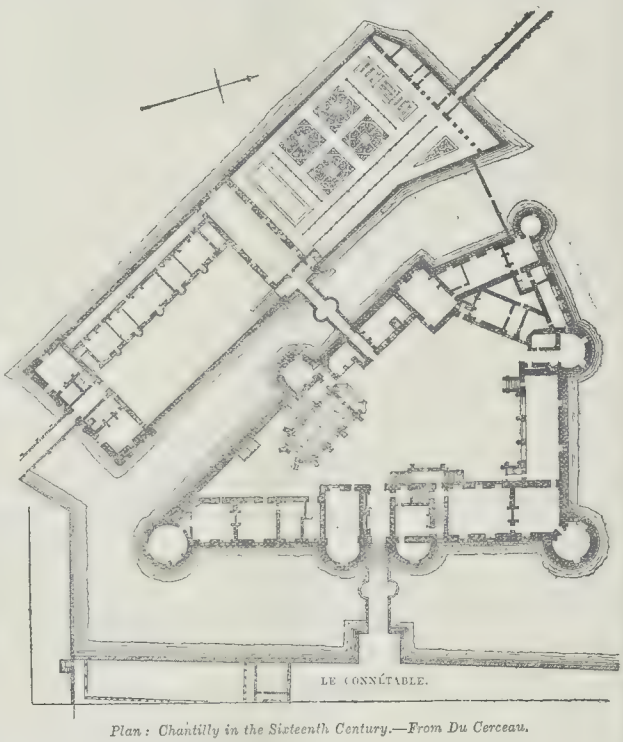
This is not the place for sketching the rough, soldier-like features of the Constable Anne de Montmorency. Inflexible alike to himself and to others, incorruptibly faithful to his country and his sovereign, Anne is the last man of the Middle Ages, the first "Grand Seigneur" of the Renaissance; the transition between the two periods is faithfully represented by the union in his character of brutality, violence, and egotism with high aims and strong feelings of duty and personal dignity. Rising to the highest political and military honours of the state, and possessed of an immense fortune, he resolved to transform the fortress in which his youth had been passed, and whose bare, stern walls were still pierced with the blows of the Burgundians and the English, into a castle worthy of his wealth and grandeur, bearing the impress of that taste for the fine arts which he had acquired during his campaigns in Italy.

In the time of the Bouthilliers, of the Clermonts, and of the Orgemonts, Chantilly Castle rose from a triangular-shaped rock, surrounded on all sides by the river, whose course was accurately followed by the lines of the buildings. These were built round an interior courtyard, and abutted at the three corners against large towers of defence. Beneath the ground-floor, which was on a level with the flattened summit of the rock, vast subterranean chambers were hollowed out, forming a complicated network of passages, hiding-places, covered communications, and rooms for domestic purposes, and for the use of the Corps de Garde. This part of the castle was lighted from the trenches, which were steep, and it formed a solid and majestic base for the massive erection above. The limestone rock upon which the castle was built communicated with the plain below by a natural incline of very gradual ascent, which gave easy access to the east front. On the north side the slope ceased abruptly, and was replaced by huge steps cut in the steep rock. Whether natural or artificial, this terrace still exists, and is known as "Le Connétable." It gives access now, as formerly, to the principal front of the castle, which was isolated by means of a wide moat, and connected, both in the building of the Middle Ages and in that of the Renaissance, by a drawbridge between two towers, whose massive buttresses can still be traced.

Androuet Ducercean, in his celebrated work published in 1579, "Les plus excellents Bastiments de France," has preserved the plans and elevations of the building with which the Constable Anne de Montmorency replaced that of the Middle Ages. He summoned the aid of a young man named Jean Bullant, who had lately returned from studying the monuments of antiquity in Italy, and was already reckoned among the distinguished architects of the day. Jean Bullant was associated with Philibert Delorme in the building of the Tuileries, and he it was to whom Catherine de Medicis entrusted the erection of her famous "Hôtel de Soissons" in Paris, of which one tower, intended for astronomical observations is still standing close by the "Halle aux blés." He added to his fame by two great works undertaken for the Constable, at Chantilly and at Ecouen.

Obliged by the nature of the ground to retain the triangular enclosure, and desirous of profiting by the labours of the engineers of the Middle Ages who had excavated the subterranean buildings, Jean Bullant contented himself with introducing the richer style of the architecture of the Renaissance into the façades opening upon the interior courtyard, and kept the massive towers of the exterior, which gave the castle its character as a fortified building. The Constable had a large family, a numerous retinue, a military establishment, and body of troops, for whom accommodation had to be provided; the architect, therefore, came beyond the walls, threw a bridge over the moat, and selected a site on the south-west (at a much lower level than the castle, of course) upon which to erect an annexe. This is the "Châtelet," the upper story of which corresponds with the ground floor of the old castle. The subterranean buildings were brought into the plan, and being enlarged by continuing the excavations in the rock, were made use of for all the household, civil and military offices. We may date from this time the truly exceptional importance of these vast subterranean chambers, so spacious and comfortable, as to remind the visitor of the similar structures at the Palais de Justice.

The plans preserved in Du Cercean's work give us the Chantilly of the Renaissance as it was, and relieve us from the necessity of studying the edifice of Jean Bullant in detail.




*Plan: Chantilly in the Sixteenth Century.—From Du Cerceau.*

One point, however, we must take note of, viz., the means of communication between the subterranean chambers and the terrace called "Le Connétable."

An agreement with the builders, bearing date 1538, proves that Jean Bullant, by equalising the steps of the terrace, underpinning the retaining walls upon the trenches, decorating them with gurgoyles to carry off the rain, and probably also by re-arranging the subterranean passages and chambers, gave to that part of the building the massive aspect it has ever since retained; it was he who christened it "Le Connétable."

Anne de Montmorency, dying in 1567, left his castle to his children, and it was in possession of his grandson, Henri II., Governor of Languedoc, Maréchal de Montmorency, when he was made prisoner at Toulouse in rebellion against the king; he was beheaded in 1632. This Montmorency married an Orsini, who, having been educated in Italy, had brought with her the architectural ideas of her country. It was she who directed the construction of the grand staircase on the north side of the castle, leading to "Le Connétable," and thence to the gardens and the ornamental water. The great allegorical groups of statuary peopling the niches, the huge vases, the heavy columns adorning this majestic staircase, remind us of the Florentine artist Ammanati, and of the gardens of the Pitti Palace, and other Italian villas. The staircase itself served as a colossal pedestal for the equestrian statue of the Con-

stable, which was overthrown during the Revolution. The rebellion and execution of the Maréchal de Montmorency led to the confiscation of his property; but Louis XIII. restored Chantilly to Charlotte de Montmorency, sister of the Maréchal, and she brought it as her dowry to her husband, Henri de Bourbon, Prince of Condé, father to the conqueror of Rocroy.

The great Condé (1621—1682) wrought a complete transformation in the architectural aspect of Chantilly, and this he accomplished under much the same political circumstances as those which had influenced his famous ancestor, the Constable Anne. He, like the Constable, was at the time living in retirement on his estate, suspected by the Court, and holding aloof from public affairs. At the commencement of the seventeenth century Chantilly still represented the refined age of the Renaissance, with a reminiscence of the Middle Ages; the great Condé succeeded in making it a striking example of the new architectural period that has received the name of the reign which witnessed its birth in France, and the grandeur, the magnificence, and the theatrical ostentation of which it so faithfully reflects. We must not neglect to note one circumstance of some importance in the history of French architecture. Chantilly Castle and gardens are of earlier date than Versailles, and, great as may be the disproportion between the two, it is, nevertheless, certain that it was after his famous visit to the conqueror of Rocroy at Chantilly that Louis XIV. determined upon employing Lenôtre to lay out the gardens of Versailles.

Condé rebuilt the whole castle with the exception of the Châtelet, the exterior of which was left untouched, while the interior was decorated according to the taste of the age. It was no more possible for Lenôtre than for Jean Bullant to ignore the conditions imposed upon him by the nature of the ground and the successive works of his predecessors in the solid rock. The triangular inclosure remained; even the corner towers were left standing, contrary as this was to the prevailing taste; those which broke the principal façade, right and left of the only entrance by the "Connétable" were razed to the height of the drawbridge, which was done away with and replaced by a front, resembling in its main features the porch of the Invalides.

Magnificent as were the proportions of the new building, its lines were of an extreme simplicity; the central design was crowned by a high-pitched roof with trophies at the two corners; the façade to the right and left consisting of a ground floor, an upper story, and a "Mansard" story, in the style of that at the Invalides, was pierced by windows (without architraves), with a balcony extending the whole length of the front. The building abutted at its northern and southern extremities upon the two corner towers, which were surmounted by observatories.

The plan of the Louis XIV. building was extensive and of magnificent proportions. Air was admitted to the subterranean chambers, the passages were widened, the military offices swept away, to make room for that exclusive attention to the "service of the table" which was required in order to provide, at any given moment, for those sumptuous banquets described by Madame de Sévigné which the tragic death of the "great" Vatel has rendered famous in history.

The principal staircase to the upper stories, placed in the southern angle of the court, was of enormous proportions; so also were the rooms, which all, from the antechambers to the galleries and the cabinets, bore the name of the king.

As we have already said, the Châtelet alone preserved its architectural character, the great Condé making it his personal habitation. The vast hall which looked upon the "Pêlouse" (the race-course) was magnificently decorated in the taste of the time, and entered from the famous "Salon des Singes," a unique example of a witty idea rendered by a skilful pencil. The Prince caused the warlike achievements of his father to be depicted on the walls of the great hall, leaving space for his successor to add the representation of the battles which had been won by his own valour.

Our space, too limited for its proper purpose, will not allow us to describe the gardens laid out by Lenôtre; it is only possible to do justice to their magnificence by examining the series of engravings of the seventeenth century, which illustrates the royal visits to Chantilly. Anne de Montmorency had the genius of construction; the Condés, by tradition, loved gardens and the chase; nor can it be denied that they loved show also, and sometimes mistook size for grandeur. This was notably the case with Louis Jules Henri de Bourbon, who, between 1719-1735, built the famous Chantilly stables of such unreasonable size that they ran the risk of spoiling the effect of the main building, had it not fortunately been preserved from so great a disaster by the distance of the stables, and the diminishing effect of the perspective. This pompous Bourbon had acquired enormous wealth by the timely sale of his shares in Law's famous bank, which had taken up its quarters in his own hotel in the Rue d'Avoye, "L'Hôtel de Montmorency," called for the nonce "L'Hôtel de la Banque du Mississipi." The Château d'Enghien, built in 1772 in the space of four months, on the occasion of the birth of a Duc d'Enghien, lies to the east of the great castle towards which it turns its regular and finely-proportioned front.

At the time of the French Revolution Chantilly Castle, notwithstanding some alterations in detail, presented the same general appearance as in the time of the great Condé. An engraving of the 9th of August, 1789, representing the Revolutionary troops coming to take the cannons from Chantilly to arm the population of Paris, shows the castle as it existed on the eve of the great overthrow which was to leave no stone of it standing upon another.

The Reign of Terror came. The Condés emigrated; the Chantilly estate was sequestrated, together with the majority of princely residences in France; the collections were dispersed, the statues destroyed; that of the Constable, represented as a hero of antiquity, his naked sword in his hand, which was placed on the "Connétable," was broken up; so were those of Henry IV., of Louis XII., and of the great Condé himself, the work of the sculptor Coysevox. The Museum of Artillery, which was said to contain a precious relic, the armour of Jeanne d'Arc, was dispersed; its principal contents, recovered at a later date, now form part of the Museum of the Invalides. The castle was converted into a prison under the Terror, and 1,100 prisoners were incarcerated there; then the "black band" took possession of it, and dismantled it; finally, it was destroyed stone by stone, and the Châtelet was on the point of disappearing in its turn, when it was discovered that the possessors had not observed the terms of the bargain made with the State. The Ministry of War thereupon claimed the building for the use of the army, and a troop of cavalry was installed there; thus the great stables, the Château d'Enghien, and the Châtelet were saved.

Then came the Restoration (1815). Prince Joseph de Bourbon returned to France, and revisited Chantilly. The great castle was razed to the ground, and the cleared space levelled and enclosed by railings. In 1820 the last of the Condés, grand master of the hounds, who was fond of Chantilly, restored the Châtelet. It was then that a change was made of considerable importance in the history of building. From 1538 to 1820 the Châtelet was cut off from the upper castle by wide trenches and a drawbridge. These trenches were now filled up, and the two islands, upper and lower, were made into one. Other works were carried out of little interest from an architectural point of view, and the prince, who had hitherto resided at St. Leu Taverny, had determined to take up his abode at Chantilly when his sudden death put an end to his intention. By a will, dated August 30th, 1829, the last of the Condés appointed as sole legatee his great-nephew and godson Henri Eugène Philippe Louis d'Orléans, Duc d'Aumale. The same will directed that the castle of Écouen, Jean Bullant's *chef-d'œuvre* (also built by the Constable Anne de Montmorency) should be converted into a charitable institution. As such it is now in the hands of the administrative council of the order of the Legion of Honour. The final reconstruction of the castle of Chantilly was the work of the Duc d'Aumale.*

**The Alexandra Palace.**—It is stated that the London Financial Association, as owners of the Palace and grounds, have let the Palace and the south portion of the park (exclusive of the racecourse) for exhibition purposes.

* To be continued.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

THIRD NOTICE.

AFTER passing the South African exhibits we come upon the Indian collection, which occupies the remaining bays of the central avenue to the right until the central transept is reached, of which it also occupies the whole south wing. It has been admirably arranged under the directions of Colonel Michael, C.S.I., who is considered the founder of practical forestry in India. The collection is the largest exhibited, and contains some splendid specimens of wood, every article being specially labelled, a practice which might have been generally followed with advantage. The "Index Collection," which has been sent from Calcutta, comprises about 800 specimens of trees from the various portions of India which have been alphabetically arranged and the geographical locality marked on each. From Bombay there is sent a fine collection of woods, which are cut so as to show the grainings and texture of the timber, both in its rough state and when varnished. There are important contributions from British Burmah, and amongst these are beautiful specimens of teak contributed by the Bombay Burmah Trading Company. In preparing teak (*Tectona grandis*) for export the logs are sawn into squares. A market has to be found for such scantlings as can be cut from the slabs. The larger scantlings thus obtained are easily disposed of, and a fair price is obtained, although considerably below what the cost would be if cut of equal quality from the squares which form the bulk of the shipments. For any small sizes, however, say 6 × 1, the supply is considerably in excess of the demand, and such material can always be had in the principal markets of India at less than half the cost that would produce them cut from the square.

The logs shown are as imported to the European markets, but especially dressed and polished for exhibition. One is remarkable for its extreme length, the difficulty of bringing such very long logs from the forests being very great. Teak planks are principally taken off the sides of the logs during the process of conversion from the rough state into merchantable squares, and are much cheaper than if taken from the squares, while the quality is, if anything, superior, as the best wood is that nearest the outside. Teak is exclusively used for making wheel blocks, for the filling in of Mansel's patent railway carriage-wheel, which has for many years been considered the best for passenger carriages, as it is the only wood which will stand the tear and wear to which the wheel is exposed. The blocks are shown in their rough state as imported, and also in segments ready for use. A complete Mansel wheel is also shown. Teak railway keys are rapidly coming into use throughout Great Britain, the peculiar characteristics of this wood rendering it extremely useful and economical for this purpose, it being unaffected by heat, dryness, or moisture, while it is the only wood that can be used in close contact with iron without injury to either. The patterns shown are those used by three Scotch railways, and it will be noticed that two of those patterns are slightly tapered, the advantage of this form being that, while the keys can be more easily and firmly fixed into the chair, the wood retains all its elasticity. In the process of compressing and black-leading, which is generally a necessary feature in the manufacture of parallel keys (the form hitherto used in Great Britain), the valuable elasticity is greatly destroyed. From the small and refuse material are made step-ladders, and easels (the "Hatherly" patent), which from the lightness and rigidity of the wood are highly commendable. Two specimens of Robb's patent flooring are shown; one pattern is a sample of flooring for outside work, halls, &c., where considerable strength and great durability are the essentials; the other exhibits the patent as applied to flooring for public rooms.

The manner in which this wood can be employed in the most delicate work is shown in carved panels, cabinets, mantel-pieces, and articles of furniture. The Black-wood is another valuable tree largely used in the manufacture of artistic furniture, admirable examples of which are exhibited by Messrs. Proctor & Co., of Oxford-street. The Sisoo is another useful tree for wheel-work, it being related that the wheels of gun carriages which went through the tear and wear of the Afghanistan campaign

came back to India without a break-down having been recorded.

Amongst the specimens from the Andaman and Nicobar Islands is a slab, of great size, of the Poon (*Calophyllium Inophyllium*), having a colour similar to that of light polished mahogany. Another tree, of which there are beautiful logs, is the Padowk (*Pterocarpus indicus*) varying greatly in colour, some resembling cedar, others dark mahogany, and others having a dark scarlet tinge. Amongst the indigenous trees of these islands is the marble-wood (*Diospyros Kurzii*) with streaked markings of black and grey, which is used for cabinet-work. Fine specimens of ebony come from Travancore, which display the black heart-wood surrounded by the lighter coloured sapwood. The luxuriance of vegetation in the Indian peninsula is exemplified by the bamboos exhibited, some of which exceed 80 ft. in length. Other interesting products derived from the Indian woods are medicinal barks, gums, resins, oils, perfumery, and dyes. The collection would be incomplete without examples of the native carved work, interesting specimens of which are lent by Sir Philip Owen and by the authorities at South Kensington Museum. Her Majesty and the Prince of Wales lend heads of forest animals, and His Royal Highness and suite are shown taking part in a tiger hunt, in a picture which gives a graphic idea of the situation, the odds against the wild beast appearing tremendous.

In an interesting preface to the catalogue of the Indian exhibits, Sir George Birdwood, C.S.I., gives to Edinburgh botanists the credit of having first called attention to the necessity for forest conservancy in our great Eastern Empire. About thirty years ago the Department of Forestry was originated by the East India Company, an impetus having been giving to this important movement by the report of a committee on tropical forests, which was appointed at the Edinburgh meeting of the British Association in 1850. The grand primeval forests were up till that time subjected to wasteful clearing, a process which would in time have subjected large districts to a state of barrenness, as has been done in Afghanistan through the disforesting of the uplands of that once fertile country. The Indian Forestry Department is now a great State institution, giving employment to thousands of natives, whose work is exerting an ameliorative influence on the climate and physical conditions of the country. As a result of tree-planting along the frontier towards Afghanistan and Beloochistan, it is interesting to learn that within the last ten years there is a gradually increasing annual rainfall in the Punjab and in southern Afghanistan, northern Beloochistan, and Scinde. Not only has this result followed, but it also appears that the Forestry Department has proved a financial success. Before 1848, we are told, the forest revenue was trifling. In 1881-2 it exceeded 874,000*l.*, the expenditure being 557,000*l.*, leaving a surplus of no less than 317,000*l.*, and by the development of the vast resources of the country this source of revenue may be greatly increased. The area of the reserved forests of India is 40,000 square miles, that of the unreserved has not yet been ascertained. The surveying of the Indian forests is being rapidly pushed forward under the directorship of Major Bailey, R.E. During the past year 361 square miles were plane-tabled on a scale of 4 in. to the mile, and 83 square miles triangulated; and the result of these labours may be seen on the walls of the Indian Court, in the shape of over 100 excellent maps.

## THE NEW "MADAME TUSSAUD'S."

THERE is nothing to detain the mere student of architecture in the new building which now gives shelter to the famous wax-work show. It is not Gothic, nor, indeed, of any other assignable style, yet it illustrates one principle of Gothic design,—it is eminently constructional. Within is a long room; without, a long box. The whole building is admirably suited to its purpose. It is lighted, as it should be, from the top; the effect of its glass domes is not displeasing, and some art has been shown in relieving the monotony of the long expanse of the south wall. The gorgeous staircase from Baron Grant's ill-fated mansion in South Kensington is probably as well housed here as it could be anywhere. Thereby we approach, at an easy gradient, to a gallery of works the chief interest of which is not artistic. Lawrence's portrait of William IV., which excited Hayden's wrath, presides proudly over the entrance-hall. The principal *salon* is a fine room, covered, suitably enough for its purpose, with a deep damask paper. To those unaccustomed to the splendour of courts, who regard statesmen with distrust, and pin not their faith upon princes, it suggests irresistibly how splendid a ball-room it would make, if this heterogeneous assemblage of rank and notoriety should take wings to itself and fly. We have one complaint against the show. The "Chamber of Horrors" is a mean apartment. De Quincey would have craved for these artists in murder a richer environment. Trade instinct, we should have supposed, would have suggested to Mr. Tussaud the propriety of giving to these favourites of the people a habitation at once richer and more awe-inspiring. They want some local colour; some more of the "trappings and suits of woe." They stand, huddled together, in a shabby, unfurnished chamber, altogether beneath their deserts. We are not that "shallow critic," decried by the great organ of the people, who "wonders at the public interest in great crimes, and finds fault with it." On the contrary, we do not wonder at all. We think, with De Quincey again, that a great murderer, like a great poet, must create the taste by which he is to be judged. But this he cannot do unless Mr. Tussaud will place him so that the full effect of his personality may make itself felt. As the room is at present arranged we may receive, indeed, a momentary shock: as from the awful resemblance between Charlotte Winsor and a college "bedmaker" of our early days; but we are not actually haunted by her memory. Finally, we must repeat that the arrangements for the reception of the "profession" are wholly inadequate whether we consider their own adventurous lives, or the number and high character of their admirers.

The life of Madame Tussaud herself is well worth study, and the works from her hands are infinitely the finest, as well as the fullest of interest in the exhibition. Her "Memoirs," published in 1838, twelve years before her death, contain most interesting records of the most terrible days of the Revolution. It requires no boldness of criticism to assert that there was genius as well as courage in the woman who produced those models of the murdered Marat, of the guillotined heads of Louis XVI. and Marie Antoinette, of Robespierre and the infamous Tinville. They are not pleasant sights, but they have a terrible historical interest. All these, and some more, were taken immediately after death by Madame Tussaud. She knew Voltaire, and, when no more than eighteen, took a model of him from life, which is, probably, the best work in the Exhibition.

# Illustrations.

## NEW HALL OF THE BUTCHERS' COMPANY.

THE ancient hall of the Worshipful the Butchers' Company, formerly situate in Eastcheap, was pulled down to allow of the completion of the Inner Circle Railway, and the widening of Eastcheap.

The design of Mr. Alexander Peebles, F.R.I.B.A., F.S.I., for the new hall in course of erection in Bartholomew-close, in the City, was selected by the Court of Assistants from those submitted in a limited competition.

The chief entrance, in the centre of the façade, leads to the lobby, which will be enclosed with a handsome oak screen with double doors, all glazed with coloured glass in lead quarries, and thence into the hall, from which will ascend a handsome stone staircase. The committee-room, clerks' offices, waiting-room, lavatories, dressing and coat rooms will be upon the ground story, and the court-room, ladies' drawing and retiring rooms, upon the first story, whilst the large hall will be upon the second story, this arrangement being necessitated by the limited area of the site. Upon one side of the hall will be a musicians' gallery.

The kitchens and other domestic apartments, and those for the housekeeper's use, are upon the third story, approached from the street by a second and separate service staircase. Upon the basement story, at the foot of the service stairs, there will be a kitchen porter's office, fitted with a goods lift to the kitchens; and the waiters' room and other necessary offices will also be upon the basement story.

The walls of the hall and court rooms will be finished with wainscot panelled dados, and most of the joiners' work will be of the same material. The stairs are to be of stone, and the corridors, landings, &c., paved with mosaic. Sanitation has received due consideration at the hands of the architect,—the drains being disconnected from the public sewer, and thoroughly ventilated upon Banner's system; whilst ventilation, which is so important in a building of this character, has also received due consideration, and each apartment will be supplied with foul-air extractors, and fresh-air inlets through which cool air in summer and warm air in winter will be supplied by the appliances of the Æolus Water Spray Company.

## THE NOTTINGHAM PORCH, ST. MARY'S, BURY ST. EDMUNDS.

THIS, which forms the north porch of the large and interesting late church of St. Mary, at Bury St. Edmunds, has been measured and drawn by Mr. G. G. Wallace, whose drawings, as previously mentioned, received special commendation when submitted in competition for the Architectural Association Travelling Studentship. The moldings, which Mr. Wallace has carefully and conscientiously given, exhibit the characteristic weakness of the style in this class of detail, but the general treatment of the front is picturesque and original. The porch is or was when we knew it—connected with the porch of the opposite church of St. James by an avenue of trees, forming a happy mixture of natural and artificial architectural effect. The illustration may have special interest for some of our readers just now, as the church is included in the list of buildings to be visited in the course of the forthcoming Architectural Association excursion.

## NURSES' HOME, ST. MARYLEBONE INFIRMARY.

THE Nurses' Home at Notting-hill, opened by H.R.H. Princess Christian this week, has been erected by the St. Marylebone Guardians as an adjunct to their infirmary at Ladbroke Grove-road, Notting-hill. The establishment is intended as a training school for nurses, and is interesting as being the first of its kind attached to a poor law infirmary. The architects, Messrs. H. Saxon Snell & Son, have designed the building three stories in height, and the accommodation on the various floors consists of forty rooms, each 14 ft. long and 10 ft. wide, but one of them on the first-floor is fitted up as a kitchen, which will be found useful in cases of sickness. At the ends of the corridors, giving access to the various rooms, bath-rooms are provided, and water-closets and slop-sinks are placed in the corner towers, but they are cut off from connexion with the building by means of cross-ventilated lobbies. Immediately fronting the entrance to the building, and leading out of the vestibule, is a class-room, 33 ft. long and 25 ft. wide, and on either side are the apartments of the superintendent.

Each of the nurses' rooms has a fireplace, and, in addition, the corridors can be warmed by hot-water pipes, which run along one of the side walls.

The builders, Messrs. Wall Bros., entered into a contract to erect the building for the sum of £8,993, inclusive of all engineering works and fittings. The heating works have been executed by Messrs. Fraser & Co.; the cold-water pipes and fire-mains by Messrs. Potter & Sons; the gas-mains and fittings by Messrs. Berry & Sons; and the electric-bells by Mr. F. Brown.

## SCULPTURE AT THE ROYAL ACADEMY.

NOS. VII. AND VIII. BY H.S.H. COUNT GLEICHEN.

A GOOD many visitors in going round the Lecture-room will probably have noticed the very pleasing and dignified portrait-bust of a lady, by Count Gleichen, to which a certain additional individuality is given by the addition of the wings from between which it seems to rise; a pretty fancy, which gives a touch of poetic feeling to the portrait.

The studies of children given on the other plate represent a class of subject on which Count Gleichen has often been engaged. The boy with the toy engine is not, perhaps, a strictly "sculpturesque" subject, but the figure is very bright and characteristic in manner and expression.



INK PHOTO. SPRAGUE & Cº LONDON

SCULPTURE AT THE ROYAL ACADEMY.

No. 7.—A Portrait Bust. By H.S.H. Count Gleichen.



Wyman & Sons Photo-lith.

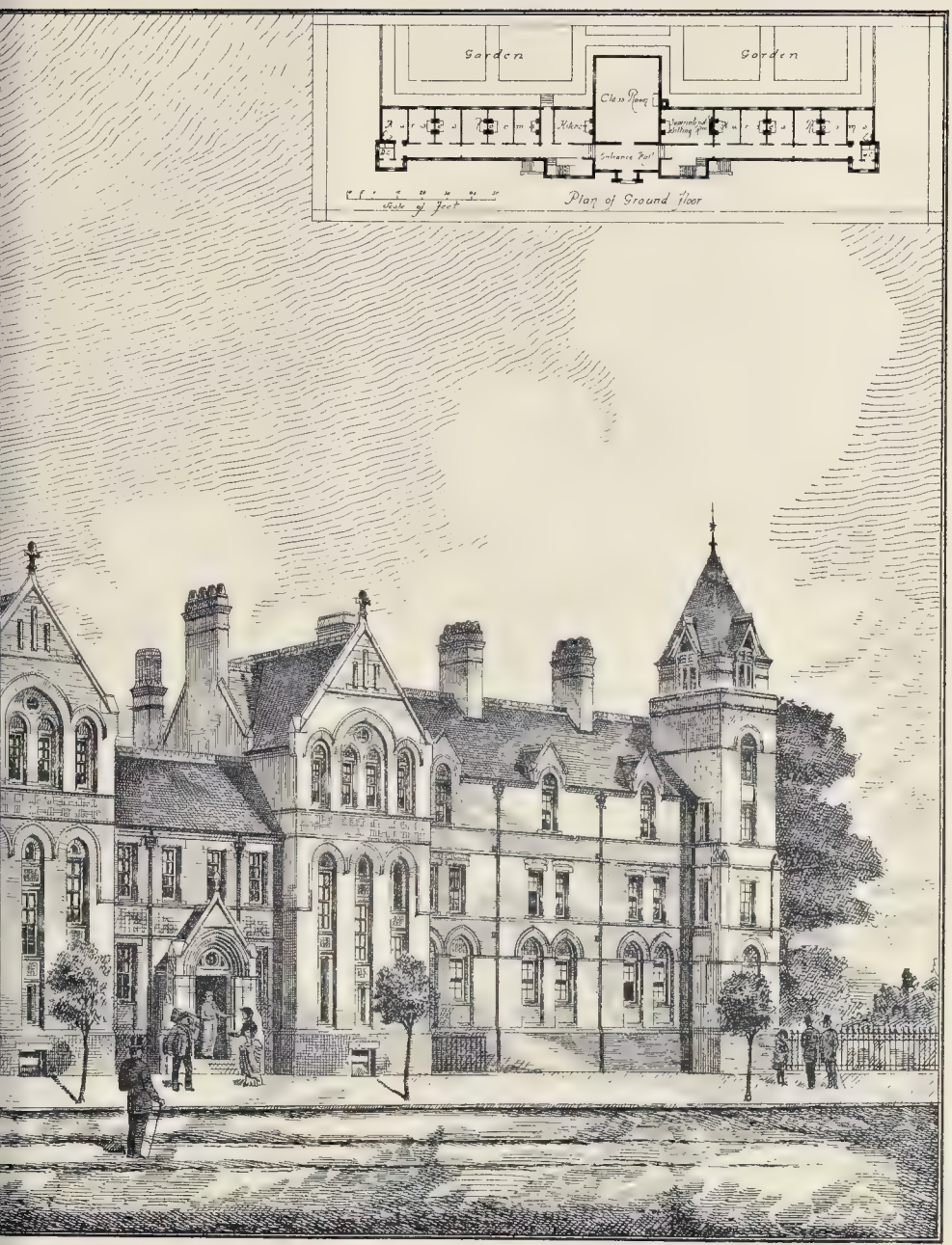
CHANTILLY IN THE SIXTEENTH CENTURY.—From Du Cerceau.



F. Kell Photo Lith & Printer

NURSES' HOME, ST

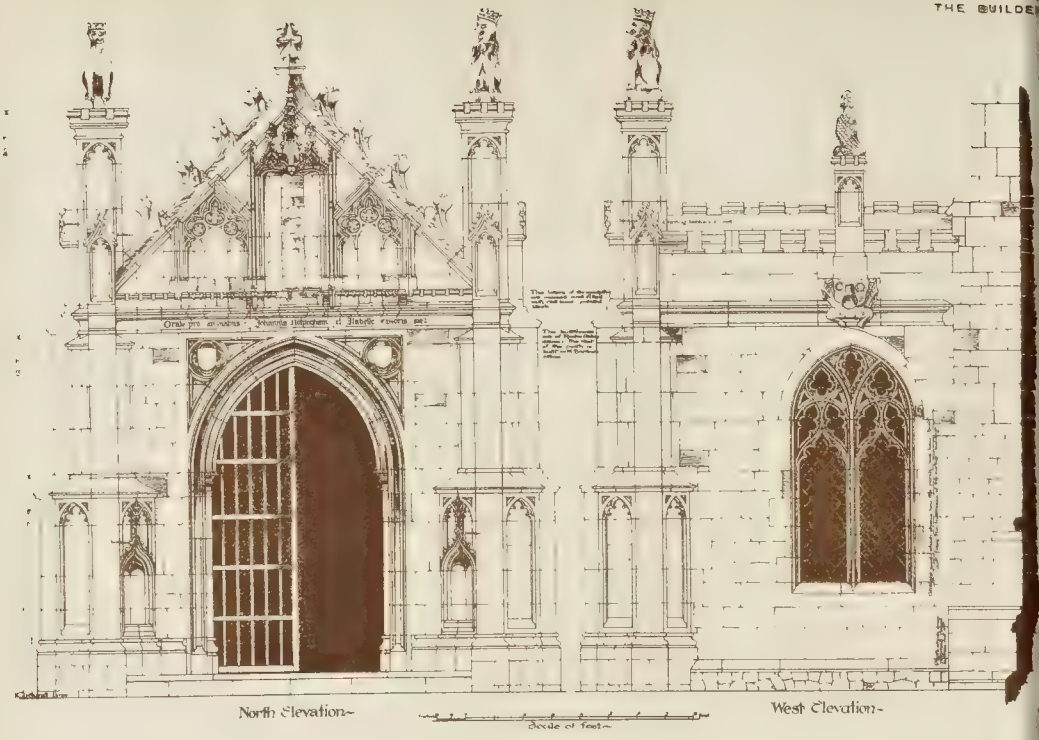
H. Saxon Sn



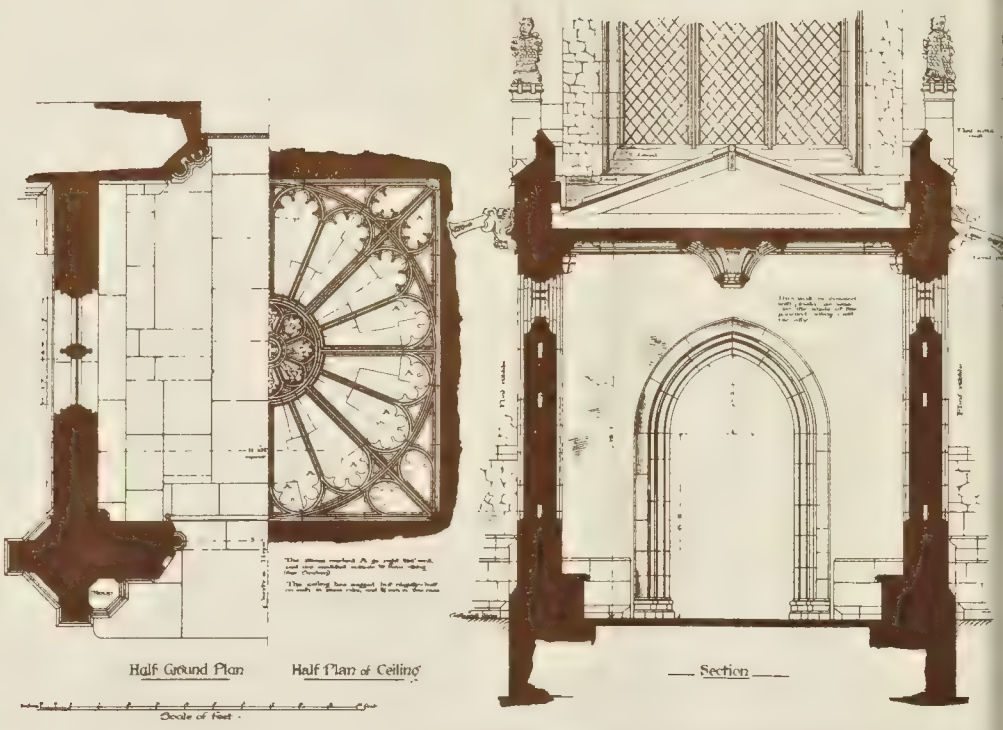

8 Castle St Holborn London E.C.

BONE INFIRMARY.

ARCHITECTS.



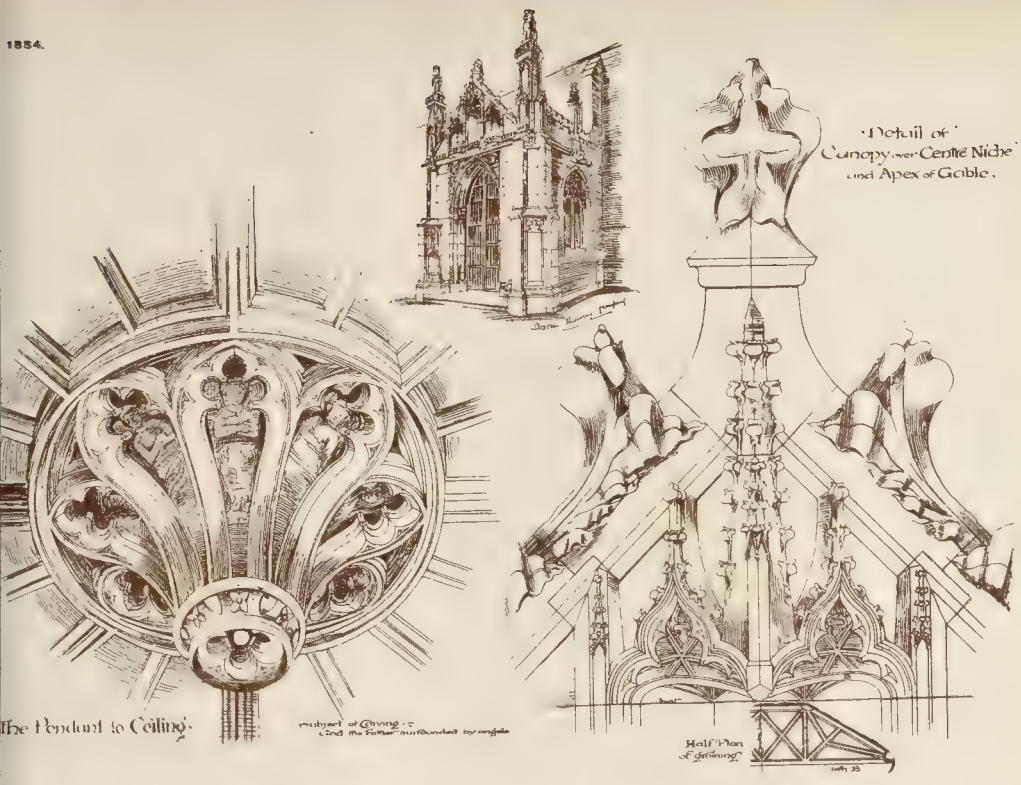
North Elevation~ Scale of Feet~ West Elevation~



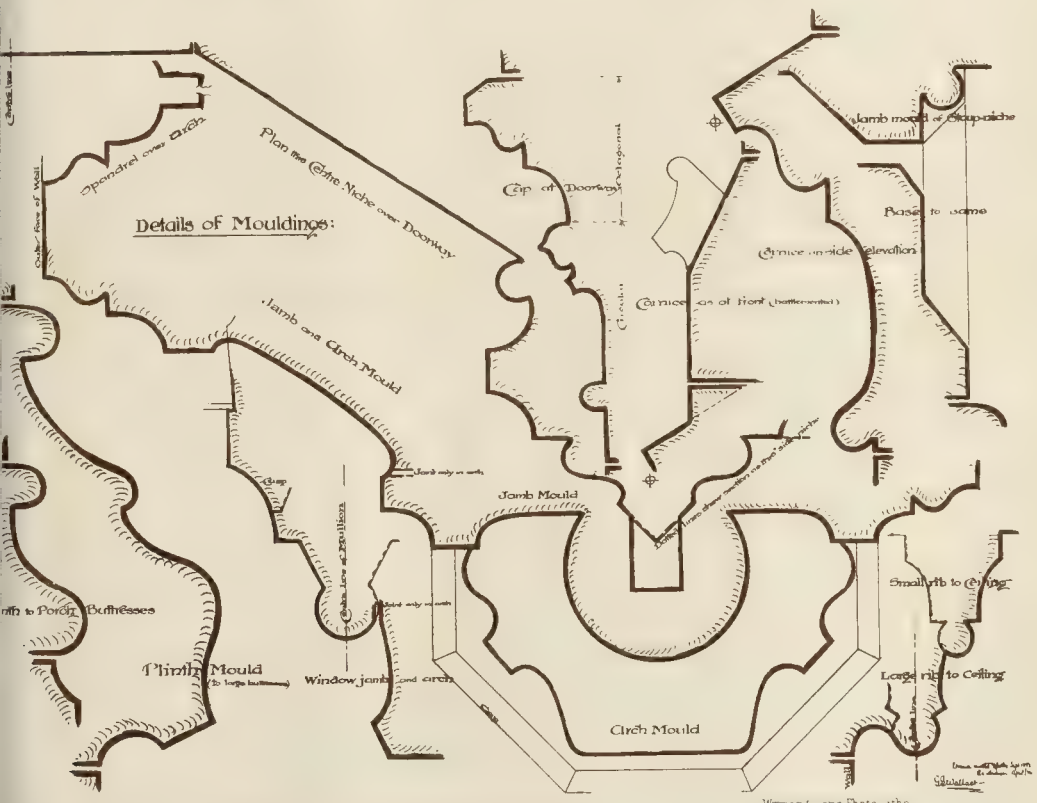
Half Ground Plan Half Plan of Ceiling Scale of Feet Section

The Nottingham Porch · St Mary's Church · Bury S

1854.




The Pendant to Ceiling.

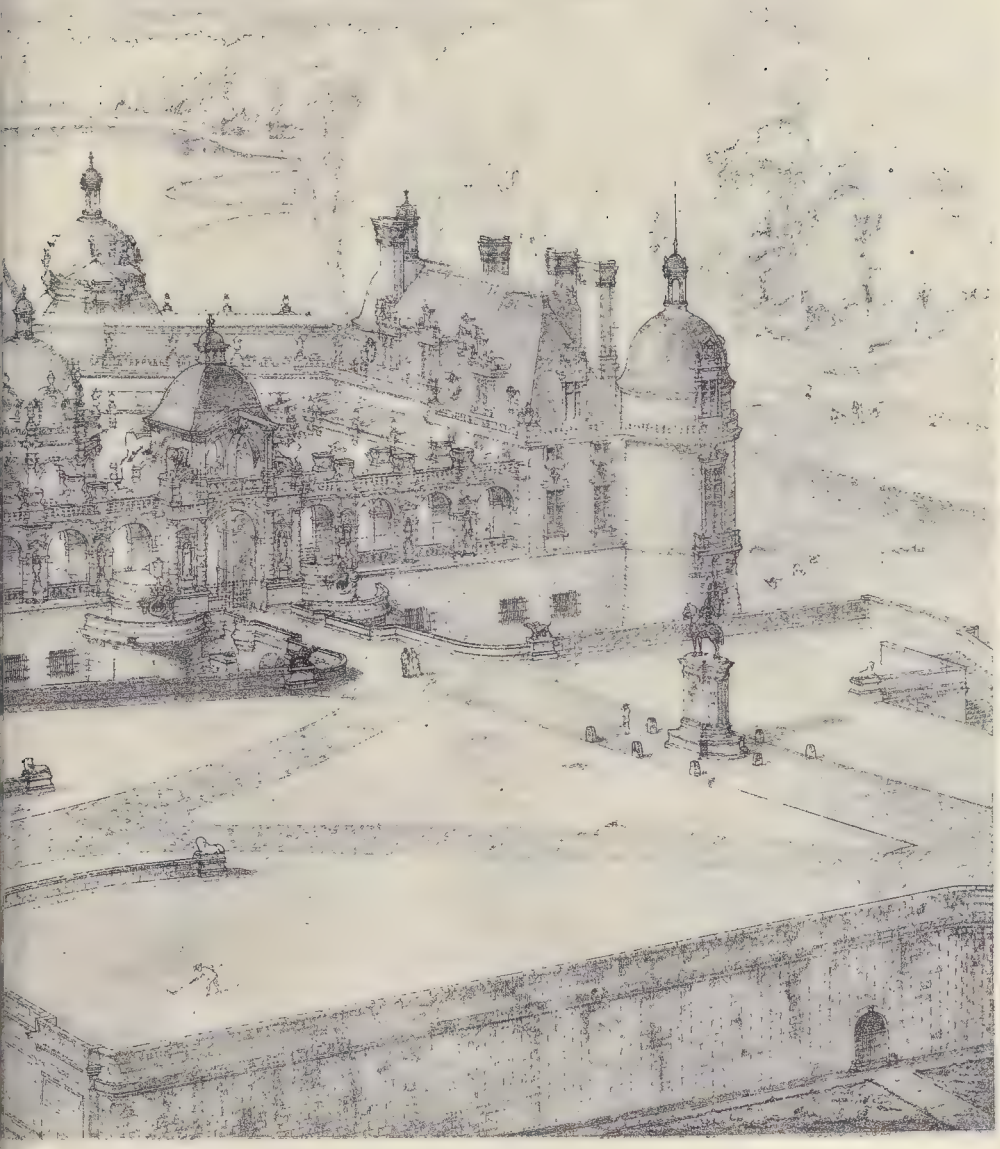



Wyman & sons Photo-litho

hds measured and drawn by Mr. G. G. Wallace.



THE CHÂTEAU OF CHANTILLY:
G
M. Henr



RED FOR THE DUC D'AUMALE.

HITECT.



NEW HALL FOR THE WORSHIPFUL COMPANY OF BUTCHERS.—Mr. Alexander Peebles, F.R.I.B.A., Architect.





'Na PHOTO SPRAGUE & Co LONDON

SCULPTURE AT THE ROYAL ACADEMY.

No. 8. Studies of Children. By H.S.H. Count Gleichen

## THE INSTITUTE OF ARCHITECTS' CONFERENCES AT THE HEALTH EXHIBITION.

### WATER SUPPLY.

THE paper on this subject by Mr. T. H. Watson, which was the concluding contribution to the Institute Conference at the Health Exhibition last week, we were compelled, as before mentioned, to hold over for want of space.

After having enumerated the various possible sources of water supply, from springs, lakes, and rivers, wells in the chalk, and rain-water, and regretting that the idea of storage of the latter on a large scale was still neglected, Mr. Watson continued—

The management of the water, after we have collected it and have got it delivered to our house, is the special subject of this paper.

In the metropolis there are at present two systems of delivery,—the constant and the intermittent. The latter is being gradually superseded. Much information on this and many other matters connected with the subject is published in the reports of Colonel Sir F. Bolton, the official water examiner appointed under the Metropolis Water Act, 1871. I do not understand that any effectual power is given by Parliament to compel the companies to deliver pure water. What is wanted is not a "standard of filtration" on which the companies may agree, but a "standard of purity and softness" on which the public may rely, and also we want "requirements," not exclusively with the object of saving water, but made also in the interests of the consumers, to facilitate the proper management of it within the house, and to insure the proper cleaning of all cisterns and tanks periodically. The perodical examination of cisterns as to their cleanliness, proper surroundings, and fittings, should be made the work of an independent public officer, acting under the direction of the sanitary authority entirely in the interest of the consumers, whether occupiers of private houses, chambers, clubs, hotels, or lodgings.

The great objection to the intermittent service is the much greater storage required in each house and consequent multiplication of cisterns and tanks, and the inconvenience of having to receive at a particular time the whole supply for twenty-four hours.

The constant service, however, requires fittings much improved on those which have been allowed to be used under the old system. The great hindrance to the introduction of this service is the expense and trouble involved in making the necessary alterations to the fittings to limit the waste of water.

The waste of water that may take place when the fittings are imperfect and the pressure is great, has led to the introduction of a throttle or ferrule into the communication-pipe, lessening the diameter of the water-way to such an extent that, when the pressure is reduced, the water may flow too slowly to be of effectual service. Some storage and a moderate pressure are, therefore, desirable. The constant system, to work effectually and economically, depends upon mutual fair dealing between the Water Companies and the consumers, but it is not easy to adjust things on this basis, and many persons advocate a mixed system. It is, therefore, important to consider the whole subject of cisterns and tanks.

*Materials.*—Stone, brick, or tile lined with cement, and puddled on the outside with clay, where the ground is porous, are found to be the best materials for tanks of large capacity. Soft water dissolves lime, but cement is not acted upon by any water. It may be trowelled smooth, and kept clean.

For house-cisterns, stone, slate, iron, lead, zinc, and other materials are used. Of these, perhaps slate is best, but it requires to be most carefully fitted and put together with slate cement and metal cramps. Iron rusts badly when alternately wet and dry; enamelled iron is expensive and uncertain, galvanised iron having a mere coating of zinc, which is dissolved by soft water, cannot be relied upon. Lead, of very ancient use, and its modern rival zinc, are also considered objectionable, and should not be used where anything better can be had. I think that stoneware is the best material for the house-cistern, and as the constant supply requires only a limited storage, say 100 to 200 gallons, there should be no difficulty in the general adoption of cisterns of this material, provided they are made and fitted in a way that will admit of their proper use.

Reservoirs for spring-water require to be fitted with means to aërate the water at the inlet. Large tanks must be thoroughly ventilated; all, without exception, require to be fitted with means to run the water off to the very bottom, —this is called "the wash-out," without which they cannot be effectually cleaned. A flap-valve and chain is the proper contrivance for this purpose. Tanks are usually constructed underground; it is sufficient, however, if they be half sunk in situations where the earth that results from the excavation can be heaped around and over them in a mound of sufficient thickness to protect the contents from changes of temperature.

The house-cistern requires to be close covered to keep out light, dust, and vermin, and no foul air should by any possibility find access to it. On lifting the cover (which should be kept clean) the whole interior of the cistern should be well lighted and in full view.

Most people would be shocked could they but look in the cistern of their house, but cisterns unfortunately are not usually placed where they can be looked into: the neglect of this is simply amazing.

The best system is to form a separate cistern room in a cool, light, and well-ventilated place in the upper part of the house; here the cistern stands just so much above the floor as will admit of the connexion of pipes, and give access to it all round. The cistern itself is close covered. The arrangement I make is this,—standing in front of it with the cover removed, you see the service-cock near the back right-hand corner, a solid tin trumpet waste to take the overflow and form a wash-out, rises from the bottom of the left front corner; the cistern is fixed a little out of level,—the left front corner about an inch lower than the right back corner,—to drain the contents away completely when the waste is out. The proper cleaning and rinsing out of a cistern thus arranged is the work of a few minutes. It is to be done every three or four months. No supply-pipe is taken from the bottom. At about an inch from the bottom the supply to the hot-water system is taken; 3 in. above this level the cold-water supply is taken in a pipe sufficient bore to serve all the lesser branch-pipes. The object of this is to let the cold supply fail first in the event of any interruption of the service; there are then 3 in. in the depth of the cistern reserved for the hot-water system until the service is renewed.

The under-waste should be syphoned below the cistern to form a trap; the pipe should be carried to some convenient place in the open air, where the end of it can be readily seen by the company's inspector; this forms an efficient "warning pipe." At the same time it must discharge in such a way as not to deluge the house when the contents of the cistern are being run off for cleaning.

The regulations issued by the Water Companies are rather misleading. They suggest that every waste-pipe must be converted into what is called an "overflow-pipe"; that is, a pipe taken out of the side of the cistern near the top, and this so arranged as to act as a warning-pipe. A cistern thus fitted cannot be properly cleaned out except by such an expenditure of time and trouble as is likely to cause it to be neglected altogether. In my opinion this form of waste-pipe should never be admitted. The "wash-out" and "waste," when properly fitted, answer every requirement as an overflow, and the end of this, equally with the other, is an efficient warning-pipe when properly placed in view.

The plumber has been so accustomed to perforate the cistern when in position,—considering only how he can best accommodate his work without regard to its subsequent cleaning out,—that prejudice is likely to arise against the use of the stoneware cistern. I think the plumber should give way in this, and cisterns might then be kept in stock sizes, and perforated as follows, viz:—

Stock size 3 ft. × 2 ft. × 3 ft. = 100 gallons effective capacity.
" 4 ft. × 3 ft. × 3 ft. = 200 " " "

Angles rounded in bottom and sides,—glazed brown, yellow, or white inside,—provision for service-pipe and waste-pipe as before described and for two supplies on the right side, near to, but not in the front,—the lower one to take connexion of 1 in. pipe, the upper one 1¼ in.

For drinking-water a separate cistern is recommended. It is not sufficient that this should differ from other cisterns only in being smaller and of a glazed material. Special arrangements must be made in its construction; these must be determined by a careful consideration of its special use and the means by which it may be kept in order.

My idea is that it should be smooth and white inside, so that no dirt could rest in it undetected; glazed and rounded, that it might be readily cleaned; no larger than is necessary, and so shaped that it might be completely emptied and set in order every day; deep, rather than shallow, with a close-fitting cover going over the top rim no larger than could be safely handled with one hand.

The water required for drinking purposes as water, and in beverages as tea, coffee, &c., is estimated at two pints a day for each person; we may double this during hot weather, and double it again, as we need not be sparing where there is such abundance. I should say that one gallon a day for each person would be ample for such a cistern, or say 1 cubic foot for each multiple of five persons in a family, starting at 2 cubic feet as a useful size for a family of ten persons.

This cistern should be fitted up in the pantry, still-room, or any clean cool place in the house; its front edge should stand on a hard wood drainer, such as is found by the side of the pantry sink. Let the cistern be in full light, accessible in every part of it, and resting on a projecting bracket, which may also serve as a shelf for glasses.

The bottom of the cistern should be rounded and sloping towards the front, where a ground-in porcelain plug should be fitted so as to enable it to be completely emptied. A porcelain tap, the parts simply and easily cleaned, should be immediately over the plug, and should not draw the water quite to the bottom. The overflow should be provided for by a slight depression in the front of the rim, so that any waste may be observed as it flows down in a channel in the front of the cistern to the drainer.

A glass ball-valve, supplied direct from the main, and not from any other cistern, completes the apparatus. This tap may be small, the metal nickel-plated, and the ball and arm must be capable of being turned up out of the way.

With a preliminary swill round and emptying, the plug is inserted, the ball turned down, and the cover put on,—the cistern is then charged. Every day, immediately before or during the intermittent supply, it is to be washed out with the remains of the last day's supply, rinsed out with the first of the fresh water, emptied again, and then set in order for the day. This would not take more than two minutes, and for that day, at least, the drinking-water would not be perceptibly worse than that which the Company supplies, while the addition of a pound of washed ice in summer time would give it just that degree of coolness that would render its use the more agreeable.

Of the other cisterns in the house I need speak but briefly. The hot-water tank should not be placed, as it frequently is, near to the cold water to affect its coolness. It is a mere accumulator or reservoir on the hot water circulation, and needs no special fitting beyond a manhole for occasional cleaning. It is best placed in the bath-room, where some of its heat may be utilised in a drying-closet.

Water-closets, urinals, &c., require waste-preventer cisterns. All those in use need improvement. The principal objections are that the incoming of the water is attended with noise: this may be obviated by taking the delivery nozzle down nearly to the bottom of the cistern; also the noise and want of force in the flushing of the closet. The valve should be contrived near to the pan, so that a column of water is standing above the valve ready to act the moment the valve is opened.

Where there is an open boiler a feed cistern is required. It has been the practice to put this in a dark cupboard, generally near the kitchen range. For this there is no necessity. It may be placed in any open light place where it can be got at all round; it only needs to be on the level of the boiler. It must have a close-fitting cover, and be kept quite clean. Stoneware is the best material for this purpose.

Too great a pressure upon pipes and fittings causes waste of water. It is advisable, in determining the place for the cistern, to arrange that the pressure does not exceed that which is due to about 25 ft. to 30 ft. head of water. In houses of many stories, with the hot-water system, this difficulty cannot be met, and a great want is a really efficient hot-water high-pressure tap.

In regard to the management of hot-water there are two or three points to be observed. The flow-pipes should always be fitted to a flange-joint on the top of the boiler and of the accumulator, the inner surface of which should be smoothly rimmed to prevent the formation of an air-trap,—the cause of the thumping and vibration often experienced. The flow-pipe should be of larger bore for a short part of its length immediately over the boiler, especially when the water is hard and much deposit is formed at the mouth of the flow-pipe. All supplies should be taken from the flow above the accumulator so as to draw the hottest water. Very short branch pipes should be admitted to hinder the dead water becoming cold and causing waste. The return should take the shortest course to the lower part of the boiler; the feed-pipe should be entered into the return so as to deliver the cold water direct to the boiler and not reduce the temperature of the whole volume stored in the accumulator. The feed should have an elbow or dip at its connexion with the return so as to hinder the hot-water ascending into the cold-water cistern.

*Stop-cocks.*—There should be a stop-cock on the "communication" pipe to enable the service to be shut off entirely. There should be a stop-cock in a convenient place on every supply taken from a cistern, to enable the workmen to shut off the supply without interfering with the other service of the house, or emptying the cistern when alterations in any of the fittings have to be made.

*Distribution.*—The conduits for distribution of water now in use are exclusively of iron when of large capacity, coated in various ways to hinder the action of the water in direct contact with the pipes, from rusting the metal away. For soft water the pipes are coated by Dr. Angus Smith's process, with a varnish of coal-tar, or by a coating of cement or lime, paid over the interior metal surface of the pipes. The joints which used formerly to be made with tow yarn and lead caulked in, are now, where the capacity of the pipe admits of it, made on the inside with cement, to hinder the increase of organic matter observed in water that was allowed to come in direct contact with the yarn. Hard water has little action upon iron pipes, a coating is formed by the earthy salts on the insides of the pipes, and contact with the metal is thereby hindered.

For the smaller pipes within the house, on the whole iron tubes are considered best. Various processes have been introduced for protecting the metal from contact with the water; where, however, the water is at all hard, the inconvenience of direct contact is soon overcome by the deposit formed on the inside of the tubes. For soft and hot water the protective processes of Barffing and galvanising are frequently used, but tubes thus treated do not admit of being worked up, or bent, without injury to the coating, and the only effectual way of employing either process is by taking down the whole of the work after it has been fitted, sending it away to be treated, and refixing the work without any alteration whatever: this becomes an expensive matter as the cost of labour far exceeds the value of the tubes. Wrought iron may be artificially coated with a deposit of lime after fixing, and, when kept well painted on the outside, tubes of this material are, perhaps, the best and most economical for hot-water work.

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In the discussion which followed,

Sir Joseph Fayrer gave some interesting information about the water-supplies in India.

Mr. Grantham, C.E., considered that hot-water pipes were a source of great trouble in a house, and referred to an instance in which galvanised pipes, so used, got entirely stopped after a few years.

Mr. Schmidt, of Eastbourne, said that in that town they claimed to have a pure supply of water, owing to the liberality of the Duke of Devonshire. They had also a special Act requiring every new building to be carefully inspected. The death-rate there only averaged 13 per 1,000, and the water showed 9 degrees of hardness.

Mr. Ewan Christian, speaking of the action of water upon lead, stated that in the case of one old cistern he had found no deterioration. He was present some years ago at Canterbury when the ancient leaden pipes in the Close were being taken up, and he found they were as perfect internally as when they were laid down. As a contrary experience, he had put up a milled lead cistern in Lancashire, not knowing the quality of the water, which was entirely destroyed within a year. He had found the same thing occur in Surrey, and in the neighbourhood of Ascot it was almost impossible to use lead for cisterns or water-pipes.

In the course of some remarks at the close of the meeting,

Professor T. Hayter Lewis said:—I have now to declare that this week's Conference is about to close, and as it has been conducted under the auspices of the Royal Institute of Architects, it may be well that I should offer a few remarks respecting the part which the Institute and its various members have taken, from time to time, towards assisting in and bringing forward, prominently, the various questions of sanitary science, and the better housing of the poor and rich alike. The history of the movement which has resulted in the present Health Exhibition is briefly this. Some forty years ago Mr. Edwin Chadwick published his report on the sanitary condition of the labouring classes, and this was soon followed by the establishment of the society for improving their condition. In 1847, for the first time, householders were compelled to drain into the sewers. Shortly before this time the Institute came into vigorous life, thanks mainly to our dear friend, Professor Donaldson. In 1839–42 its first volume of Transactions was published, and amongst its articles are some on sewers, damp in foundations, hollow walls, warming and ventilation, filtering water, and artesian wells. All these were, of course, in addition to the valuable papers by Professor Willis and others on fine art and construction, and it furnishes, I think, a convincing proof of the interest taken by us in sanitary matters, at that time, no doubt, imperfectly studied.

It would be simply wearisome to give a lengthened list of the papers which have, since then, appeared in our Transactions, but I may be allowed to mention a few which have appeared in them and in other places by our members. In 1850, Mr. Roberts read a paper on the dwellings of the labouring classes, which has since been expanded into his well-known book on that subject. In 1851, we had the important subject of smoke-consuming, brought forward by Mr. Stevens. In 1852, Messrs. Ashpitel & Whichcord produced a valuable paper on baths and wash-houses, and in the same year the arrangement of houses in flats,—a mode of building which is now, at last, coming into use, and which was investigated, at a much later period, with great care by the present secretary of the Institute of Architects, Mr. White. In 1854, Mr. George Godwin published his well-known "London Shadows," a work which did much to rouse public attention to the housing of the poor. In 1854 there was read by Mr. Boulnois a paper on drainage, the discussion of which extended over three evenings, and will always be consulted as giving a clear account of the state of knowledge on the subject at that time. In the same year, Mr. E. C. Robins, one of the honorary secretaries of this Conference, who was then honorary secretary to a Local Board of Health, published his "Practical View of the Sanitary Question," a work which had a good practical result in many ways.

Amongst other subjects relating to health we have had the following treated at considerable length, taking them in the order of date:—Hospital construction, abattoirs, artisans' dwellings, house construction, heating and ventilation, public health, theatres, water supply, and model by-laws; and I conclude my list with a paper read a few sessions back, by Mr. E. C. Robins, on sanitary science in its relation to civil architecture, the discussion upon which, carried on by some of the most eminent men in various professions, occupied three evenings. For in all discussions at the Institute we invite the freest comments, not only from our own members, but from any visitors who can throw light upon the subject, whether their views are in accordance with ours or not.

We thoroughly acknowledge the great service done for the work by eminent men in other professions; we gladly accept their most valuable help, and we feel bound to keep well abreast with them in their scientific work, and to bring the results of their labours into a tangible form. And to bring them in the most practical way before our younger brethren, we have made it compulsory now for each associate before he is admitted into our ranks to pass an examination in which the leading principles of sanitation form a prominent feature. And it will serve as an encouragement to them in the pursuit of this knowledge to know that our past vice-president, Mr. George Godwin, has recently had presented to him by Her Majesty, at our recommendation, her gold medal, for his long, zealous, and able advocacy of the work in which we are all now engaged.

Before I conclude, I must call your attention for a few minutes to a fact which is constantly overlooked, and the omission of which is often made to bear somewhat hardly upon us architects, although, in reality, it ought to weigh more heavily on the speculating builders, viz., that whilst sanitation has been erected into a science within a comparatively short time, most of the houses in which we live have been erected a comparatively long time, and though the sanitary details of the best houses erected even a few years since may now appear to be, and often are, very defective, as judged by our present state of knowledge; they were, when put up, very probably up to the state of knowledge at that time possessed. To give a clear example of what I mean, I will take the case of typhoid fever, whose special properties were not known forty years ago, and whose origin in foul air is a still later discovery. But foul air was, nevertheless, always sufficiently offensive, and a thing to be fought against, and, a few years back only, it was the belief (I might almost say the universal belief) that a well-constructed water-trap was an effectual preventive to its entry into the house. Now it is known that foul gases will pass this water.

The progress of knowledge, and the difficulty of keeping pace with it, is curiously illustrated by Professor Corfield in his "Common Defects in the Sanitary Arrangement of Houses." He says (to give a short abstract) the form of trap which was used first in connexion with water-closets was the siphon, which was afterwards discarded, but which we now praise, and the trap which supplanted it was the D-trap, which we are now condemning, and taking out whenever we can. It is by no means unlikely that, in a few years, another discovery,—viz., that of Pettenkofer,—may effect a very considerable modification of both the external and internal finishings of our dwellings. His theory of the filtering of air through our walls and floors has not yet been thoroughly worked out, but it evidently has a very important and quite unexpected bearing on their construction.

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## INTERESTING DISCOVERY UNDER PETERBOROUGH CATHEDRAL.

In connexion with the operations attending the rebuilding of the great central tower of Peterborough Cathedral, which operations were described at some length in the *Builder* of the 17th of May, a very interesting additional discovery has recently been made. It will be remembered that in excavating for the foundations of the new piers of the restored tower some buried masonry was exposed to view, affording indications of the strongest kind that herein had been come upon the remains of the ancient Saxon church, which, along with the bulk of the other erections forming the stronghold of the monastic colony, fell a prey to the Northmen. This discovery showed that the more modern and much grander church occupied the same site in part as that originally chosen in the seventh century, and it led to further speculation, on the part of those immediately interested, with reference more particularly to a traditional crypt or vault alleged to have existed under the flooring of the church. Following the rather vague indications afforded by one of the old historians of the cathedral and monastery, a fresh opening was made in the flooring of the building, at a spot in close proximity to the northern flank of the tower now being restored, and bordering the southern termination of the north transept. The success which attended the exploration seemed to be complete and immediate, and was held as showing the calculation, thus based upon the historic mention alluded to, to have been a very accurate one. Directly beneath the existing flooring of the church at this point the workmen of Mr. Thompson, the contractor, came upon a small underground chamber, packed to the brim with a very curious assortment of unconsidered trifles. The chamber was quickly cleared of its contents, when it was immediately apparent to the Clerk of the Works and other adequate authorities present that here had been stowed away part of the *débris*

remaining after the sacking of the building by the Parliamentarians in the year 1643. The very fine choir-reredos, at that time pulled to the ground with ropes on suspicion of strong leanings to Popery in the style of its ornamentation, had, it seems, been partly bestowed,—in fragmentary form of course,—within this hiding-place, and these fragments are now useful as showing the quality of a piece of art-work which, in the old times, was the object of so much admiration on the part of historians and others. Mixed with these were pieces of broken swords and other weapons of both iron and steel, also shreds of some kind of leather-work of the sheath order, fragments of stained glass, and some bones and half-burned bits of wood. The bones are judged to be those of the sheep chiefly, and it did not appear that any of them were of the human species. The underground chamber itself was found to be of no great size, being barely 7 ft. in length by about 3 ft. 6 in. wide and 6 ft. deep. It is furnished with two separate flights of steps descending to the basement, and was at one time approached, apparently, only by concealed traps in the floor of the minster, these traps in each case resting over the topmost steps. The walls of the underground chamber are of stone and lime, and the floor is of stone flags, which still bear signs of violent upheaval at some epoch of disturbance, —these most likely the handiwork of Cromwell's soldiers while in unscrupulous search of still more secretly contrived conveniences for the hiding away of valuables. The roof of the artificial cavity seems always to have been simply the floor of the church itself, which floor, as is well known, has at various times been slightly raised in level. If this is the crypt or vault mentioned in the old records of the building,—a theory which would bear some additional strengthening, perhaps,—its use in ancient times was in all probability that of a regularly contrived hiding-place for valuables. Its situation would be that most likely of any within the abbey walls to safeguard from sacrilegious attempts whatever treasure it might for the time contain. Its comparatively trifling dimensions rather militate against the supposition, however; for while the chamber thus discovered is not much more roomy than many a rather large-sized grave,—though it is, in point of fact, not at all of the tomb order,—the language of the old historian seems to point to a receptacle of some considerable capacity. The two flights of steps form the most striking feature, and have led the Dean to the theory that it was rather a place where means existed of obtaining water from certain large pipes, discovered at a considerable depth below the church, and extending up to its entrance. Other authorities on the spot, however, do not hesitate to identify this curious chamber with the actual "strong-box" of the old abbots.

## NATIONAL ART-STUDENTS' COMPETITION.

THE drawings and other works sent in competition for the prizes given by "the Department" have been, as usual, open to public inspection this year in the Indian Courts in the main building. The authorities have separated the Gold, Silver, and Bronze Medal works from the rest on this occasion, so that they are not so difficult to find as formerly. In the main, decorative design seems up to the usual mark, —it is generally about the best portion of the work,—sculpture not quite so good as usual; life study much as usual, except one admirable drawing above the average mark. The Gold Medallists are Carl Amquist (West London School), holder of the Mence Travelling Scholarship, who has a good collection of coloured studies of Renaissance detail; F. Shelley (Hanley), designs for majolica ware, very good; C. B. Aylward (South Kensington), designs for textiles; F. Poole (Southampton), still life in water-colour, broader in style than usual in this class of the work submitted; A. C. C. John (we omitted to note the school), nude study in chalk, admirable; Ernest O.Cooke (Nottingham), still life in oil; Sidney G. Mawson (Manchester), decorative designs based on floral forms, elegant and refined, but a little too naturalistic; Constantine Procopides (Manchester), designs for printed calicos, very good; A. G. Weatherstone (West London), decorative schemes of semi-architectural character, clever but rather gaudy; Tonelli Dominico, sculpture in the round; Harold Forrester (Hanley), vase with figures in low relief; and — Willdigg, modelled terra cotta dish. We cannot go through the crowd of other awards, which, as we have often said, seem to be sown broadcast. We may observe that architectural work seems poorer than ever, and the things in this way, for which silver and bronze medals are given, are, as the Americans say, "a caution."

## ELECTION OF TWO DISTRICT SURVEYORS.

TWENTY-SIX candidates presented themselves for the two vacancies caused by the death of the late Mr. Edwin Nash and by the Metropolitan Board of Works having decided to divide the hitherto single district of Penge and Lower Norwood into two separate districts named in accordance with the respective localities. The election took place at the meeting of the Board on the 18th inst.

The following is a list of the candidates, with the number of votes recorded for each in the preliminary voting for each appointment:—

| Name. | Lower Norwood. | Penge. |
|---|---|---|
| Ashbridge, A. | 27 | 23 |
| Batterbury, T. | 23 | 15 |
| Bridgman, H. H. | 13 | 12 |
| Brooks, C. W. | 7 | 8 |
| Cheston, H. | 9 | 8 |
| Clarkson, S. F. | 14 | 17 |
| Edmeston, J. S. | 19 | 15 |
| Elkington, G., Jun. | 29 | 28 |
| Grellier, W. | 5 | 6 |
| Hazelhurst, E. | 3 | 1 |
| Hunter, P. | 32 | * |
| Inskip, G. | 3 | 3 |
| Jackson, G. | 6 | 6 |
| Lean, G. A. | 3 | 3 |
| Lees, W. H. | 15 | 16 |
| McLachlan, H. | 11 | 8 |
| Marsland, E. | 25 | 27 |
| Mundy, T. E. | 14 | 13 |
| Murray, R. C. | 3 | 1 |
| Nash, W. H. | 3 | 3 |
| Scrymgour, W. H. | 12 | 8 |
| Smallpeice, W. | 10 | 14 |
| Spiers, W. L. | 10 | 10 |
| Stevens, W. H. | 14 | 10 |
| Stock, H. W. | 19 | 17 |
| Street, E. | 18 | 19 |

* Elected for Lower Norwood.

The subsequent voting was as follows:—

*Lower Norwood.*

| | Second Vote. | Third Vote. | Fourth Vote. | Fifth Vote. | Final Vote. |
|---|---|---|---|---|---|
| Ashbridge | 16 | 9 | — | — | — |
| Batterbury | 12 | 11 | 10 | . | . |
| Elkington | 24 | 28 | 21 | 14 | 10 |
| Hunter | 30 | 27 | 28 | 27 | 30 |
| Marsland | 16 | 13 | 16 | 10 | – |
| Stock | 10 | — | — | — | — |

Mr. Hunter was, therefore, the successful candidate for this district.

*Penge.*

| | Second Vote. | Third Vote. | Fourth Vote. | Fifth Vote. | Final Vote. |
|---|---|---|---|---|---|
| Ashbridge | 20 | 20 | 8 | — | — |
| Clarkson | 13 | 10 | — | — | - |
| Elkington | 26 | 25 | 23 | 25 | 25 |
| Marsland | 23 | 20 | 21 | 18 | 11 |
| Stock | 10 | — | — | — | — |
| Street | 23 | 12 | 16 | 13 | — |

Mr. Elkington was thus successful in obtaining this district.

Both appointments were made subject to the usual conditions imposed by the Board.

## SWIMMING-BATH FOR WHITECHAPEL.

WE gladly give further publicity to the following on behalf of an object which should commend itself to all sanitarians:—

"Eleven years ago baths and washhouses were opened in Whitechapel. They have been a godsend to thousands to whom cleanliness had been an impossible luxury. It is now proposed to add a large swimming-bath, which shall be available all the year round, at a small charge. The Vestry has undertaken the expense of maintaining the bath, but justly shrinks from throwing the whole cost of construction on the ratepayers of a parish in which a penny rate produces only 600*l*. A thousand pounds is wanted to complete the sum necessary for the building of the bath. In a locality where the streets are so crowded that bodily exercise can rarely be a pleasure, where cleanliness is expensive and difficult, and where most of the families occupy single rooms, a swimming-bath will give to many greater length of days, and more joy in living.

Contributions towards this sum will be received by

F. D. MOCATTA, 9, Connaught-place, W.
S. A. BARNETT, St. Jude's Vicarage, Whitechapel."

About 600*l*. of the sum required is, we understand, already promised or subscribed. We hope some of our readers may be able to assist in making the remainder. There could hardly be a more useful or truly humanitarian expenditure of money.

## FIRE-EXTINGUISHING.

SOME simple but crucial experiments in fire-extinction were carried out on Thursday last with the "Harden Hand Grenade" on a vacant plot of land near the Farringdon-street station, of which record may be usefully made. Fires under various conditions were lighted, with the result that they were extinguished in a few seconds by the application of the grenade, which consists of a small glass bottle containing one pint of a fluid which, on exposure to the air or to heat, generates a considerable volume of carbonic acid gas.

Supposing a fire to have been discovered in a house or elsewhere, a grenade is broken by being struck by a second one, or it is thrown against the surroundings of the fire with sufficient force to break it and disperse the contents.

One experiment made on Thursday was very telling, and illustrated a very common and useful application of the invention. A wooden chimney, 14 feet in height, and about a foot square in section, had a fire of wood, petroleum, and kerosene lighted in its lower portion. The flames rose quickly high above the top. But on a single grenade, containing a pint of the fluid, being broken over the fire at its base, the flames from the whole interior (which had been painted with oil and pitch) were most speedily subdued. This experiment illustrated the rapidity with which ordinary chimneys when on fire could be extinguished. For the invention, nothing more than its capability of dealing with incipient fires is claimed. It is not intended to supplant the extincteurs and hand-engines, still less the fire-brigades; and, consequently, the real point of value is its inexpensiveness, its handiness and readiness, and its efficiency for extinguishing fires in their incipient condition.

## BUILDERS' BENEVOLENT INSTITUTION.

THE thirty-seventh annual meeting of this Institution was held at Willis's Rooms, King-street, St. James's, on Thursday last, Mr. Geo. Plucknett, J.P., treasurer, in the chair.

The annual report, read by the Secretary, Major Brutton, states that during the past year seven pensioners (six men and one woman) have died, and nine new ones have been elected (seven men and two women), making an addition of four pensioners. Two widows of deceased pensioners have also been admitted to the benefits of the Institution. The Committee have yielded to the urgent necessities of applicants, and have added to the numbers of the pensioners in the firm belief that it would meet with the general approval of the subscribers; especially as there are several more applicants of advanced age hopefully seeking to be elected. There are now fifty-eight pensioners on the funds of the Institution, and to support them the Committee earnestly appeal to all who read this report to become subscribers, if they are not so already, and thereby help to sustain the charity. Very valuable aid, which is greatly appreciated, was given by the president of the year, Mr. Henry G. Smith, to the Institution, and the thanks of the subscribers are due to the gentlemen who kindly and successfully superintended the arrangements for the annual dinner and ball. The committee regret the loss by death, year after year, of the friends of the charity. In the past year two of the late patrons have considerately remembered the Institution in their wills. The late Mr. Charles Hack bequeathed a legacy of 250*l*., and the late Mr. Henry Couchman 200*l*. These sums will be invested in accordance with the rules.

The balance-sheet shows total receipts from all sources during the year amounting to 5,266*l*. 2s. 9d., the total expenditure being 2,273*l*. 10s. 5d., leaving a balance in hand of 2,992*l*. 12s. 4d.

The report and balance-sheet were adopted, on the motion of the chairman, seconded by Mr. Bussell.

Votes of thanks were given to the president for the past year (Mr. H. G. Smith), to the vice-presidents, to the trustees (Mr. George Plucknett, J.P., Sir S. Morton Peto, Ald. Sir J. C. Lawrence, bart., M.P., and Mr. C. T. Lucas), to the treasurer (Mr. George Plucknett, who was re-elected), to the auditors (Messrs. J. H. Hunter, J. Cruttenden, and R. J. Ward), and to the committee, the retiring members being re-elected, and Mr. G. N. Watts was elected a new member of the committee.

On the motion of the chairman, seconded by Mr. Thomas Stirling, Mr. Stanley George Bird was elected president for the ensuing year; and it was announced that the annual dinner will be held at the Freemasons' Tavern on Nov. 6th.

After some discussion, in which the chairman, Mr. Stirling, Mr. F. J. Dove, Mr. Bussell, Mr. Foxley, Mr. T. F. Rider, Mr. W. Mitchell, and Mr. Hall took part, it was unanimously resolved to alter Rule 9, so that any future male candidate for the

benefits of the Institution must have been established in business for at least ten years, in lieu of five years, the limit hitherto fixed.

## SOCIAL SCIENCE ASSOCIATION.

THE annual business meeting of the members of this Association was held at the offices of the Association in Adam-street on Tuesday last. A report from the Council, detailing the action taken by the Association during the twelve months ending June, was presented, and ordered to be received and circulated. The report dealt with several subjects of interest in regard to which special action had been taken, and among these may be mentioned the Fine Art Copyright Bill, promoted by a Committee of the Association; their Bill to amend the law as to the administration and devolution of the estates of deceased persons; the conveyance of land by the system popularly known as one for the registration of titles as opposed to a registration of deeds; the marriage laws; stolen goods; instruction in workshops; milk supply; loss of life at sea; the Hospitals Association, which was the outcome of the Conference on Hospital Administration held last year under the auspices and management of a special Committee of the Council; the International Health Exhibition. The following appointments in the Association for the ensuing year, 1884–5, were then made:—President, the Right Hon. G. J. Shaw-Lefevre, M.P.; Presidents of Departments: I. Jurisprudence, Mr. John Westlake, Q.C., LL.D.; II. Education, Mr. Oscar Browning, M.A.; III. Health, Dr. Norman Chevers, C.I.E., F.R.C.S. Eng.; V. Art, the Right Hon. A. J. B. Beresford-Hope, M.P.; Chairman of the Repression of Crime Section, Mr. J. S. Dugdale, Q.C., Recorder of Birmingham. Sir Richard Temple was appointed President of the Council. Mr. Westlake, Q.C., LL.D., and Mr. Joseph Brown, Q.C., were re-appointed as Foreign Secretary and Treasurer; and Mr. Andrew Dunn and Mr. Andrew Edgar, LL.D., were re-elected Auditors. The following were appointed Hon. Secretaries of Departments:—I. Jurisprudence, Mr. H. N. Mozley, M.A., Mr. Meryon White, M.A., Mr. Herbert A. Safford; II. Education, Mr. Rowland Hamilton; III. Health, Mr. H. H. Collins and Dr. Edward Seaton; IV. Economy and Trade, Rev. S. A. Steinthal and Mr. Edward J. Watherston; V. Art, Mr. Philip H. Rathbone and Mr. Arthur H. Mackmurdo, A.R.I.B.A.

It was reported that the arrangements for the Annual Congress, which is to be held at Birmingham from the 17th to the 24th of September, were in a very forward state.

## SALES OF PROPERTY.

*Building Sites at Clacton-on-Sea.*—On Monday last Messrs. Baker & Sons conducted a large sale of building sites at Clacton-on-Sea. The sale took place by direction of the Marine and General Land, Building, and Investment Company, and comprised 100 plots of freehold building land, having frontages to the Marine Parade, Carnarvon-road, Pier-avenue, and other roads. The several lots offered varied in area from 18 ft. frontage and 80 ft. in depth, to 65 ft. frontage and 125 ft. in depth, the conditions providing that as to the smaller plots no houses of less value than from 180*l.* to 300*l.* were to be erected, and that as regarded the larger plots, the outlay on each house was to range from 500*l.* to 1,000*l.*, according to situation and area. On the various lots being submitted, there was an active competition, and ultimately sixty of the plots were sold at prices ranging from 2*l.* to 30*l.* each, the total proceeds of the day's sale amounting to 3,250*l.*

*Freehold Property in Highbury.*—During two days last week Messrs. Norton, Trist, Watney, & Co. were engaged at the Auction Mart in disposing of a quantity of valuable freehold property at Highbury. The property consisted of thirty-six houses in Highbury-place, which were sold for 52,990*l.*, or an average of about 1,500*l.* each. Amongst the other property disposed of were five freehold houses in Highbury-terrace, which realised 7,180*l.*; two freehold houses in Highbury Park, sold for 2,660*l.*; and freehold ground-rents of 43*l.* per annum, which produced 1,860*l.*, the total proceeds of the sale amounting to 64,690*l.*

*Freehold Ground Rents at Clapham.*—An exceptionally heavy sale of property in Clapham took place at the Auction Mart last week, the sale being conducted by Messrs. Hards, Vaughan, & Jenkinson. The property consisted of freehold ground-rents and other freehold rentals amounting to 1,040*l.* per annum, with rack-rents in reversion amounting to 3,300*l.* per annum. The sale was by the direction of the trustees of what is known as the Bowyer estate, and comprised the ground-rentals on 185 houses, shops, and other premises in High-street, Manor-street, Little Manor-street, Cross-street, and other streets and roads in the locality. The property was divided into fifty-one lots, which realised prices ranging from 400*l.* to 3,900*l.* each. The highest sums obtained were for the several properties in High-street. Amongst these was a ground-rent of 60*l.* per annum, secured upon two houses and three shops in High-street, with reversion to the rack rent (estimated at 275*l.* per annum) in 1894. This lot was sold for 3,900*l.* The ground-rent of 40*l.* per annum (increasing from 1890 to 125*l.* per annum), secured upon other premises in High-street, realised 3,500*l.* The reversion to this lot, the rack-rent of which is estimated at 450*l.* per annum, will take place in 1958. Three other ground-rents, of 80*l.* and 65*l.* per annum, upon properties in High-street, with reversions in seventy-four years, were sold for 3,040*l.*, 2,760*l.*, and 2,750*l.* respectively. The entire proceeds of the fifty-one lots amounted to 51,935*l.*, being an average at the rate of fifty years' purchase; but in some cases the leases had only about fifteen years to run before the purchasers come into possession of the reversion. Where the leases had seventy-four years to run, the prices realised amounted to from twenty-five to thirty years' purchase.

## WAR-OFFICE COMPETITION.

SIR,—According to rumour, the finish in this race is likely to be a very close thing indeed.

The judges have only selected nine, instead of ten, candidates for the final struggle, and thus save 600*l.* It would be a gracious and a popular act, and help to mitigate the disappointment of those who were so very near winning the great prize, if this spare 600*l.* were divided amongst, say, the second and third in order of merit. H. P.

## CAN THE NEW GOVERNMENT OFFICES BE DURABLE?

SIR,—In his notice of a proposal of mine on the above subject in the *Builder* of the 5th inst. [p. 9], M. Tagnon's recommendation of Belgian granite as a suitable material is altogether unsupported by evidence of its durability in our abnormal London atmosphere, with its destructive hydrochloric, sulphuric, and other gases.

So far as we may judge by his letter [p. 101], cheapness is its only value. But even upon this point he does not make out a very strong comparative case; for he tells us that it costs 15 per cent. more in this country than freestone. This compares badly with the 3 per cent. extra for the English granites referred to in my proposal.

In making these remarks I have no wish to depreciate Belgian granite, for I am entirely unacquainted with its qualities; but English architects know well that stone which has lasted for centuries without decay elsewhere utterly fails when used in London. The new buildings referred to by M. Tagnon at Bristol and Brussels are not evidence on this point; nor did Mr. Gough's letter supply much practical information as to Belgian granite. The absolute durability in London of the materials I recommended is proved by existing structures, which are from 20 to nearly 100 years old, and are as perfect now as when left by their builders. I am, therefore, at present unable to see that there would be advantage in the British Government going to Belgium for a new and comparatively unknown material when there are such durable, economical, and splendid resources in this country as those I referred to in the proposal you were good enough to print.

H. TRAVIS.

## STREET PAVING.

SIR,—At the present season, when the imperative necessity of immediately removing anything that may contaminate the atmosphere, or serve as a medium for the dissemination of the germs of disease, is fully recognised, is it not much to be desired that our streets, and especially our back streets and slums, should be more generally paved with some material, such as asphalte, which, being non-absorbent and impervious, cannot retain any liquid impurity; while its perfectly smooth and level surface is not only washed down by every shower of rain, but, offering no obstruction to the free action of the broom, is kept perfectly clean with the greatest ease, preserving the atmosphere in a sweet and wholesome condition?

SANITAS.

## HENLEY-ON-THAMES.

SIR,—It may interest some of your readers to know that the town of Henley-on-Thames is to be sewered on the "Shone" system, and Mr. Shone, the inventor, and Mr. J. Sturgeon, of Westminster-chambers, are engaged as engineers.

The town not being sewered before, Shone's system will be carried out in its entirety, and the inventor will have a good opportunity of proving the efficacy of his system, for the sewage will be lifted above 120 ft. to the outfall works, which will be situated about a mile from the town.

It is hoped the work will be completed by Midsummer next.

FREDERICK BALL, Town Councillor.

## CARFERAL.

SIR,—In your review of a work by M. A. Wazon on the "Sanitation of Towns and Dwellings" in your issue of the 12th inst., it is stated, respecting filtering material, that "carferal is very costly." This statement, appearing in so eminent a journal as yours, is, we are afraid, unless corrected, likely to seriously affect us as the agents for Major Crease's Carferal, and we beg of you to allow us this opportunity of publicly stating that carferal, if used according to our direction, is a very cheap filtering medium. This, together with the fact of its being so eminently efficient, as proved by the series of trials it was subjected to at the Army Medical School, Netley, under the superintendence of Dr. de Chaumont, Professor of Hygiene, is the reason of its being so largely used by Government and other large bodies.

J. & C. CHRISTIE (late "Gardners"),
Sanitary Engineer, Charing-cross.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—IV.

### GREEK.

IT is one thing to perceive the sources from which Greek architecture was derived; but quite another thing to point out the exact channels by which they reached their destination. It is difficult to say whether it was fetched or brought. We shall have been prepared, by the last article, for two elements, one of a graceful kind from Asia, with which the term "Ionic" will be connected, and the other of a stern kind from Egypt, with which the term "Doric" will be connected, and these elements, after passing through the refining crucible of Greek art, have influenced the architecture of all the nations of Western Europe (see Smith & Slater's "Classic Architecture," p. 80). "We cannot put a finger upon any features of Egyptian, Assyrian, or Persian architecture, the influence of which has survived to the present day, except such as were adopted by the Greeks. On the other hand, there is no feature, no ornament, nor even any principle of design which the Greek architects employed that can be said to have now become obsolete."

If we turn to the aboriginal inhabitants of Greece in order to see how far they are responsible for the invention of Greek architecture, we shall find the various accounts of them somewhat conflicting. However, they may be found in "Fergusson's Handbook," p. 255; "Ramée," vol. i., p. 373; "Rosengarten," p. 57; Gwilt's "Encyclopædia," p. 61; "Smith & Slater," p. 84; and Viollet-le-Duc's "Habitations of Man," p. 195. These, and all other authors, describe the Pelasgi, who, according to Fergusson, were by no means confined to Greece alone, but spread over Etruria (in Italy) and Asia Minor, and he adds that their power became extinct in Greece in the eleventh century B.C. The buildings attributed to them certainly testify to the Eastern influence that they would have encountered in Asia Minor, as may be seen by the scroll or voluted ornaments carved on a pillar in front of the Treasury of Atreus at Mycenæ, illustrated in all the handbooks at or about the pages just mentioned. At Mycenæ also is the famous Gate of Lions, so called from the pair of lions,—or lionesses,—supporting something like part of inverted column, base upwards. This, at least, is the explanation of this feature by Professor Hayter Lewis after a recent visit to the spot.

The Treasury itself is a circular chamber of the form of a pointed arch in section, the arch being formed not of radiating courses, but of stones oversailing until they meet in a point. The internal surface was probably plated with brass, as indicated in the large internal view of it in Gell's "Itinerary of Greece," showing the attachment of such plates.

Their wall masonry was of the kind known as Cyclopean, like the Peruvian walls; and Dr. Phené, in a paper read at the Institute (see "Loan Collection of Transactions," vol. i., page 138), has an ingenious theory that the polygonal outline of these huge stones is simply that of their natural fracture, in which form they were rebuilt, being raised into position on inclined planes, otherwise the labour of cutting and adjusting them would have been enormous.

So much for the Pelasgi, who appear to have combined massive building with graceful ornament, and who have been mentioned first because of the early buildings left by them.

The other, or Dorian race, says Fergusson, may have existed in Greece from the earliest ages, but only superseded the Pelasgi politically about ten centuries before Christ; but their civilisation took no new artistic form for at least three centuries afterwards, at which time what we know as the true Grecian form of art first made its appearance. It is in this Doric form that the Egyptian source of inspiration asserts itself; the tomb fronts at Beni Hassan, described in the last article, will have prepared us for the result so far as the columns are concerned; the small Egyptian temples called Mammeisi (see Fergusson, page 240) may have suggested the general arrangement; but it is a remarkable fact that the earliest Greek Doric building, the temple at Corinth, is as completely and distinctively Greek, as if it were the result of a long series of gradual developments. It is perhaps more remarkable that the little temple at Rhamnus, which has all the appearance of an early step in such a series, comes quite late in the chronological list (see Smith and Slater, page 101).

Regarding, however, the forms of Greek temples ranging from extreme simplicity to completion in all their parts, we may say that the *simplest* was a mere rectangular cell, that the side walls were sometimes continued to form a porch, that a couple of columns were introduced between these prolonged walls or *antæ*, producing the arrangement known as "two column" or *distyle in antis*, or that, instead of the antæ, two other columns were used, making "four column" or *tetrastyle*; that, if this were at one end only, it is called "front" or *prostyle*, and if repeated at the other end it is called "both front" or *amphi-prostyle*; that if the sides as well as the ends are then further enveloped in columns we have a temple with columns "around" it, or *peripteral*, the enveloping columns adding, at the ends, two to the four above mentioned, making "six," or *hexastyle*, front and back.

It is in this particular form, *hexastyle peripteral*, that the temple at Corinth bursts upon us in the seventh century B.C.,—simple, solid, and stern in style, but leaving nothing to be added to its complete arrangement as a temple. This would seem to indicate that this arrangement had been laid down in the form of instructions to the architect by some one who knew exactly what he wanted, probably the priest,—a process much to be desired in the present day, instead of the clergy screening themselves behind the knowledge of Mr. So-and-So, the eminent architect.

Ramée, whose chapter on Greek architecture will be found in vol. i., p. 373, says that, first of all, the sacred element must be entirely separated from all that is profane or public; hence the custom of building the chief temple of a town upon an elevated rock or *acropolis*, which also insured a stable foundation. In connexion also with the respect for sacred things are the three steps surrounding the entire temple; so that, beginning to ascend with the right foot, one lands also on the right foot. Next, the Divinity (represented by a statue) must be inclosed with solid walls in the space called the naos or cella, turned towards the east, in front of which is the pronaos, and then the porticus. The other end of the building is occupied by the opisthodomus or treasury, and then the posticum. The whole was covered with a span roof of flat pitch, the end gables or pediments forming convenient spaces for sculpture.

The columns, as has been said, have no bases, whereupon arises a difference of opinion, one author saying that the idea was taken from posts stuck in the ground, while other authors claim a stone original for these Doric columns and their capitals, although they claim a wooden origin for the entablature, or surrounding portion above the columns. There will always be some healthy fighting on this point; Viollet le Duc, in his "Lectures on Architecture," supporting the stone theory and illustrating it with his accustomed clearness. Moreover, in his "Habitations of Man," when speaking of the Ionic column, he says that the fact of its having a base is a proof that *it* was derived from a wooden original, such base being necessary to prevent the damp of the ground from rising and injuring the wood.

There is a great deal to be said about the beauties of Greek temples of the Doric "order," one of which, the Parthenon at Athens, built in 438 B.C. under Ictinus Architect and completed with sculpture by Phidias, is universally admitted to be the most beautiful building the world has ever seen. Illustrations of it will be found in all the Handbooks, and it is now time to mention the special works on Greek architecture to be found in the Library of the Institute.

First of all are the magnificent series of folio volumes published by the Dilettanti Society, and first of these for completeness and accuracy is Penrose's "Principles of Athenian Architecture," 1851. In this will be found wonderful measured drawings of the Parthenon. Wilkins' "Magna Græcia" and a second copy containing the original drawings for it, dated 1807, are a good example for study in these days of "flicked-in Q. A. Perspectives." The "Antiquities of Ionia," in four parts, dating from 1821, three having been published about that time and the fourth part in 1881. And there is Cockerell's "The Temple of Jupiter Panhellenius at Ægina and of Apollo Epicurius at Bassæ, near Phigallia in Arcadia." Besides the above there are other important folio works. Stuart and Revett's "Athens"; John Pennethorne's "The Geometry and Optics of Ancient Architecture, illustrated by examples from Thebes, Athens, and Rome," 1878; Sir Charles Fellowes's "Asia Minor," containing landscapes in which temples are shown to a small scale; Norman's "Parallels," that is to say, comparative plates of the Greek and Roman orders; Gell's "Itinerary of Greece" 1810; Fergusson's "The Parthenon, an Essay on the Mode in which Light was introduced into Greek and Roman Temples," 1883, one vol. quarto.

Besides these are the various papers at the Institute read and bound together as one volume of the Loan Collection of the Transactions, in which will be found "The Report of the Committee as to Colours on the Elgin Marbles," 1837; Tite on "The Mausoleum at Halicarnassus," 1858; Texier on "Perga in Pamphylia" 1863, and Remarks on the same, 1863; J. W. Papworth on "The Roof of Temples called Hypæthral at Ægina and Bassæ," 1866; Wood on "The Temple of Diana at Ephesus and Hypæthrum of the Greeks," 1877; Penrose on "Optical Refinements of Greek Architecture" 1877; Schliemann on "The Architecture of Troy," 1877; followed by a learned discussion, 1877; Phené on "The Architecture of Troy and Mycenæ"; Lysandros Kaftangoglioglu on "The Chæroneian Lion" and on "Recent Discoveries at Mycenæ"; and Fergusson on "Wood's Temple of Diana at Ephesus," 1883.

The student will soon become acquainted, in reading up the subject, with the difference between the simple Doric order, and the lighter and more graceful Ionic order, which is said to have succeeded it in point of date, as applied to an entire building. There are, however, buildings of the Doric order which contain some Ionic columns, such as the Propylæa, or entrance to the Acropolis, at Athens, which is dated 436-431 B.C. in Smith and Slater. There is another curious but well-known building on the same Acropolis called the Erechtheiom, which contains not only two temples joined together of the Ionic order, but a third tacked on to them, in which the office of the columns is performed by female figures called Caryatides, a copy of which may be seen in the church of St. Pancras in the Euston-road. The Temple at Bassæ, so beautifully illustrated by Cockerell in his work above named, contains not only Doric and Ionic columns, but Corinthian as well. This is an order with a foliaged bell capital and slender proportions, which is not often found in Greek architecture, though the Greeks invented it, with a hint perhaps from Egypt.

In all these temples there is room for considerable difference of opinion as to the method by which daylight was admitted into them, or into such parts as were not hyphæthral, that is "under,—or open to,—the sky." Cockerell illustrates simple openings left in the roof, but Fergusson continues to maintain that a sort of clearstory arrangement was adopted, which will be best understood by a visit to St. Peter's, Eaton-square, where M. Blomfield has ingeniously constructed such a clearstory into a church that is not unlike a Greek temple.

The choragic monument of Lysicrates, surrounded by Corinthian columns, may be seen copied on St. Philip's Church in Regent-street. The front of the British Museum, with its sculptured pediment will, if the return colonnades be concealed, convey a notion of a Greek Ionic temple; but "walk in, walk in," and see the actual examples of ancient Greek work in that splendid collection!

## Miscellanea.

**New Buildings in Gracechurch-street.**—A new block of buildings has just been erected on the west side of Gracechurch-street, opposite one of the entrances to Leadenhall Market. The building has three frontages. The principal elevation is that in Gracechurch-street, which is 70 ft. in length, and upwards of 60 ft. in height, containing four stories above the ground floor. The lower portion of the façade is of red Aberdeen polished granite, with arched entrances to the upper floors at the north and south ends of the elevation. The facing of the upper portion of the frontage is in Portland stone, with a free introduction of carving. The frontage is ornamented, between the windows of the several floors, with fluted columns, the lower parts of the columns being in polished granite. At the north and south angles of the frontage there are pilasters of a rusticated and panelled character, the capitals being enriched by the introduction of sculptured figure-heads in the centre. The elevation terminates by an ornamental central pediment beneath which is inscribed "Woolpack-buildings," the name which has been given to the structure. Overlooking St. Peter's Churchyard, and approached from Gracechurch-street along a passage, is the north frontage, about 60 ft. in height. The other frontage is on the south side, in Corbett-court. The lower portions of this frontage are faced with Portland stone and polished granite, the materials of the upper parts of the elevation being red brick. The buildings have been erected from the designs of Mr. Thomas Dudley, and Mr. J. Bangs is the contractor.

**The Thames.**—It was felt while the Royal Commission on Metropolitan Sewage Discharge was sitting that some of the evidence given was exaggerated, and that the pessimist view taken of the matter by the medical officer of health for the port was scarcely justified by the facts. Unfortunately, however, the decision arrived at by the Commission has, during the recent hot weather, been far more than justified. It is no exaggeration to say that the whole river from Greenwich to Greenhithe has been full of sewage. The colour of the water is black and the odour intolerable. Such a state of things has naturally caused much anxiety. The Port of London Sanitary authority, alive to the danger, has addressed the Local Government Board, pointing out the necessity for immediate action. As a consequence pressure has been brought to bear upon the Metropolitan Board of Works, who have tardily agreed to the deodorisation of the sewage before it reaches the outfall. This, however, can merely be a palliative measure, the only real remedy being to remove the outfalls many miles further down.—*Lancet*.

**Railway Crossing Gates.**—Under the title of "Works in Iron," Messrs. Young & Co. issue a very useful and illustrative catalogue of practical ironwork, including some special descriptions of their opening and closing gates for railway level crossings, and the opening and closing apparatus which is worked from the signal-box, but with greater convenience than is possible with wooden gates. These gates are opened and shut by means of rods and chains working on wheels connected with the back stile of the gate. These wheels are covered in with cast iron "wells" or boxes. Part of the top of these "wells" is movable, permitting free and easy access to the underground workings. The rods are protected by underground channels, which can be of wood, brick, or iron. Easy access can be had to these at any time by removing part of the cover. The speciality of this system of underground workings for the gates consists in the fact that whether in opening or shutting them it is always accomplished by drawing the rods. In other systems the gates are drawn one way and pushed the reverse way. The advantage of a constant draw over alternate pulling and drawing is obvious.

**Electric Gate Openers for Level Crossings.**—A French paper says that the railway companies are about to try an electric gate-opener. The method to be tried is briefly as follows:—A catch connected with an electro-magnet keeps the gate closed. An approaching train closes the circuit at a certain distance from the gates, the catch is released and the gates open. When the last carriage has passed the circuit is broken again and the gates close. A bell is also rung as the train approaches.—*Electrician*.

**Stanley's Patent Plastering Process.**—The special feature of this process consists in substituting for the usual lathing-key for plaster a fine woven wire with an open mesh, and which is corrugated equal to the usual centre to centre spacing of joists. The wire is fixed with the concave side of the corrugations upwards, each ridge of the corrugation being fixed by staples into the soffit of a joist. The plaster, in laying, is forced right through the meshes of the wire, thus ensuring a very firm key besides placing a sufficient amount of plaster between each joist, behind the wire, to cut off all draught from one joisting space to another, and thus further check the liability to rapid combustion in case of fire, which the plaster itself, on a wire key, will, in first instance, offer considerable resistance to. The liability to the cracking of the plaster from shrinkage of the ground is also much diminished. The process, which is American in its origin, is one of the best substitutes for the antiquated and flimsy lathing system that we have noticed.

**Smoke Abatement.**—On this subject Mr. Ernest Hart delivered a lecture last Monday, at the Health Exhibition. He cited statistics proving the enormous amount of waste which is at present going on in regard to the consumption of coal. The result of the trials made by the Smoke Abatement Committee proved that on an average in London 42 per cent. of the total heat generated in domestic grates passed away without in any degree being utilised in warming the rooms of the houses. The thick pall of smoke which frequently hung over the metropolis was productive of very baneful results to health, the mortality during some weeks when fog had prevailed being equalled only by that caused by a heavy cholera epidemic. We may observe, however, that this involves the assumption that smoke plays a larger part in the composition of "London Fog" than has by any means been proved to be the case.

**An Extraction Ventilator.**—Mr. W. H. Chapman, who has had many years' experience in practical matters as a clerk of works, has patented an ingenious and what appears likely to be an efficient mechanical extractor for exhausting gas from sewers, and foul air from large buildings or from railway tunnels. The principle consists in propelling air through a pipe carried up to near the top of an exhaust chimney, and then turned into and around the circumference of the chimney, so as to produce a continual vortex at its mouth, causing a powerful suction up the chimney. Mechanical power, such as a gas-engine, is required to propel the blast up the pipe; but for ventilation or extraction on a large scale it seems likely to be an efficient and by no means expensive system.

**Wrought-iron Watertight Casements.**—We have received from Messrs. Burt & Potts, of York-street, Westminster, a revised prospectus and price-list of their well-known wrought-iron watertight casements and frames, which have been largely used for many years past, and are likely to continue in demand; for they are strong (though light in appearance), and well adapted to resist the entrance of water, even in in situations exposed to the most driving rains. The illustrative sections which are given will be found very useful for reference. Messrs. Burt & Potts, we may add, have just completed their contract for casements for the new building for St. Paul's School, Hammersmith, of which Mr. Alfred Waterhouse, A.R.A., is the architect.

**Honour to an Architect.**—The *London Gazette* of the 18th inst. contains the following announcement:—"The Queen has been pleased to give and grant unto Josiah Conder, esq., her Royal licence and authority that he may accept and wear the insignia of the Fourth Class of the Order of the Rising Sun, which his Imperial Majesty the Emperor of Japan has been pleased to confer upon him, in recognition of his services while actually and entirely employed by his Imperial Majesty beyond her Majesty's dominions." Mr. Conder, who is an Associate of the Royal Institute of British Architects, acted for some time as Architect to the Japanese Government.

**Theatres.**—Sir Henry A. Hunt has been appointed arbitrator in the matter of the appeal against the notice served by the Metropolitan Board of Works on the owners of the St. James's and Sadler's Wells Theatres, under the Metropolis Management and Building Act Amendment Act, 1878.

**Tenders for Surveyor's Work.**—One of the persons tendering sends us the following list of tenders for the completion of Survey and District Map, Burgess-hill, Sussex, for the Burgess-hill Local Board:

| | |
|---|---|
| Arthur Leader | £125 0 0! |
| C. O. Blaber | 95 0 0 |
| Charles E. Gritton | 90 0 0 |
| Frederick W. Hyde | 63 0 0 |
| E. J. Hamilton | 55 0 0 |
| H. C. Card | 50 0 0 |
| Samuel Denman | 48 0 0 |
| W. H. Nash | 44 2 0 |
| Thomas Hunter (accepted) | 39 0 0! |

We are surprised to find that so many as nine tenders were sent in, for we hold that the practice of tendering for professional work is one strongly to be deprecated. It would appear from the list that surveyors can be as much wide of each other in their "tenders" for a given piece of work as builders themselves are sometimes found to be.

**New Flour Mills at Battersea.**—A description is given in a recent number of *Engineering* of the mechanical contrivances in the large flour-mills just erected at Battersea for Messrs. Marriage, Neave, & Co. It may be noted that the owners have apparently desired to consider the architectural as well as mechanical side of the subject, having employed an architect, Mr. F. Bath, to design the mills "in the Queen Anne style." We should not have thought that style was specially suited for the architectural expression proper to a building of the class; but the intention to study architectural effect is at least to be commended.

**Leeds.**—In a competition instituted by Messrs. Milling & partners, Leeds, for the conversion of the old Corporation Gas-offices in Boar-lane, with an hotel, restaurant, and bodega, the designs of Mr. Nelson, architect, Leeds, have been awarded the first, and those of Mr. Jas. Ledingham, architect, Bradford, the second premiums. Mr. Watson, architect, Leeds, was the referee.

**Leith.**—The foundation-stone of a new Established Church at Lorn-street, Leith, was laid on Saturday, the 19th inst. The plans have been prepared by Mr. James Fairley, architect, Edinburgh, after the Gothic manner. There will be accommodation on the ground floor for 500 persons, and in the gallery for 395. The estimated cost is about 4,000*l*.

## COMPETITIONS AND CONTRACTS.

*Epitome of Advertisements in this Number.*

### COMPETITION.

| Nature of Work. | By whom required | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Public Baths | Corporation of Stockport | £50, £30, £20 | Sept. 15th | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Paving, Kerbing, &c., Roads | Beckenham Local Bd. | Geo. B. Carlton | July 28th | xiv. |
| York Paving | Vestry of St. George, Southwark | *Official* | July 29th | ii. |
| Piers and Gates | Brighton Town Council | P. C. Lockwood, C.E | July 31st | xiv. |
| Painting, Bell Lock | War Department | *Official* | do. | ii. |
| Wesleyan Chapel, Brighton | | C. O. Ellison & Son | do. | ii. |
| Repairs and Painting to Station Buildings | Midland Railway Co. | A. A. Langley, C.E. | August 1st | ii. |
| Covered Service Reservoir | Crewkerne Water Co. | T. & C. Hawksley | do. | ii. |
| Cleaning and Painting Stations | Midland Railway Co. | A. A. Langley, C.E. | do. | ii. |
| Boundary Walls and Entrance Gates | Met. Asylum Board | Pennington & Bridgen | August 2nd | xiv. |
| Gasholder Tank | Wellingboro' Gas Co. | | August 4th | ii. |
| Construction of Main Sewers | Sandal Magna Local Bd | Wm. Crutchley, C.E. | do. | xiv. |
| Patent Victoria Stone, and laying same | Aldershot Local Board | W. L. Coulston | do | ii. |
| Girder Bridge, Eastbourne | L. B. and S. C. Ry. Co. | *Official* | August 5th | ii. |
| Station, Offices, &c., Horley | do. | do. | do. | ii. |
| Railway (one mile length) | do. | do. | do. | ii. |
| Reconstruction, &c., of Bridges | do. | do. | do. | ii. |
| Wood Paving | Vestry of Kensington | | do. | ii. |
| Iron Galleries, Infirmary | Guardns of St. Leonard, Shoreditch | J. Wallace Pegge | August 6th | xiv. |
| Brick and Pipe Sewers | Willesden Local Board | O. Claude Robson | do. | ii. |
| Kerbing and Asphalting | Slough U. S. A. | J. Baker | do. | xiv. |
| Church Extension, Woodford Wells | Committee | E. Egan | do. | ii. |
| Granite, Flints, &c. | Bexley Local Board | F. R. Boulter | do. | xiv. |
| Cart Shed, Stores, &c. | Wandsworth B. of Wks. | *Official* | do. | xiv. |
| Paving Works | Greenwich Bd. of Wks. | | do. | xiv. |
| Paving Brass | do. | | do. | xiv. |
| Road Making and Paving | Fulham Board of Wrks | | do. | xiv. |
| Making up Roads, &c. | Guardians of Kensington | A Baker | August 7th | ii. |
| Concrete Reservoir | Driffield Water Co. | J. Fairbank, C.E. | August 9th | xiv. |
| Pipe-laying | Corporation of Burton-upon-Trent | James Mansergh | August 11th | xiv. |
| New Booking-Office, &c. | Hammersmith and City Ry. Joint Committee | *Official* | August 12th | xiv. |
| Coastguard Buildings, near Weymouth | Admiralty | *Official* | do. | ii. |
| Sewerage | Dorking Local Board | Smith & Austin | August 18th | xiv. |
| Construction of Dock, &c. | Corporation of Preston | Edward Garlick, C.E. | August 20th | xiv. |
| Alteration of Levels, and New Station, Liverpool | Lan. & Yorks. Ry. Co. | *Official* | August 25th | ii. |
| Ironwork for ditto | do. | do. | do. | ii. |
| Wesleyan Church, Herne Bay | | Chas. Bell, F.R.I.B.A | Not stated | ii. |
| School Buildings, Charlotteville | Guildford School Bd. | Wm. G. Lower | Not stated | xiv. |
| Alterations, &c., to Malt Kiln | P. Phipps & Co. (Lim.) | H. Stopes & Co. | Not stated | xxix. |

### TENDERS.

For the erection of artisans' dwellings, Gibson's Buildings, Stoke Newington. Messrs. Davis & Emanuel, No. 2, Finsbury-circus, E.C., architects. Quantities supplied by Mr. Frederick Downing, No. 7A, Whitehall-yard, S.W.:

| | |
|---|---|
| Holiday & Greenwood | £12,193 0 0 |
| Macey & Sons | 12,063 0 0 |
| G. S. S. Williams & Son | 11,983 0 0 |
| Edward Conder | 11,790 0 0 |
| John Mowlem & Co. | 11,619 0 0 |
| Coils & Sons | 11,617 0 0 |
| William Brass | 11,493 0 0 |
| John Woodward | 11,399 0 0 |
| E. Lawrance & Son | 11,124 0 0 |
| John Grover (accepted) | 10,843 0 0 |

For the erection of the first portion of proposed new buildings at St. Mary's College, Woolhampton, near Reading, Berks. Mr. Frederick A. Walters, architect, 1, Great Queen-street, Westminster:—

| | |
|---|---|
| Norris | £5,884 0 0 |
| Parmenter | 5,560 0 0 |
| Kemp | 5,399 0 0 |
| Kimberley | 5,110 0 0 |
| Claridge | 5,071 0 0 |
| Buckle & Wheeler (accepted) | 4,350 0 0 |

For rebuilding Congregational Church, Robertson-street, Hastings. Mr. H. Ward, architect, Hastings:—

| | |
|---|---|
| Dobson | 8,247 0 0 |
| Moon & Co. | 8,200 0 0 |
| Hughes | 8,200 0 0 |
| Rolls | 8,100 0 0 |
| Vidler | 7,854 0 0 |
| Peters | 7,747 0 0 |
| Jones & Co. | 7,744 0 0 |
| Taylor Bros. | 7,598 0 0 |
| Walker | 7,500 0 0 |
| Wade | 7,500 0 0 |
| Jenkins | 7,469 0 0 |
| H. E. Cruttenden | 7,380 0 0 |
| Bi[illegible]ham | 7,300 0 0 |
| F. Cruttenden | 7,290 0 0 |
| B. Foster | 7,142 0 0 |
| Higgs | 7,120 0 0 |
| Eldridge & Cruttenden | 7,100 0 0 |
| Howell & Son | 7,0 9 0 0 |
| S. Clarke | 6,526 0 0 |

For heating the Presbyterian Church, Chester, with heir "small-tube" hot water apparatus:—

| | |
|---|---|
| John King, Limited, Liverpool | £104 0 0 |

For heating the New Wesleyan Schools, Morley, with their "small-tube" hot-water apparatus:—

| | |
|---|---|
| John King, Limited, Liverpool | £208 0 0 |

For completing eight houses on the Colville Hall Estate, Forest-gate, for the Land Investment Company, Limited. Messrs. Whitmore & Reeves, surveyors, Devonshire-square, Bishopsgate :—

| | | | |
|---|---|---|---|
| Barkel, Plaistow | £1,370 | 0 | 0 |
| Rice, Peckham | 1,120 | 0 | 0 |
| Pollard, Forest-gate | 950 | 0 | 0 |
| Mar in, Stratford | 896 | 0 | 0 |
| R. & W. Foster, Custom-House | 818 | 0 | 0 |
| Brickell, Manor Park | 775 | 4 | 0 |
| Beale, Cambride Heath | 695 | 0 | 0 |
| Sayer, Leyton | 600 | 0 | 0 |
| Richardson, Stratford | 590 | 0 | 0 |
| Feary, Gosswell-road | 580 | 0 | 0 |
| Ditto ditto (reduced and accepted) | 508 | 0 | 0 |

For alterations at the Poplar Union Workhouse. Mr. G. Morris, architect :—

| | | | |
|---|---|---|---|
| Smith | £4,100 | 0 | 0 |
| Sherwood | 3,850 | 0 | 0 |
| Howell & Son | 3,720 | 0 | 0 |
| Alexander | 3,695 | 0 | 0 |
| Denton | 3,600 | 0 | 0 |
| Stephenson | 3,503 | 0 | 0 |
| Hicks | 3,496 | 0 | 0 |
| D. D. & A. Brown | 3,490 | 0 | 0 |
| Robson | 3,365 | 0 | 0 |
| Aldridge & Jeavey | 3,289 | 0 | 0 |
| Walker | 3,270 | 0 | 0 |
| Johnson | 3,128 | 0 | 0 |
| Evans | 3,054 | 0 | 0 |
| Harper | 3,040 | 0 | 0 |
| Curnon | 3,033 | 0 | 0 |
| Hunt | 3,026 | 0 | 0 |
| Harris & Wardrop | 2,994 | 0 | 0 |

For additions to the offices of the Hornsey Local Board at Southwood-lane, Highgate. Mr. T. de Courcy Meade, engineer and surveyor :—

| | | | |
|---|---|---|---|
| Kerry & Son, Highgate | £6,770 | 0 | 0 |
| Gibbs & Imber, Highgate | 6,200 | 0 | 0 |
| Houghton, King's-cross | 5,628 | 0 | 0 |
| Kearley, Kensington | 5,585 | 0 | 0 |
| Greenwood, Bermondsey | 5,543 | 0 | 0 |
| Nightingale, Lambeth | 5,480 | 0 | 0 |
| McCormick & Son, Canonbury | 5,397 | 0 | 0 |
| Wall, Chelsea | 5,382 | 0 | 0 |
| Tongue, Plumstead | 5,250 | 0 | 0 |
| Lawrance & Sons, Wharf-road, City-road (accepted) | 5,243 | 0 | 0 |

For the erection of warehouse, offices, &c., at Millwall, E., for Mr. J. T. Morton, under the superintendence of Mr. William Eve, architect, 10, Union-court, Old Broad-street, E.C. :—

| | | | |
|---|---|---|---|
| Perry | £4,501 | 0 | 0 |
| Brown | 4,466 | 0 | 0 |
| Holland | 4,401 | 0 | 0 |
| Heiser | 4,331 | 0 | 0 |
| Lion | 4,195 | 0 | 0 |
| Salt | 3,995 | 0 | 0 |
| Higgs | 3,900 | 0 | 0 |
| Downs | 3,560 | 0 | 0 |
| Harris & Wardrop, Walwood-street, Limehouse (accepted) | 3,833 | 0 | 0 |

For new building on the site of Muggeridge's Granaries, Queen Victoria-street, E.C. Mr. Wimple, architect :—

| | | | |
|---|---|---|---|
| Lawrance & Sons | £13,797 | 0 | 0 |
| Dove Bros. | 13,755 | 0 | 0 |
| Hall, Beddall, & Co. | 13,250 | 0 | 0 |
| Ashby & Horner | 13,079 | 0 | 0 |
| Colls & Sons | 12,995 | 0 | 0 |
| Morter | 12,879 | 0 | 0 |
| Scrivener & Co. | 12,841 | 0 | 0 |
| Brass | 12,473 | 0 | 0 |

For alterations and additions to Messrs. A. Boake & Co.'s Chemical Works, Stratford. Mr. Richard H. Hill, architect, No. 9, Clement's-lane, Lombard-street :—

| | | | |
|---|---|---|---|
| Morter | £997 | 0 | 0 |
| Perry & Co. | 971 | 0 | 0 |
| Allen & Sons | 949 | 0 | 0 |
| Gregar | 937 | 0 | 0 |
| Holland | 897 | 0 | 0 |
| Bangs & Co. | 896 | 0 | 0 |
| Martin Wells & Co. | 875 | 0 | 0 |
| Norton & Sons | 874 | 0 | 0 |
| Harris & Wardrop | 840 | 0 | 0 |

For the erection of Liberal Club at Great Grimsby. Mr. Charles Bell, F.R.I.B.A., architect, London and Grimsby :—

| | | | |
|---|---|---|---|
| T. Summerson | £3,756 | 0 | 0 |
| A. Haywood | 3,477 | 0 | 0 |
| J. G. Smith | 3,361 | 0 | 0 |
| N. Kirk | 2,995 | 0 | 0 |
| Willows & Roebuck | 2,955 | 0 | 0 |
| Nightingale & Danby | 2,949 | 0 | 0 |
| Tolland Chapman | 2,910 | 0 | 0 |
| Riggall & Henries (accepted) | 2,675 | 0 | 0 |

For the erection of a Wesleyan Chapel, Grays, Essex. Mr. Chas. Bell, architect. Quantities by Mr. Henry Lovegrove, 28, Budge-row, E.C. :—

| | | | |
|---|---|---|---|
| Prentis & Co. | £3,601 | 0 | 0 |
| H. J. Carter | 3,210 | 0 | 0 |
| J. Anley | 3,060 | 0 | 0 |
| J. Brown | 2,972 | 0 | 0 |
| J. Baxter | 2,796 | 0 | 0 |
| Thompson & Son | 2,786 | 0 | 0 |
| Everett & Son | 2,775 | 0 | 0 |
| Geo. Green | 2,742 | 0 | 0 |
| W. H. Archer | 2,740 | 0 | 0 |
| W. Wood | 2,608 | 0 | 0 |
| Brickell | 2,400 | 0 | 0 |

For the erection of bailiff's cottage and farm building's on the Corporation Farm at Hampton Park, Hereford, for the Hereford Town Council. Mr. J. Parker, city surveyor :—

| | | | |
|---|---|---|---|
| Edward Powell, Hereford | £433 | 0 | 0 |
| George Hudson, Hereford | 402 | 11 | 6 |
| Wm. Cullis, Hereford | 400 | 0 | 0 |
| H. Welsh, Hereford | 391 | 0 | 0 |
| Jas. Davies, Hereford | 380 | 0 | 0 |
| Jas. Watkins, Hereford | 377 | 10 | 0 |
| Gardiner & Co., Hereford | 375 | 0 | 0 |
| A. J. Colley, Hereford | 360 | 0 | 0 |
| Jas. Collier, Hereford (accepted) | 317 | 10 | 0 |

[Surveyor's estimate, £380.]

For the erection of new stabling, kitchen garden, and terrace walls, &c., at Sandhurst, for Lieut.-Col. Harvey. Mr. W. Ravenscroft, architect, Reading. Quantities by Messrs. Cooper & Sons, Reading :—

| | | | |
|---|---|---|---|
| Grover, Reading | £2,894 | 0 | 0 |
| Lawrance & Sons, Wharf-road, N. | 3,830 | 0 | 0 |
| Margetts, Reading | 2,752 | 16 | 8 |
| Smallwood & Co., Birmingham | 2,750 | 0 | 0 |
| Thos. Higgs, Goring | 2,611 | 16 | 8 |
| Rider & Son, 181, Union-street, Southwark | 2,588 | 0 | 0 |
| H. Higgs, Reading | 2,548 | 0 | 0 |
| Searle, Reading | 2,520 | 0 | 0 |
| Bottrill, Reading (accepted) | 2,373 | 0 | 0 |

For the erection of a house in the North Common-road, Ealing, for Mr. J. Lee Thomas. Mr. Robert Willey, architect, 66, Ludgate-hill, E.C. :—

| | | | |
|---|---|---|---|
| Green, Chipton | £2,850 | 0 | 0 |
| Lathey Bros., Battersea | 2,530 | 0 | 6 |
| Penny & Co., Ealing | 2,347 | 0 | 0 |
| Waters, Ealing | 2,127 | 0 | 0 |
| Macey & Sons, Strand, W.C. | 2,125 | 0 | 0 |
| Nye, Ealing (accepted) | 1,979 | 0 | 0 |

For the erection of a house at Harlesden for Mr. E. Powell. Mr. Robert Willey, architect, 66, Ludgate-hill :—

| | | | |
|---|---|---|---|
| Standen, Harlesden | £1,265 | 0 | 0 |
| Tennant, Willesden | 1,220 | 0 | 0 |
| Waters, Ealing | 1,168 | 0 | 0 |
| Nye, Ealing | 1,150 | 0 | 0 |
| Bailey, Ealing | 1,123 | 0 | 0 |
| Penny & Co., Ealing | 1,116 | 0 | 0 |

For the erection of warehouse, &c, Theatre Plain, Great Yarmouth, for Mr. W. G. Knowles. Messrs. Bottle & Olley, architects, Great Yarmouth :—

| | | | |
|---|---|---|---|
| M. Barnard | £1,532 | 0 | 0 |
| Rand & Cooper | 1,266 | 0 | 0 |
| R. Davy | 1,248 | 0 | 0 |
| E. Howes | 1,244 | 0 | 0 |
| J. Leggett | 1,240 | 0 | 0 |
| T. Howes | 1,230 | 0 | 0 |
| J. W. Bray | 1,199 | 0 | 0 |
| Cork & Beech | 1,198 | 0 | 0 |
| J. S. Cooper (accepted) | 1,184 | 0 | 0 |

For the erection of first portion of a curate's house to the St. Paul's Mission Church, for the Rev. Canon G. Venables, vicar, Great Yarmouth. Messrs. Bottle & Olley, architects :—

| | | | |
|---|---|---|---|
| Cornish & Gaymer | £985 | 0 | 0 |
| Cork & Beech | 927 | 0 | 0 |
| T. Howes | 890 | 0 | 0 |
| J. Leggett | 859 | 0 | 0 |
| G. Nickerson | 843 | 0 | 0 |
| E. Howes (accepted) | 802 | 10 | 0 |

For the erection of a class-room to the Cobholm Island Board School for the Great Yarmouth School Board. Messrs. Bottle & Olley, architects :—

| | | | |
|---|---|---|---|
| B. Springall | £201 | 0 | 0 |
| J. W. Bray | 193 | 0 | 0 |
| J. Leggett | 187 | 0 | 0 |
| Cork & Beech (accepted) | 179 | 10 | 0 |

For the erection of a class-room, &c., to the St. James's Church Schools, Great Yarmouth. Messrs. Bottle & Olley, architects :—

| | | | |
|---|---|---|---|
| M. Barnard | £354 | 0 | 0 |
| J. W. Bray | 275 | 0 | 0 |
| J. Leggett | 280 | 0 | 0 |
| Cork & Beech | 259 | 10 | 0 |
| B. Springall (accepted) | 220 | 0 | 0 |

For the erection of a class-room, &c., to the St. John's Church Schools, Great Yarmouth. Messrs. Bottle & Olley, architects :—

| | | | |
|---|---|---|---|
| J. Leggett | £145 | 0 | 0 |

For the erection and completion of new hay stores at the Foreign Cattle Market, Deptford, for the Corporation of the City of London. Mr. Horace Jones, architect. Quantities by Messrs. William Reddall & Son :—

| | A. | | B. | | C. | |
|---|---|---|---|---|---|---|
| Hubble & Trott | £4,190 | 0 | £4,142 | 0 | £4,247 | 0 |
| Hobbs | 4,011 | 0 | — | | — | |
| Staines & Son | 3,894 | 0 | 3,838 | 0 | 4,014 | 0 |
| Dickinson | 3,748 | 10 | 3,814 | 13 | 3,898 | 0 |
| Gentry | 3,650 | 0 | 3,610 | 0 | 3,683 | 0 |
| Howell & Son | 3,617 | 0 | 3,527 | 0 | 3,733 | 0 |
| Greenwood | 3,568 | 0 | 3,521 | 0 | 3,521 | 0 |
| Dickeson | 3,500 | 0 | 3,449 | 0 | 3,490 | 0 |
| Nightingale | 3,380 | 0 | 3,490 | 0 | 3,415 | 0 |
| Morter | 3,308 | 0 | 3,183 | 0 | 3,456 | 0 |
| Mowlem & Co. | 3,299 | 0 | 3,313 | 0 | 3,312 | 0 |
| Richardson | 3,104 | 0 | 2,979 | 0 | *2,988 | 0 |

* Accepted.

A.—All walls in brickwork.
B.—Internal walls in concrete.
C.—"Imperial stone" paving instead of York stone.

For the alterstion and adaptation of the old Monastery Buildings to form new Gut Stores at the Foreign Cattle Market, Deptford, for the Corporation of the City of London. Mr. Horace Jones, architect. Quantities by Messrs. William Reddall & Son :—

| | A. | B. |
|---|---|---|
| Hubble & Trott | £1,867 0 0 | £1,810 0 0 |
| Hobbs | 1,847 0 0 | — |
| Howell & Son | 1,598 0 0 | 1,524 0 0 |
| Staines & Son | 1,544 0 0 | 1,526 0 0 |
| Dickeson | 1,530 0 0 | 1,418 0 0 |
| Richardson | 1,399 0 0 | 1,349 0 0 |
| Greenwood | 1,363 0 0 | 1,251 0 0 |
| Nightingale | 1,340 0 0 | 1,285 0 0 |
| Gentry | 1,290 0 0 | 1,235 0 0 |
| Dickinson | 1,253 12 11 | 1,244 7 5 |
| Morter | 1,249 0 0 | 1,231 0 0 |
| Mowlem & Co. | 1,246 0 0 | *1,209 0 0 |

* Accepted.

A.—If with York stone paving.
B.—If with "Imperial stone" paving.

Accepted for five cottages at New-road, Holy Well Brook, near Halifax. Mr. T. L. Patchett, architect, Halifax :—

*Excavator and Mason's Work.*
Thomas Walker, Stainland.
*Carpenter and Joiner's Work.*
Collins & Hirst, Sowood.
[Total amount, £345.]

For pulling down and rebuilding 56, Cheapside, for Messrs. Wales & McCulloch. Mr. B. Tabberer, architect. Quantities by Messrs. Franklin & Andrews :—

| | | | |
|---|---|---|---|
| Lawrence & Son | £2,167 | 0 | 0 |
| F. Mark | 2,122 | 0 | 0 |
| R. Conder | 2,082 | 0 | 0 |
| W. Stubbs | 2,046 | 0 | 0 |
| Downs | 2,039 | 0 | 0 |
| Patman & Fotheringham | 1,983 | 0 | 0 |
| Baylis | 1,798 | 2 | 0 |

For pulling down and rebuilding 57, Cheapside, for Mr. Thos. Cooksey. Mr. R. Came, architect. Quantities by the architect :—

| | | | |
|---|---|---|---|
| Lawrence & Son | £1,590 | 0 | 0 |
| Downs | 1,583 | 0 | 0 |
| R. Conder | 1,525 | 0 | 0 |
| W. Stubbs | 1,500 | 0 | 0 |
| Patman & Fotheringham | 1,495 | 0 | 0 |
| F. Mark | 1,487 | 0 | 0 |
| Baylis | 1,204 | 16 | 9 |

For repairs, painting, and additions to offices of St. Matthew, Bethnal-green Board of Guardians. Messrs. T. & W. Stone, architects, 2, Great Winchester-street, E.C. :—

| | | | |
|---|---|---|---|
| Building, Fitting, & Furnishing Co. | £625 | 0 | 0 ! |
| Needham & Dilatorce | 623 | 10 | 0 |
| Cohen | 576 | 0 | 0 |
| Peers | 549 | 0 | 0 |
| Thompson & Tweed | 513 | 0 | 0 |
| Arnold | 517 | 17 | 0 |
| Sharp | 510 | 0 | 0 |
| Hawkins | 511 | 0 | 0 |
| Richards | 500 | 0 | 0 |
| Oldis Bros. | 495 | 0 | 0 |
| Wood | 471 | 0 | 0 |
| Beale | 465 | 0 | 0 |
| Thompson | 461 | 11 | 6 |
| Hobbs | 453 | 0 | 0 |
| Cullis | 452 | 0 | 0 |
| Chillingworth | 397 | 0 | 0 |
| Wilson | 384 | 0 | 0 |
| Deacon | 370 | 0 | 0 |
| Collins | 320 | 0 | 0 ! |

For rebuilding 77, High-street, Ashford, for the Trustee of the late Mr. T. E. Scott. Mr. H. R. King, architect Ashford :—

| | | | |
|---|---|---|---|
| Giles, Burden, & Giles, Ashford | £665 | 10 | 0 |
| J. Wood, Ashford | 646 | 10 | 0 |
| W. Brooks, Folkestone | 640 | 0 | 0 |
| J. Hughes, Ashford | 635 | 0 | 0 |
| W. Baker, Ashford | 630 | 0 | 0 |
| Denne & Son, Deal | 629 | 0 | 0 |
| J. Bingham, Headcorn | 627 | 0 | 0 |
| Howland Bros., Ashford | 620 | 0 | 0 |
| Tournay & Son | 578 | 18 | 0 |

[Architect's estimate, £630.]

For new Mission house, at Lennox-road, Finsbury Park. Messrs. Searle & Hayes, architects :—

| | | | |
|---|---|---|---|
| Mattock Bros. | £1,057 | 0 | 0 |
| Goodman | 946 | 0 | 0 |
| Cordell | 945 | 0 | 0 |
| Wilson & Exton | 934 | 0 | 0 |

For the erection of a villa at Lee-on-the-Solent, Fareham, Hants, for Mr. J. C. Robinson. Mr. J. E. Clifton, Swanage, architect :—

| | | | |
|---|---|---|---|
| Gamblin | £418 | 16 | 0 |
| Fallford | 390 | 16 | 0 |
| Plummer (accepted) | 300 | 0 | 0 |

For forming and completing a road at Lee-on-the-Solent, for Mr. J. C. Robinson. Mr. J. E Clifton, surveyor :—

| | | | |
|---|---|---|---|
| Beaton | £250 | 0 | 0 |
| Hayter | 240 | 0 | 0 |
| Plummer (accepted) | 230 | 0 | 0 |
| Butt | 194 | 12 | 6 |

For the construction of new staircase, &c., to Read's Restaurant, 94 and 95, Cheapside, E.C. Messrs. T. & W. Stone, architects, 2, Great Winchester-street, E.C. :—

| | | | |
|---|---|---|---|
| Building, Fitting, & Furnishing Co., Limited (accepted) | £240 | 0 | 0 |

For the renovation and reseating of the Birch Meadow Chapel, Broseley. Mr. S. K. Bland, Ipswich, architect :—

| | | | |
|---|---|---|---|
| R. & J. Millington, Oakengates | £224 | 0 | 0 |
| W. & T. Bailey, Ironbridge | 213 | 0 | 0 |
| C. T. Smith, Broseley (accepted) | 211 | 16 | 0 |

For the erection of boiler-room, coal-store, &c., and excavating for basement and subway to the proposed Jones Memorial Block, at the Royal National Hospital for Consumption, Ventnor, I.W. Mr. T. Hellyer, architect, Ryde, Isle of Wight. Quantities supplied by Mr. H. P. Foster, 5, John-street, Adelphi, W.C. :—

| | | | |
|---|---|---|---|
| Isaac Barton | £1,350 | 0 | 0 |
| Ingram & Sons (accepted) | 1,295 | 0 | 0 |

For the re-erection of factory premises, 53, Parker's-row, Dockhead, S.E., for Messrs. T. & J. Hosking. Mr. E. Crosse, architect, 32, Bermondsey-square, S.E. :—

| | | | |
|---|---|---|---|
| C. Clark | £949 | 0 | 0 |
| J. Bullers | 910 | 0 | 0 |
| F. Higgs | 799 | 0 | 0 |
| A. White & Co. (accepted) | 719 | 0 | 0 |

For the erection of "Salvation Army Barracks," Bedminster, near Bristol. Mr. E. J. Sherwood, architect, No. 101, Queen Victoria-street, London. Quantities by architect :—

| | | | |
|---|---|---|---|
| Francis King, Normanton-road, Bristol | £1,695 | 0 | 0 |
| Brock & Bruce, St. Phillip's, Bristol | 1,560 | 0 | 0 |
| R. J. Crocker, Bedminster, Bristol | 1,557 | 0 | 0 |
| H. J. Rossiter, Edgware-road, Bedminster, Bristol | 1,495 | 0 | 0 |
| H. Rossiter, Allingt n-road, Bristol | 1,449 | 17 | 10 |
| Edward King, Stapleton-road, Bristol | 1,350 | 0 | 0 |
| C. A. Hayes, 7, Redcliff-hill, Bristol | 1,300 | 0 | 0 |
| F. J. Corbead, Leytonstone, Essex | 1,285 | 9 | 10 |
| J. James, Stapleton-road, Bristol | 1,199 | 0 | 0 |

For the erection of Mission Chapel, Northfleet, Essex. Mr. Chas. Bell, architect :—

| | | | |
|---|---|---|---|
| J. Gould | £779 | 0 | 0 |
| Mitchell | 630 | 0 | 0 |
| Wallace | 610 | 0 | 0 |
| Hopkins | 580 | 0 | 0 |
| Tuffee (accepted) | 510 | 0 | 0 |
| Martin | 505 | 0 | 0 |
| Dering | 437 | 0 | 0 |

For the erection of the first part of Kensington Academy for Girls, Addison-road, W. Mr. Hugh McLachlan, architect. Quantities by Messrs. McLachlan & Carson:—

| | |
|---|---|
| Lamg & Son | £5,787 0 0 |
| T. Stafford | 5,769 0 0 |
| Staines & Son | 5,555 0 0 |
| Scharien & Williams | 5,537 0 0 |
| D. D. & A. Brown | 5,463 0 0 |
| E. C. Howell & Son | 5,350 0 0 |
| R. & E. Evans | 5,280 0 0 |
| Peto Bros. | 5,247 0 0 |
| C. Wall | 5,220 0 0 |
| A. G. Bolding | 5,187 0 0 |
| J. Tyerman | 5,138 0 0 |
| J. Allen & Sons | 5,050 0 0 |
| Stephens & Bastow | 4,999 0 0 |
| Geo. Howard | 4,963 0 0 |
| Priestley & Gurney | 4,894 0 0 |
| Geo. Stephenson | 4,852 0 0 |
| Jas. Williamson | 3,268 0 0! |

For painting, &c., at Board Schools, for the School Board for London. Mr. E. R. Robson, architect:—

*Scrutton-street (External).*

| | |
|---|---|
| Cox | £97 15 0 |
| Dearing | 94 16 0 |
| Pritchard | 91 0 0 |
| McCormick & Sons (accepted) | 76 10 0 |

*Scrutton-street (Internal).*

| | |
|---|---|
| McCormick & Son (accepted) | £109 0 0 |

*York road, King's-cross.*

| | |
|---|---|
| Shurmur | £437 0 0 |
| Williams & Son | 420 0 0 |
| Grover | 404 0 0 |
| Wilmott | 397 0 0 |
| McCormick & Son (accepted) | 316 0 0 |

*Hammond-square.*

| | |
|---|---|
| Smith & Son | £484 0 0 |
| Grover | 414 0 0 |
| McCormick & Son | 138 10 0 |
| G. S. Pritchard | 364 0 0 |

*Bocking Green-lane.*

| | |
|---|---|
| Kirby & Chase | £387 0 0 |
| Catchpole | 280 0 0 |
| McCormick & Son | 247 10 0 |
| Grover | 194 0 0 |

*Blackheath road.*

| | |
|---|---|
| Pitchford | £118 0 0 |
| S. J. Jerrard | 94 0 0 |
| Holding & Son | 85 5 0 |
| G. W. Davis (accepted) | 65 17 0 |

*Regent-street, Deptford.*

| | |
|---|---|
| Pitchford | £122 10 0 |
| Ash | 86 10 0 |
| Holding & Son | 83 5 0 |
| G. W. Davis | 66 12 0 |
| F. Johnson | 63 10 0 |

*Creek-road, Deptford.*

| | |
|---|---|
| Holding & Son | £338 0 0 |
| S. J. Jerrard | 270 0 0 |
| F. Johnson | 245 0 0 |
| Pitchford | 206 12 0 |
| W. Tongue | 191 0 0 |
| G. W. Davis (accepted) | 184 12 0 |

*Hughes's Fields, Deptford.*

| | |
|---|---|
| Holding & Son | £273 0 0 |
| Johnson | 255 0 0 |
| S. J. Jerrard | 224 0 0 |
| G. W. Davis | 212 16 0 |
| Pitchford | 196 0 0 |
| W. Tongue | 180 0 0 |

For painting and general repairs to 1, Soho square:—McCormick & Sons (accepted) £122 10 0

For cemetery chapel and boundary-wall, Bucklebury, Berks. Mr. James H. Money, architect, The Broadway, Newbury:—

| | Concrete. | Brick. |
|---|---|---|
| E. James | £590 10 0 | £592 0 0 |
| W. Gosnell | 502 0 0 | 485 10 9 |
| W. Fisher | — | 445 0 0 |
| J. C. Cook | 395 0 0 | 428 0 0 |

For parish-room, mission-room, and verger's house, St. Nicholas, Newbury. Mr. James H. Money, architect:—

| | |
|---|---|
| W. G. Adey (accepted) | £1,035 0 0 |

For new shop front to business premises, Market-place, Newbury, for Messrs. Hawkins. Mr. James H. Money, architect:—

| | |
|---|---|
| Samuel Elliott | £110 8 0 |
| E. James (accepted) | 116 10 0 |

For building new boys' water-closets and urinals at the British Orphan Asylum, Slough, for the Directors. Messrs. Eddington & Summerbell, architects, Windsor. Quantities supplied:—

| | |
|---|---|
| Goddard & Son, Eton | £349 0 0 |
| Willis, Eton | 318 0 0 |
| Norris, Winkfield | 291 0 0 |
| Bowyer, Slough | 289 0 0 |
| Deverill, Slough (accepted) | 280 0 0 |

For alterations and additions to Highland Lodge, Foxlane, Upper Norwood, for Mr. Frederic Hetley, M.D. Mr. Frederic W. Ledger, architect:—

| | |
|---|---|
| R. H. Jenkin | £1,304 10 0 |
| J. Woodward | 1,116 0 0 |
| J. & C. Bowyer | 1,090 0 0 |
| B. E. Nightingale | 1,88 0 0 |
| J. Smith & Sons (accepted) | 1,052 0 0 |

For the erection of a five-quarter brewery at Cardington, Beds., for the Cardington Brewery Company, Limited. Mr. F. T. Mercer, architect, St. Paul's-square, Bedford. Quantities supplied:—

G. Harrison, Bedford (accepted) ..... £450 0 0

For rebuilding No. 81, Wimpole-street, for Mr. G. Buckston Browne, F.R.C.S. Mr. Chas. H. Worley, architect. Quantities by Mr. R. C. Gleed:—

| | Allow for old material. |
|---|---|
| Lawrance & Sons | £1 950 0 ... £50 0 |
| Patman & Fotheringham | 4,833 0 ... 65 0 |
| Andrew & Nanson | 4,695 0 ... 58 0 |
| Downs | 4 050 0 ... 75 0 |
| Robinson | 3,926 0 ... 133 0 |

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

J. H.—T. H. L.—C. L. T.—E. T. H. (next week).—C. B. A.—F. & C.—A. L. F.—F. J. D. (next week).—[illegible] [illegible] [illegible] [

# The Builder.

VOL. XLVII. No. 2166. SATURDAY, AUGUST 2, 1884.


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## *Society of Arts Conference on Water Supply.*

THE Society of Arts held a Conference at the Health Exhibition last week, on the important subject of Water Supply. H.R.H. the Prince of Wales had originally signified his intention of presiding, but circumstances having necessitated the postponement of the Conference,—which was to have been held soon after the opening of the Exhibition,—the chairmanship devolved on Sir Frederick Abel.

The Papers, which numbered seventeen in all, were divided under three heads:—

1. Source of Supply.
2. Quality of Water, — Filtration and Softening.
3. Methods of Distribution in detail.

The papers were, for the most part, short and condensed, as the time allowed for their delivery was limited to twenty-five minutes, and the speakers in the discussion were restricted to ten minutes. The topics discussed were very varied, and some of them were so important that it was scarcely possible to treat them exhaustively in the limited time available. One paper especially, that by Professor Sorby (which we print in another column), propounded so novel and startling a view as to the purifying action of minute animals and plants as to deserve almost a separate meeting for its discussion, while the paper which followed it, by Professor Odling, was of itself sufficient to occupy the attention of the Conference for an entire day; but the discussion was, of course, for want of time, brought to a premature close. Three out of the four papers first read referred exclusively to the "Underground Supply"; that by Mr. Whitaker, F.G.S., was illustrated by a series of very interesting maps, on which were depicted the entire chalk formation and the various permeable and impermeable beds by which it is overlaid. As the object sought by Mr. Whitaker in the construction of his maps was "Contrast and Conspicuousness," the colouring adopted by him differed from that ordinarily used in strictly geological maps, but to the engineer or to laymen not well versed in geological lore, the simplicity of Mr. Whitaker's maps depicts very clearly the area of the chalk formation which is accessible to surface water. The result arrived at somewhat reduces the excessive estimates which have been hitherto current of the chalk area available for the absorption of rain, but at the same time confirms the fact that it is the chief water-bearing bed in the South of England. The second paper by Mr. Topley was interesting in indicating how the water supply always in past times influenced the distribution of the population; but under the present altered circumstances of England, the local supply has become rather a source of danger, so that all large cities and towns now prefer seeking for their water from a distant source.

Mr. de Rance's paper bore on the possible increase of the underground supply, which, he stated, might be accomplished by the sinking of "dumb-wells" through the overlying strata, and so carrying off into the water-bearing rocks much of those surface floods which now only run to waste after having mischievously inundated large tracts of land bordering their courses. Mr. de Rance estimates the area in England and Wales occupied by porous rocks at 26,600 square miles, while the tertiary, gault, weald, oolite, liassic clays, the triassic and permian marls, and the shales of the carboniferous period occupy a further 19,000 miles, in nearly the whole of which occur "pervious rocks" which might be further utilised by means of dumb-wells as underground reservoirs.

Mr. Lucas dwelt on certain particular areas of the chalk formation which he had recently surveyed, and drew attention to a notable exception which he had discovered in the green-sand formation of some springs remarkably situated on the high watershed ridge on which stands the town of Warminster, and which lies between the English and Bristol Channels.

These papers and the discussions which followed seemed to point to the conclusion that though there is undoubtedly a very large area from which an underground supply of water may be drawn, yet that, as far as inquiries have at present extended, the knowledge as to its capacity is not yet definite enough to frame an estimate of the sufficiency of its supply, especially as it is the minimum and not the maximum quantity available that should form the basis of such estimate, seeing that the storage in the chalk is always largest at the end of the year. The probability, therefore, is that it must be supplemented by leading to it some of the surplus water which now escapes by floods, and that, as far as experience at present extends, it seems certain that abstraction of water at definite points is impossible without injuriously affecting existing rights. Moreover, though, theoretically, water drawn from the chalk is purer than that taken from river sources, yet, owing to the defective state of the law (as instanced in a late judgment), any one seems to be at liberty to pour any filth down a disused well without regard to the consequence of polluting the supply on which his neighbours are dependent. Until, then, this has been remedied, the superior purity of water drawn from chalk or other wells must always be doubtful, and such hidden dangers are more to be dreaded than those which are apparent on the surface, and are, therefore, better and more easily guarded against.

It is matter of regret that Professor Symons was unable to contribute a longer paper, as everything coming from him is so valuable and suggestive. In explaining the great difference in the rainfall over the United Kingdom, he instanced two places,—the Stye in Cumberland, and Clacton-on-Sea in Essex,—where the rainfall in 1883 measured 190·28 in. and 18·71 in. respectively, or ten times more in one place than in the other. It is well known that the population is almost always in an inverse ratio to the rainfall, and therefore there can be little question as to what the proper public policy should be, viz., to lead the water from the region in which it is most abundant to those places in which the population is greatest. As long, however, as our legislation stands as at present, there is the danger of its proving exceedingly damaging to the interests of the country generally, by conferring water rights which may hereafter become so valuable as to render it almost impossible to acquire them when the need arrives for a re-arrangement or a redistribution of the supply. Professor Symons pertinently asks, "Would it be possible to safeguard our successors, by insisting that special water-rights, if now asked to be created, shall be subject to revision, without compensation, after the lapse of 100 years?" It would be well if our Legislature could be induced to lay this point to heart, and adopt the suggestion ere it be too late for any fresh schemes that may be projected. Some efficient hydraulic organisation, however, must be created before it will be possible to solve the water problem satisfactorily, and before such organisation could be effectively worked it is essential that a knowledge of the laws of rainfall distribution must be better ascertained than they are at present. Professor Symons epigrammatically states the fallacy of the current popular assertion that there are few things so uncertain as the rain. He observed that it is both true and false,—true as regards our ignorance of the future, false as regards our knowledge of the limits within which the quantity of rain will be

found to vary. The following proportion he gives as being within 7 per cent. of the truth :—

Wettest year, 15 per cent. more than the average.
Driest year, 33 per cent. less than the average.
Driest two consecutive years, 28 per cent. less than the average.
Driest three consecutive years, 21 per cent. less than the average.

The subject of Mr. Bailey Denton's paper was the supply to villages and rural districts, the general defective state of which he ascribed to the unwillingness of local authorities to perform the duties devolving upon them. In explaining that the scarcity of water in the present year was due to a dry winter followed by an unusually hot summer, he observed that the deficit would have made itself more severely felt had it not been counterbalanced by the excess of rain which fell from 1876 to 1883, and which gave, on the whole, a considerable balance to carry over. It is doubtful whether that assertion is borne out, for one of the speakers in the discussion remarked that rain in a previous year gives no balance for the succeeding one ; for that the summer supply depends entirely on the rainfall of the preceding months is borne out by observations of the reductions of temperature in well-water, owing to the melting of the snows after the month of February. As an inexpensive but efficacious mode of supply for rural districts whose population varies between 400 and 1,000, Mr. Denton advocated the employment of tube wells, and he likewise instanced the cases of Abingdon and Warwick as towns in which water has been supplied to a population of 6,000 by means of syphons for the last four years without a hitch or difficulty of any kind. This last is a method which, whenever it can be made applicable, obviously commends itself on the score of simplicity and economy, bot has to first cost and in subsequent working.

The scope of Mr. Easton's paper was confined to drawing attention to well-recognised principles, which he observed are too often forgotten or neglected. One of the points alluded to by him was that, though water of the purest kind may be delivered in mains, the position and condition of the cisterns to which it may be led too often rendered it utterly unfit for human consumption ; and thence he argued that a constant supply should be substituted, wherever practicable, for the intermittent system, but that it should, of course, be under proper regulation, so as to guard against undue consumption and waste, as otherwise the cost to the consumer will be greatly enhanced.

The first division of the Conference was concluded by a contribution from Mr. Mansergh, who advocated a supply of pure "soft" water as being on the whole preferable to a pure "hard" water, and gave briefly a few typical examples of the utilisation of the different sources of supply, enumerating the towns of Lancaster, Glasgow, and Manchester as being supplied from elevated moorland springs, lakes, and artificial reservoirs on the gravitation system, while London furnished the type of water raised partly from rivers and filtered before delivery into the mains, and partly from underground springs. On the whole Mr. Mansergh seems to be in favour of the underground supply, which, he considers, combines the greatest number of advantages with the fewest disadvantages.

A perusal of these several papers leaves the unsatisfactory impression that as there is so much diversity of opinion as to the best sources of supply, it will be hopeless to look for any solution of the problem so long as it is left to the individual opinion of the various parties consulted in each particular case. This difficulty is recognised by some of the most eminent of the several lecturers, some of whom pointed out the necessity for the creation of a Central Government Hydraulic Department. This is a view which has been consistently advocated in the columns of the *Builder*, and which we consider should not be limited to the simple question of water supply, but should be extended so as to exercise a control over the entire water system of the kingdom ; for, if one thing has been made clearer than another by the various discussions which have taken place, not only lately, but on previous occasions, it is the intimate connexion that exists between the various branches of the water question, and how impossible it is to deal with supply, unless the drainage be simultaneously regulated ; while the storage of the surplus which falls from the heavens obviously presents the only source from which either surface or underground reservoirs can be fed, or the all-important arterial system of even the existing lines of water-carriage can be maintained. The Protection from Floods Bill still remains unsettled ; and it would be well if the Legislature could be persuaded to deal with the whole subject comprehensively, and go to the root of the matter, following the example of the Continental Powers, and creating a Water Department charged with the control and comprehensive treatment of the entire water system of the United Kingdom.

Passing on to the second division of the Conference, the quality of water, the two papers read by Professors Sorby and Odling call for special notice. As before observed, the former puts forward some novel and startling facts, on the truth of which hangs the solution of some, if not all, of the objections which are generally supposed to be ineradicable in connexion with a supply drawn from rivers, and yet, when calmly considered, Professor Sorby's conclusions are only a scientific elucidation of facts which have already been popularly exhibited by means of the solar microscope. When, by means of that instrument, the busy crowds that inhabit a drop of dirty water were first revealed to the human eye, the impression conveyed was a dread of what might not befall the unwary individual who incautiously swallowed such terrible objects. But Professor Sorby's investigations have removed all ground for fear, for they tend to show that those wonderfully minute plants and animal organisms are in reality our friends, and not our enemies. He views them as an atomic army of sanitarians, cleansing rather than polluting the water. His discoveries show them to be living and thriving on what would be death to us, and multiplying to an incredulous extent in water sufficiently foul to require large numbers of them for its purification. Professor Sorby even throws out the hint that they may be able to make short work of disease germs, and that in this way an immense amount of infectious disease that otherwise would have to be drunk in with our waters will be disposed of. These disease germs and *bacilli* of sorts were a source of terror when they were first revealed ; but now, when *microcosmi* and *bacilli* are known to people earth, air, and water in myriads, and their infinite variety rivals the number of the sands of the sea or the stars in the firmament, they have ceased to be regarded with horror. Thanks to Dr. Sorby, they may now be contemplated with comparative indifference, when it comes to be proved that they constitute the legitimate food of millions of *entomostraca*,—of how many millions who would venture an estimate, when as, in one season, it is stated, one single female cyclops may give rise to four thousand millions of young. The number of "free swimming" animals in fairly pure river water is not more than one per gallon ; in muddy ponds 200 per gallon ; in water into which sewage has been discharged, twenty-seven per gallon. The number of microscopic plants in the mud deposited from water is also truly astonishing. In that from pure rivers their number is comparatively small ; but in the district of the Thames where sewage is discharged it mounts up to figures not easily comprehended by the ordinary mind. Thus in summer in one grain of mud at half-ebb tide there were found no less than 400,000, which would give 5,000,000 per gallon of water.

Under such circumstances, Dr. Sorby's idea that these minute organisms may be regarded as sanitary allies, and not as a relentless army of disease-mongers, that live only that man may die, should prove a most welcome source of consolation to the nervously disposed who constitute so great a part of the population. To learn that the *bacillus* has so many enemies is an apt illustration of the well-known couplet,—

> "So naturalists observe, a flea
> Has smaller fleas that on him prey ;
> And these have smaller still to bite 'em,
> And so proceed *ad infinitum*,"—

an extension of the truth of which Jonathan Swift was unconscious when he indited his rhapsody.

Another deduction from Dr. Sorby's investigation is that in microcosmic population the number in a given area bear a distinct proportion to the food supply. Hence by counting that population in a gallon of water it is possible to estimate with sufficient exactness the amount of sewage contamination that has been allowed to flow into it.

Professor Odling's paper most opportunely followed that of Professor Sorby. He commenced by observing that the views he was about to propound were not those which were most popular,—a fact which was made evident by his opponents in the discussion ; nevertheless, to those whose judgment is not already biased by professional technicalities, Dr. Odling's arguments convey the common-sense view of the question, and in the opinion of many are likewise unanswerable from the scientific side. He explained how the chemist's definition of "purity" differed from the ordinary acceptation of that term, being used by them not in the sense of the opposite to nasty, but, as is often commonly used, to express the exclusion from one thing of anything else, whether better or worse ; as, for instance, the expression of pure rubbish is as familiarly used as pure gold, or, as he humorously observed, "we speak of pure nonsense as readily as we speak of pure truth, irrespective of the circumstances that the nonsense would be benefited, though to the prejudice of its chemical purity, by its contamination with a few grains of sense." Pure water, as conceived by the chemist, he pointed out, had never yet been produced, and may be regarded as an ideal rather than as a real chemical substance. He likewise explained that air from which the minor constituents have been carefully abstracted is sometimes spoken of as purified air, but such air is absolutely incapable in relation alike to animal and vegetable life of fulfilling the functions of our atmosphere. It is exactly the same with water, some of whose minor constituents are known to be essential, while others, there is reason to think, are advantageous to the fulfilment of its functions in nature. Hence, "bearing in mind the interaction everywhere of life and the means of living, it is scarcely to be doubted that the actual mixed substance water is better suited to supply the daily wants of life than the ideal unmixed substance would be." He, therefore, deprecated the practice of using terms in their chemical sense to the general public, who are unacquainted with their particular significance. Dr. Odling then proceeded to show that just as there are different qualities of saline matter in water, so there are different varieties of organic matter in potable water, but that there is a vast difference in their relative proportions, and that while saline matter occurs in appreciable quantities of $\frac{1}{10}$ to $\frac{1}{10}$ per cent., the dissolved organic matter never amounts to more than an exceedingly minute proportion, say from $\frac{1}{100}$ to $\frac{1}{10}$ per cent., and that hitherto the nature of its constituents is almost if not wholly unknown. At the same time, however, the quantity of organic carbon existing in different waters can be definitely determined, and that it is found in its least proportion in uncontaminated spring or well water ; that it is not easy to assign the order of seriation in general lake and river sources, but that on the whole it is probable river water must take precedence of lake water in respect to the smallness of its proportion of dissolved organic matter. After stating the result of the analysis of the water furnished by the five Thames waterworks companies, Dr. Odling summarised his remarks by thus describing in a popular way the proportion of organic impurity contained in that water. "If we suppose for an instant that the Thames Companies' water, instead of containing only three-tenths of a grain contained seven-tenths of organic

matter per gallon, a maximum which has occasonally been met with, even this exceptional proportion would but correspond to the presence in the water of exactly the thousandth part of one per cent. of the organic matter." And he concluded that, so far as organic matter is concerned, the water supplied to London from the Thames and Lea takes, on the whole, precedence of the highly and deservedly reputed water furnished to Glasgow, as it doubtless will do also to that about to be furnished to Manchester. Assurances such as these coming from so distinguished an authority as Professor Odling may well comfort the somewhat disturbed serenity of Londoners, and coupled with the previous remarks of Dr. Sorby, bear out the common-sense view of the case which cannot but commend itself to the unprejudiced understanding, that with so low a death-rate as that obtaining in a great city comprising nearly five millions of inhabitants the quality of the water supplied thereto must, on the whole, be exceedingly good; and though the River Thames above the companies' intakes is not yet wholly freed from the drainage of the towns on its banks, yet that it must practically have been reduced to an innocuous proportion.

It has never yet been determined how many of the minor constituents of ordinary water are not absolutely essential to the functions of human life, but there seems to be a danger, if chemists are to have their own way, of water becoming so chemically purified as to deprive it of its vivifying properties, and of mortality being actually increased rather than diminished when the chemist's idea of a pure potable water has been reached.

Space will not allow of the remaining lectures being noticed, but there is one point which we cannot help observing seems to have escaped the observation of both writers and speakers at this Conference when discussing the question of sources of supply. That point is the apparent anomaly of leading waters, which have fallen from the heavens on its surface, into the bowels of the earth, and then devising every possible expedient for economising the trouble and cost of raising it again, instead of adopting the simple plan of storing it in convenient and suitable sites, from which it may, in nine cases out of ten, be delivered by gravitation. The objections hitherto usually urged against storage evidently fall to the ground if the arguments of Professors Sorby and Odling are of any value, but of that value it is for our readers individually to satisfy themselves.

## THE WAR OFFICES COMPETITION.

THE five judges in the competition which was instituted for the new War and Admiralty Offices (Messrs. Childers, W. H. Smith, Ewan Christian, Hardwick, and the First Commissioner of Works), have completed their examination of the designs of the nine architects invited to join in the final competition, and have reported in favour of the one by Messrs. Leeming & Leeming, of Halifax. It may be convenient to repeat here again the names of the nine architects or architectural "firms" (reluctantly to use a phrase which suggests commercial participation in art) who were competitors in the final struggle, viz.:—

Messrs. Glover & Salter, London; Messrs. H. Hall & W. H. Powell, London; Messrs. Leeming & Leeming, Halifax; Messrs. Maxwell & Tuke, Manchester; Mr. Thomas Porter, Norwood; Messrs. Spalding & Auld, London; Messrs. Stark & Lindsay, Glasgow; Messrs. Verity & Hunt, London; Messrs. A. Webb & E. I. Bell, London.

By the conditions of the competition the judges were to select not more than ten out of the first anonymous competition, which selected ones were to compete again with fuller and more detailed drawings. The provision that not more than ten were to be selected was read, we imagine, by most of the competitors as implying the proposition "not less than ten," and some dissatisfaction has been expressed publicly, and much more privately, that the committee did not at least make up the ten, a dissatisfaction which was mingled with some astonishment when it became known that some of the most eminent architects of the day had been among the rejected ones, and that no name that could properly claim to be among the most eminent was among the accepted. That people of the reputation of Mr.—— and Mr.—— should have sent in designs which were not even considered to stand, any of them, as a possible one out of ten, seemed inexplicable and unheard of, and it was hastily assumed by various persons, both within and without the ranks of the competitors, that so unlooked-for a result was due to favouritism. No conclusion, as a matter of fact, could be more illogical. It is always the eminent and successful architect whose name is before the world, who can command the most influence if private motives once come into play, and whose name has in itself the most effect on a committee. Besides this, the choice of eminent men generally meets with the suffrage of public opinion, and so far it was the interest of the judges, if there was any interest in the matter, to smooth the way for the acceptance of their decision by such a choice, especially in the case of a public building of so much importance as this. The accusation of favouritism, therefore, was absurd in itself; but, beyond that, we wish to add that, from what we have seen and heard about the matter, we do not believe any competition has been or could have been decided with more absolute and *bonâ-fide* intention of perfect fairness to all than this one has been. Whether the result has been the selection of the best and most suitable design out of the whole number originally submitted is, of course, another matter. We may have absolute faith in the *bona fides* of the Committee, but not equal faith in their judgment. We should certainly have been disposed to think that the two professional members of the Committee, Mr. Ewan Christian and Mr. P. C. Hardwick, were exceptionally qualified to form an impartial and reliable judgment in such a matter. We were disposed to think, with one or two of our correspondents, that the selection of the nine designs out of 128 was accomplished in rather a short time; but it is very easily to be believed that among those 128 were a considerable proportion which it was not worth while to analyse, and which might safely be put on one side at once. But on the other hand, when we look at one or two that are among the chosen nine, we find it very hard,—nearly impossible, in fact,—to believe that some of the architects who we know were among the competitors could have sent in anything which was not superior to these. On this account we hold that the authorities would have done still more fairly by all concerned if they had organised an exhibition of the whole of the designs originally sent in. They would then have given the unsuccessful men the benefit of publicity, at least, for their work, and they would have shown emphatically that they did not shrink from public criticism as to the selection. They may call together such an exhibition still, and if they do not, the unsuccessful competitors themselves may organise one. But it would come with a far better grace from the Office of Works.

In regard to the final competition, and the process of selection, we may quote the words of the judges' report:—

"The judges, after a careful examination of these designs, selected three as possessing especial merit,—namely, those of Messrs. Leeming & Leeming, Halifax; Messrs. Verity & Hunt, Regent-street, London; Messrs. A. Webb & E. I. Bell, Queen Anne's-gate, London.

After further consideration of the relative merits of these three designs, the judges are unanimously of opinion that, taking the plans and elevation together, and having regard to the conditions of the competition, Messrs. Leeming & Leeming have produced the best design, and they accordingly recommend to her Majesty's Government that, subject to the approval of Parliament, Messrs. Leeming & Leeming be employed as architects of the new building for the Admiralty and War Office."

The nine designs are now at No. 18, Spring Gardens, where they have been open during the last three days of this week to the inspection of members of Parliament and of members of the Institute of Architects and the Architectural Association; and for one month from Monday next they will be open to the general public for inspection, from eleven till four on each day.

We do not propose to attempt an analytical criticism of the designs after the short examination of them conjointly, for which alone there has been time this week. To attempt to form a judgment in one afternoon of the relative merits of plans which have occupied weeks or (taken altogether) months in consideration and preparation, would appear to us equal injustice to the authors and to ourselves. We propose to give a careful and detailed analysis of the whole set when we have had more time to consider them fully in reference to the requirements of the Office of Works. In regard to the general architectural merits of the designs it is possible, of course, to see more at a glance than can be accomplished in regard to plan. That the design selected is not the best architecturally, as far as style and picturesque effect are concerned, can be seen at a glance. It does great credit, however, to its authors in respect of the care and finish which has been bestowed upon every portion of the drawings, and is, in fact, one of the most admirable pieces of purely architectural draughtsmanship which we remember to have seen. That it has, even unconsciously to the minds of the judges, owed its position in some degree to this quality we should be disposed to believe. As to design, the features are Classic, grouped in a very odd fashion in some respects, and with apparently a great uncertainty on the part of the authors as to which portions, both of the whole and of details, they really wished to accentuate, and a still greater uncertainty as to scale. Details of one story appear to belong to a building of quite a different scale from those which another story suggests, and the whole design appears to need revision in this respect: it consists of a number o details which have no relation to each other or to any "common denominator." The one emphatic point in the design is where it should not be, in the shape of a high tower "overcrowing," as Dugald Dalgetty would have said, the Horse Guards. This is not only objectionable in itself, but at variance with the suggestion of the authorities, that an attempt should be made to lead down to the Horse Guards, and combine it with the new building; which would certainly have been possible and would have been an interesting little problem in design. Messrs. Bell & Webb's design, which is of the French Château order, is a far more picturesque building, and more of a united whole, than what must, we suppose, be regarded as the selected one. Whether the latter presents points of superiority in plan sufficient to atone for its inferiority in architectural treatment we shall be able to conclude when we have examined the plans more carefully. Messrs. Verity & Hunt's design is a powerful and massive-looking building, employing a large Classic "order" at the salient points of the design, and richly decorated with sculpture; it is much better grouped as a whole than the selected design, but not so elegant or finished in detail.

We have arranged, by permission of the Office of Works, who are now the owners of the drawings, for the publication of the whole nine designs, giving sufficient drawings of each to form a complete record in our pages of the materials of the competition; but the preparation of these will occupy a week or two, as we have preferred to wait till the designs were collected and exhibited under Government authority before taking any steps for their publication.

**Birmingham Architectural Association.** On Saturday afternoon last the members of this association made an excursion to the Wolverhampton Fine Art Exhibition. Amongst those present were Messrs. Franklin Cross, O. Essex, H. H. McConnell, C. E. Bateman, F. W. F. Newton, and Victor Scraton, hon. sec. After visiting the industrial and archæological sections the party proceeded to the department of Fine Art. They then visited St. Peter's Church and several other buildings in the town, returning home thoroughly gratified with their excursion.

## THE CATHEDRAL OF OUR SAVIOUR AT MOSCOW.

(WITH ILLUSTRATION.)

THE foundation stone of the present Khram Spassitel, Cathedral of Our Saviour, at Moscow, was laid by the Emperor Nicholas, the grandfather of the reigning Tsar, in 1839; and the remarkable edifice which bears that name was not completed till the year 1880. In some respects it is new, in others it belongs to ancient history; for though the present building was not commenced till 1839 the history of the cathedral dates back to much earlier times. Ever since the disastrous campaign of 1812 it had been the intention of the pious Alexander I. to raise a temple to God in gratitude for the deliverance of his country and in commemoration of the confusion of the French. This worthy idea did not find a fit and artistic expression until 1816, when a certain Witberg sent in a scheme that called forth universal admiration for its magnificence and grandeur. The emperor himself exclaimed, "You have divined my thoughts, my wishes for this temple, which I have kept secret in my bosom, never hoping to find an architect to satisfy me. You have made the stones to speak!" The extraordinary part of the matter was that Witberg was not professionally an architect, but had been seized with the idea that it was his mission to carry out this great work. He voluntarily devoted two years to the study of the principles of architecture and to travels in foreign countries that he might return with matured judgment, capable as well as willing to fulfil his mission. His plan was, indeed, sublimely fantastic and mystical. The cathedral was to be erected on the Vorobyovia Gory,—the Sparrow Hills, from whence Napoleon had first looked down on the ancient capital of Holy Russia. It was to represent a man, for the spirit of God is in each of us, and consequently it was to consist of three parts: one to represent the body, and dedicated to the Nativity; another to represent the soul, dedicated to the Transfiguration; the third to represent the spirit, and dedicated to the Ascension. The first and lowest church was to be placed at the foot of the Sparrow Hills, and built in the shape of a coffin,—it was to be dark, and only to admit the light from one side. The second church was to be on the side of the hill, and should represent a cross; whilst the third, which it was proposed to erect on the summit, was to be circular in shape to represent eternity. This too symbolic design was, however, not destined to be carried out. In 1825 a commission was appointed to inquire into the progress of the work, and the result was that the site was condemned as unsuitable, owing to the clayey nature of the soil. The foundations, the committee discovered, would sink into the ground, and the work requisite to make them secure would involve an enormous increase of expenditure. The most unfortunate part of the matter, however, was that the Commission discovered many serious malpractices, and proved that the moneys of the State and the building materials were embezzled most shamefully. The result of the whole inquiry was that Witberg was exiled to Viatka, in 1828; and the remarkable church on the Sparrow Hills was never more heard of. It should be remembered that the strong hand and sharp common-sense of Nicholas is traceable in the appointment of this Commission and the summary punishment of the amateur architect, whose only vocation, it appears, was to embezzle; for Alexander had died long before 1825. The ruling powers of Russia now found themselves again face to face with the problem of erecting a fitting monument to remind future generations of the great mercy which Providence had shown to the Russian people, and to exhort them to piety and gratitude. The question was at last settled in favour of the present cathedral. This has been built entirely of Russian materials, not the least interesting among which is the Russian marble from the Kolomensky district of the Government of Moscow. The cathedral is faced with white stone; it is flanked by four towers, each surmounted by a golden cupola, and the body of the building is covered by an enormous gilded dome, in which the whole of Moscow can be seen reflected. The relief work is in marble. The cathedral, from its base to its highest cross, stands 336 ft. 6 in.; it covers an area of 10,500 square feet, the centre dome is 98 ft. in diameter, this is gilt externally. A congregation of 7,200 persons can find easy accommodation in the body of the church. The northern and southern entrances are 300 ft. apart. The cathedral contains 726,530 cubic feet of air; it is lighted by sixty windows, and it has fourteen bells in its four belfries. It is difficult to identify the building with any particular order or school of architecture. Russians say it is built in the Græco-Byzantine style, which is so far near the truth that it seems like the work of a Byzantine architect tinkering a little with some reminiscences of Classic detail. The cathedral is situate some little distance from the Kremlin, fronting the Pretchistensky Boulevard, with the river at its back. It lies high, and is surrounded by a large open space. A handsome embankment, lighted by electricity, keeps the river in its bed. The golden dome of this national memorial can be seen from almost any part of Moscow, and is a most important feature in the beautiful panorama that unfolds itself before the spectator's eyes as he looks down on the white-spired city of the Tsars from the summit of the Sparrow Hills, the river gliding beneath him, and the gorgeous churches and innumerable ponds reflecting the rays of the sun in the distance. Its situation near the Kremlin, which is built on a hill, would have dwarfed it but for its enormous size. The interior is very richly decorated, columns of malachite with gilded capitals, and pictures of saints with gilded frames give it a gorgeousness which throws even the ritual into the shade. The Emperor Nicholas expressed the wish, when the question of decorating the cathedral had to be considered, that the pictures should illustrate the principal mercies of the Almighty towards Russia during the last nine centuries. The chief task, therefore, of the building committee became the choice of suitable sacred subjects for decorating the domes and walls in harmony with the Emperor's idea, and the assignment of a fit symbolical meaning to each portion of the interior. All decorations for the centre are descriptive of the earthly life of the Saviour, and illustrations of all such events as were calculated to corroborate His Divinity, and point to the fact that the destiny of the world is in the hands of Divine Providence. The other sacred pictures bear reference to all such events as were of any special importance to the spiritual and worldly development of the Russian Empire. They are distributed in various parts of the building, and correspond to its great significance as a national historical monument and a place of public worship. It was originally the intention of the Emperor to have all these paintings executed in the ancient ecclesiastical Byzantine style; but on secondary considerations this original intention was not carried out, and there are at present but few such pictures in the cathedral. The majority of the paintings has been executed by Russian artists of the modern academical school, and in harmony with contemporary conceptions of art. And here a difficulty at once arose. Unfortunately, contemporary Russian artists are but little familiar with the conventional types of the principal saints, and are not unfrequently guilty of the gravest archæological blunders in their delineations. To avoid any possibility of error in this direction, copies of the celebrated holy pictures at the various monasteries and churches, illustrative of such subjects as it was desirous to depict, were carefully taken by monks accustomed to this sort of work, and these copies were made the basis of the pictures for the cathedral. In the principal and central dome, having a diameter of 91 ft., is representation of the God of Sabaoth of the Old Testament, with the Son of God sitting on His right hand, in the shape of a child, with the inscription "Logos," and on His finger the Holy Ghost in the form of a dove. He is surrounded by angels, and on the border of the cupela are represented,—The Saviour, the Virgin Mary, the Archangels Michael and Gabriel, the Patriarchs, King David, the Prophets, the Apostles, the first martyr Stephen, the Emperor Constantine, the Grand Duke St. Vladimir, and the Grand Duke St. Alexander Nevsky. The four smaller cupolas have painted in them,—(1) on the eastern wing, the Holy Ghost in the form of a dove; (2) on the western wing (opposite the altar), the Saviour; (3), on the southern wing, the Saviour as a child, surrounded by angels; (4) on the northern wing, God Almighty, with a sceptre in one hand, and the Book of Judgment in the other. The respective cost of these six works of art were as follows:—The central dome, 100,000 roubles (about 10,000*l.*); the border, 100,732 roubles; the smaller cupolas, 43,000 roubles. There are 177 marble tablets in the walls of the cathedral, with inscriptions relating to historical events.

## NOTES.

SOME months ago we gave an account of the projected expedition of exploration to be undertaken by Mr. Flinders Petrie, on behalf of the Egyptian Exploration Fund. Mr. Petrie has just returned to England, having completed his first campaign amid the extensive ruins of the ancient city of Zoan or Tanis. The vast mounds of *débris* which mark the site of the ancient capital of the Delta provinces were so extensive that the works had to take the form rather of prospecting than a thorough and systematic clearance of the site. The results obtained from a series of shafts and trenches sunk and excavated in the great temple area are of the greatest importance, as the antiquities discovered show that from the early days of the fourth dynasty until the time of the Ptolemies, the shrine was a favoured one. The earliest inscribed record is the inscription of Pepi, of the sixth dynasty, which was found built into the wall of a later edifice. One of the most curious results of the work here has been the revelation of the piratical tendencies of some of the greatest Pharaohs. Rameses II. (Sesostris) seems to have been a great offender in this way. Requiring a statue of his mother, he took one of a princess of the twelfth dynasty, altered it by having the dress and hair elaborated in a Ramesside fashion, in place of the antique simplicity; trimmed away the sides of the lower part of the thumbs, as they were thought too heavy, and then put on a bold inscription appropriating it; while the face was left fairly untouched. Above the whole vast edifice of the Temple towered a vast figure of Rameses himself, the building only reaching the waist. From fragments of arms, feet, and legs which remain, it is estimated that this colossus must have been at least 100 ft. high, and probably the heaviest statue known. Mr. Petrie brings with him a number of photographs and plans, and his report will be a valuable addition to Egyptian archæology.

BY the death of the Rev. Mark Pattison, late Rector of Lincoln College, Oxford, we have lost one of those rare and widely cultured intellects whose absence will be felt and regretted among all classes of educated men. His name was most prominently associated with the higher class of literary study and literary work, but nothing came amiss to his shrewd and observant mind; questions such as those of electric lighting, of natural history, of art criticism, all aroused his interest; and none who ever "talked architecture" with him, and noted his quiet yet trenchant criticism, and his faculty of immediately going to the root of the logical meaning of the art, will consider that a word *in memoriam* of him is out of place in an architectural journal.

THE opinion we have already expressed in regard to the possible extra risk of such fractures as that which caused the dreadful accident at Penistone, arising in the case of crank axles as distinguished from continuous axles, is also adopted, we observe, in an able letter to the *Times* of Thursday last by Mr. G. F.

Armstrong, who, while stating that from his own personal knowledge the firm who make those axles spare no precaution that human skill and foresight can suggest in their manufacture, adds :—

"The real fault is in the design of axles of this character, not in their manufacture. Of all the mechanical elements which go to form the modern locomotive the cranked axle is mechanically the weakest, and a moment's consideration will show this to be the case. Suppose one of these axles were placed in an upright position, as a column, and employed to support a load placed on its summit, or, what is more to the point, and would also be far more trying to it, as a structure, to resist a series of downward blows, delivered in direction of its length, its inherent unfitness for such a purpose would at once be apparent. Nevertheless, this is precisely one of the functions which, in the locomotive, it is called upon to perform, but with this difference,—that the blows are then delivered, not axially, as would be the case in a column, but on the outer rim of the wheel, which in mechanical effect is the same as if the blows were delivered upon the axle, through the intervention of a lever equal in length to the radius of the wheel. The effect of this kind of usage may easily be conjectured. The material of which axles thus circumstanced are made, even when perfectly sound, and without flaw of any description, becomes in a comparatively short time fatigued, and would, were the structure not renewed, give way just as the one at Penistone did."

By the "blows on the rim of the wheel" Mr. Armstrong, of course, means those which arise from the "charge" of the flange against the rail in ordinary oscillation, or in going round a curve. This view of the matter alone explains why such a breakage should be more probable in going round a curve than on the straight; and it forms also, we may observe, the best answer to the ignorant and unpractical suggestions which writers in the daily papers have made as to the increased safety by deeper flanges. On Mr. Armstrong's theory, which we believe is quite correct, the blow of the flange against the rail will rather fracture the the axle than lead the flange over the rail. Could more be said for the safety of the present flange?

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ABOUT the same time that our remarks on the proposed alterations at Westminster Hall were going to press last week, we observe that Sir G. Campbell addressed a question to the First Commissioner in much the same sense as that which we have been advocating, inquiring "whether, since the report on Westminster Hall (just presented) showed that, from the time it was built and 'divers lodgings' were attached on the west side till the Law Courts were demolished the other day, the space on the west side of the Hall always had been occupied by useful buildings, he would fully consider the growing wants of Parliament, and provide for them?" The First Commissioner replied that Sir C. Barry had intended to erect an additional wing to "this building," running from St. Stephen's porch, and meeting another coming from the clock tower. This extension, however, was abandoned some years ago, and he could hold out no prospect of its being revived, on which Sir G. Campbell intimated that, considering the strong opinion expressed by the Prime Minister in regard to the delegation of the duties of the House, he should take an early opportunity of asking him whether he will use his influence with the First Commissioner of Works not to make such delegation physically impossible by devoting the only available space to a piece of sham ancient architecture. We venture to hope that some other members of the House will show themselves alive to the fact that sham Mediæval work is of very questionable value, and that the suggestions of Sir C. Barry, who was a practical man as well as an artist, may be worth consideration.

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AMONG the special questions to be considered at the approaching Congress of the Social Science Association, those which more particularly deal with the class of subjects interesting to our readers are the questions in the Health Department on the "Best means of dealing with town sewage," and on the "Best means, legislative or other, of securing those improvements in the dwellings of the poor which are essential to the welfare of the community." The Health Department have set themselves a tolerable task in those two questions, and if they can elicit a satisfactory answer to them they will deserve well of their country. In the Art Section, the really practical questions are "Should elementary instruction in drawing be made a part of national education?" and "What is the value to the ear, the mind, the health, and the disposition of the young, of class instruction in music?" Of the former we would only remark that to our mind the affirmative goes without saying; instruction in drawing means instruction in the meaning of the objects we see around us, and the cultivation of the power of *seeing*. We are convinced that the difference between the two boys in the story of "Eyes and No Eyes" was, that "Eyes" had been taught to draw. As to the musical question, we hope it will be discussed by those who understand what teaching music means, and not, as we heard it at the Manchester Congress, by a meeting composed of doctrinaire schoolmasters imbued with mistaken convictions about a supposed royal road to reading music. The third question in the Art Department, "How can a love and appreciation of art be best developed among the masses of the people?" is one of those questions out of "Cuckoo-Cloudland" which have a way of turning up at social science congresses, and have about as much practical bearing as the question, "How may the general good of mankind be best attained?" We will suggest that as a departmental question for the next Congress.

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WE fear the statue of Burns in the Embankment Gardens cannot be added to the very brief list of our successes in out-door monumental sculptures. It is, as is generally known, a reproduction of that by Sir John Steell at Dundee. The poet is represented seated, and with a pen in his outstretched hand, in a more conscious and theatrical attitude than we can at all associate with the idea of Burns. The face is shorter and rounder than the accepted portraits of Burns give us the notion of. It must be admitted that Burns is a difficult subject for the sculptor, inasmuch as the finest point in his face, his expressive dark eyes, with which all who knew him were struck, is exactly what sculpture cannot convey. But it might have been possible to catch somewhat more of the air of rustic dignity which one can imagine to have characterised Burns, instead of draping him and putting him into "an attitude" at variance with all our ideas of that simple unaffected man of genius. The pedestal, supplied by Messrs. A. Macdonald & Co., of Aberdeen, is a fine block of the native granite, but too large and obtrusive in its polished mass. The work, in short, is pretentious, which is, above all things, what a monument to Burns should not be. We cannot allude to the unveiling of the statue without a word of admiration for Lord Rosebery's speech on the occasion; as true in critical appreciation of his great countryman as it was eloquent in wording. In fact, the speech was the only wholly satisfactory part of the affair.

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THE elevation of the new office for the Bank of Scotland in George-street, Edinburgh, is completed. It presents a stately and dignified aspect, is correct and harmonious in its parts, but is somewhat cold and uninteresting. The style adopted by the architects, Messrs. Kinnear & Peddie, is the familiar variety of Italian introduced by Sir Charles Barry, of which the Reform Club in Pall Mall is a well-known example.

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A GRAND opportunity for architectural effect has been missed by the architect of the Waverley Hotel, which occupies one of the finest sites in Princes-street, in the same city, adjoining the Scott Monument. It is true he was hampered by a mistaken economy on the part of the proprietor, who has elected to build the new hotel in two sections, so that the new portion when completed might be used along with the old portion left standing. This necessitated the retention of the original low ceilings, but no effort has been made to group any of the stories together so as to avoid the piled-up effect of flat above flat. The new premises consist of six floors, with two in the Mansard roof, and the elevation is profusely decorated with carving and polished red granite shafts at the division of the window lights. The ornamentation is crude and unsatisfactory, and some of it, after execution, has been cut off.

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THE "Society for the Protection of Ancient Buildings" are appealing for funds to preserve from further decay the interesting little chapel of Llandanwg, near Harlech. From the sketches circulated with their letter, it appears that the church is a small building about 50 ft. in length, on the sea-shore, about two miles from Harlech, of which it was anciently the parish church.

"The nave and chancel were continuous, forming one chamber without a chancel arch, though the timbers of the two roofs were differently treated, and there was a chancel-screen of oak. Of the existing fabric the chancel is the best preserved. It was lighted by three windows, one north and south and one east. . . . . The repairs recommended by the Society are, that the tops of the walls should be made good, the fallen timbers of the nave, as far as possible, replaced, new rafters, &c., provided, and the roof of the whole building covered with local slates bedded in mortar. Beyond this, shutters will be provided to the windows and iron ties placed across the building where required to prevent the walls from being thrust outwards; and it is distinctly to be understood that the subscriptions made in consequence of this appeal are made on the understanding that nothing beyond what has been recommended by the Society will be done."

A sum of 80*l.* is wanted to accomplish this preservative work. We cannot always support the procedure of the Society, but are glad to be able to do so in this case.

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MR. LABOUCHERE quoted in "The House" last week some of the strong expressions used in the report of the principal dockmaster to the East and West India Dock Company as to the state of the Thames at Blackwall and the neighbourhood. The minute of the Board was that "The condition of the water is such as tends to the enervation of the staff, and would be a factor in inducing cholera. The matter should be pressed upon the notice of the Board of Works and the Government, with a view to the river being dealt with, not only in the interest of the docks, but of the citizens at large." There is, however, obviously, no possibility of any immediate change in this state of things. The distance to which sewage contamination, in visible and palpable form, finds its way up, is painfully evident from Putney Bridge at the flood, where the water comes up with thick curls and scrolls of brown matter just beneath the surface. Above Chiswick the mixture gets thinner, though even here the banks at low water show ample evidence of what has been brought up. Above weir we consider that the asserted pollution has been greatly and sensationally exaggerated. But the state of the tidal Thames is most serious, and calls for the earliest possible adoption of measures, which must be on a large and costly scale, for getting the sewage far enough out to elude being brought up wholesale with every flood tide.

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"TO remain in Gallery No. 2 is impossible, the smell of cookery is quite too awful." Numerous visitors at the Royal Academy Exhibition in the recent weeks would have been ready to repeat this lady's words; or to invent something more forcible, as they recollected that Gallery No. 2 had, in fact, no exclusive monopoly. The concentrated quality of the smells as the afternoon advances has been remarked upon by connoisseurs in evil odours; they have even gone so far as to suggest that the cooks must be in fault, for that the smell of good cookery, though it obtrudes at the wrong time, has always some redeeming points. In respect of this, the most universally appreciated of the fine arts, the importance of the instruction, *celare artem*, does not commonly need an expositor. Perhaps, when next year brings to us so many elegant surprises at the Academy,—such, for instance, as

a gallery in which architecture will "sit alone," and find there admirers fit, though few,—it will be made possible for delicate people to attempt to do justice even to the second gallery, and no one will be wearied of the idea of refreshment by its fearfully pertinacious appeals.

## THE CHÂTEAU OF CHANTILLY.—II.

We learn from that chapter of the work dedicated by the philosopher Cousin to Madame de Longueville which relates to the Prince de Condé and the splendours of Chantilly that as early as 1845, the Duc d'Aumale, then commanding the French army in Africa, entertained the idea of rebuilding the castle demolished during the Revolution, and of associating his name with it after the example of Anne de Montmorency and the great Condé. We find proof of this resolution in the various preliminary works then executed, and in the preparation of a scheme for the entire reconstruction of the castle dated before the Revolution of 1848. Thirty years, however, passed away before the Duc d'Aumale found himself in a position to realise what had never ceased to be his prevailing idea, and from 1848 to 1875 Chantilly remained uninhabited except during the time when Lord Cowley, British Ambassador to the Emperor Napoleon III., made a summer residence of the Capitainerie or Châtelet, the only part of the building left untouched by the Revolution.

In 1875 the Duc d'Aumale summoned M. Henri Daumet, an architect trained in the École Française at Rome, and entrusted him with the difficult task of rebuilding the castle from entirely new designs. Added to the inevitable conditions imposed upon him in common with all previous restorers, M. Daumet had to follow certain definite instructions of a peculiar nature founded upon circumstances upon which it will be necessary here to lay some stress.

The successive calamities which had overtaken the latest owner of Chantilly had deprived him of any occasion for providing for the accommodation of a family. The Duchesse d'Aumale had died during his exile in England, and his last surviving children, the Prince de Condé and the Duc de Guise, had also been taken from him. The supplementary Château d'Enghien, built in the eighteenth century, was spacious and comfortable enough to accommodate at need the brothers and nephews of the duke. The new plan, therefore, had only to reserve a small portion of the castle for private apartments, and Chantilly was to become a palatial museum of art, in which the prince might collect the art-treasures amassed by himself and those that had belonged to Écouen and old Chantilly; the restored castle was thus to recall the memories at once of the Constable Anne de Montmorency and of the great Condé. The famous two-storied subterranean buildings were to be restored and rearranged. One wing only, called "Le Logis," was to be converted into living-rooms. In the remainder were to be placed the pictures, according to their different schools, and the collections of antiquities, of engravings, and of gems. The celebrated series of painted glass windows brought from the castle of Écouen had also to be displayed, and for this purpose a gallery must be prepared, the number of its windows corresponding with that of the specimens.

The Duc d'Aumale had carried the greater part of his treasures with him into exile, and those who have visited Twickenham will find at Chantilly many similar arrangements, resulting from similar needs. A magnificent series of tapestry hangings, representing hunting scenes after cartoons by Van Orley, dictated the measurements of the gallery dedicated to St. Hubert. Then, again, a new chapel had to be built, to contain the beautiful stained-glass windows lately discovered in the store-rooms of the castle, packed in the cases in which they had been brought from the castle of Écouen. They represented the Constable surrounded by his children (dated 1545), and had been carefully taken to pieces and preserved by Alexandre Lenoir. By him they were deposited in the Musée des Petits Augustins, and upon its suppression they were restored to their original owner the Prince de Condé.

The chapel was also to be fitted up with old wooden carvings from Écouen, a *chef-d'œuvre* of the art of the Renaissance, and with the beautiful high altar in marble designed by Jean Bullant, which had escaped destruction. Finally, the same sanctuary was to receive the funeral monument of one of the Princes de Condé from the Church of St. Paul in Paris, consisting of groups and bas-reliefs in bronze, from the hand of the sculptor Sarrazin; and the urn containing the hearts of the Princes de Bourbon, found by a countryman in the ditches round the cemetery at Chantilly which had been outraged during the Revolution.

Such were the preliminary conditions for the rebuilding of the great castle. As for the Châtelet, it was to remain almost unaltered architecturally, all that was necessary being to restore and repair it for the reception of the Prince's library, which is well known to be a valuable one, and to replace in its original condition the "Galerie des Actions de M. le Prince," executed by order of the great Condé. In the place of honour in the centre of this gallery were arranged the banners of Rocroy, the weapons and bust of the hero, relics which the Duc d'Aumale had carried with him into exile as his most precious possessions.

It will be plain to our architectural readers that though such a programme as this might have its disadvantages, it would nevertheless be useful to the architect by giving definite points to work from and by dictating certain forms as inevitable. But it must further be borne in mind that the architect was absolutely confined within certain limits of circumference (we allude to the necessity for adhering to the irregular ground-plan of the subterranean buildings), and that an exceptional amount of skill would be required in order to surmount so many combined obstacles.

The immediate result of the statement laid before M. Daumet was to suggest to him a plan for the upper stories in no respect corresponding to the plan of the subterranean buildings. I believe that this is, perhaps, a solitary example of such an arrangement in a building of so great importance. A single instance will serve to show the nature of the alterations effected, and the preliminary works which must of necessity be carried out underground. In the Louis XIV. plan the chapel occupied the central part of one of the façades looking upon the triangular courtyard; now it projects from one of the extremities of the triangle (see the plan in this week's issue, and the perspective view published last week). Another improvement was the establishment of a communication between the underground buildings and the Châtelet such as had not before existed, affording a noble and dignified entrance from the grand staircase connecting the upper and the lower buildings into the great castle. This was effected by means of excavations in the solid rock, and that large portion of the subterranean buildings (which are so lofty and capacious that on one occasion a theatre was erected in them) on a level with the "Parterre de la Volière" has been turned into offices for the transaction of business and for the preservation of archives, abundantly light and airy, and pleasant for habitation.

We shall now rapidly pass in review the main points of the edifice, endeavouring to give an idea of the way in which M. Daumet has solved the problem proposed to him by the Duc d'Aumale, and showing how far he has been able to reconcile utilitarian conditions with artistic requirements and architectural beauty.

Following the general plan, we shall enter the castle by the steps of the terrace called "Le Connétable." The equestrian statue of Anne de Montmorency, overthrown at the time of the Revolution, is shortly to be re-erected here; it is to be placed upon a lofty pedestal, in the style of that of Colleone at Venice. Crossing the moat to the former postern, we still see to right and left of us the lower part of the two towers of the Middle Ages levelled with the top of the "Connétable," and find ourselves opposite the principal front of the castle (see illustration of the "Principal Entrance"). In the buildings of the Middle Ages, of the Renaissance, and of Louis XIV. this front showed lofty stories of living-rooms abutting on to the corner towers. It is now nothing but a covered passage, uniting the two main parts of the building, and consists of four arches on each side, with a central design reminding us of the Baptistery of Louis XIII. in the Castle of Fontainebleau. It is clear that the architect's idea in turning this front into an open gallery was to give air to the triangular courtyard inside. We would draw attention to the skill with which M. Daumet has overcome the difficulties caused by the irregular shape of the courtyard, and has contrived to find the axes of construction indispensable to every good architectural composition. In the Cour d'Honneur, which we have just entered, in the axis at once of the portico, and of the north corner tower, we find the first vestibule which forms the entrance to the inner castle; this is a lantern, crowned by a dome, projecting into the courtyard, and leading into a second and larger vestibule.

We now find ourselves opposite the Châtelet, whose upper story is on the same level as ourselves. To our right we have the "Galerie des Cerfs"; to our left, a magnificent staircase in the form of an elongated horse-shoe, of which the wrought-iron balusters are a *chef d'œuvre* of modern French smith's work. This leads us to the chapel, with its bell-tower rising above the corner of the principal façade. Turning to the right and ascending some steps, we come to the "Galerie des Cerfs" (see illustration); there M. Daumet has hung Van Orley's superb tapestries, to which the Count of Toulouse has added borders of his own armorial bearings. Above the entrance to this hall is the musician's gallery, corbelled out in the style of the Renaissance. The huge fireplace at the other end has a decorative panel,—a St. Hubert,—painted by Paul Baudry, decorator of the *foyer* of the Opera House. A door on the right, at the extreme end of the hall, leads to the picture-gallery, where we find the works of the different schools which form the duke's collection; this gallery occupies in the plan the interior base of the triangle, and abuts on to the second tower of the north front, which opens into the gallery and forms a continuation of it on a somewhat higher level. The spaces between the ribs of this circular vaulted recess are ornamented with charming designs by Paul Baudry; here the Prince has arranged his collection of sketches by masters of every school.

Turning our back to the door of the "Galerie des Cerfs," and looking down the centre of the picture gallery to gain a general effect, we see that the projection of the corner tower which opens into the gallery has afforded the architect an opportunity for some very ingenious architectural decoration effected by carving the white stone of which it is composed. Still looking down the central line to ascertain our relative position, we shall see a door at the end of the picture-gallery on the right; this leads to the *logis*, or private apartments of the prince, occupying two stories of the whole of the north wing between the corner tower of the principal façade and that where the sketches are exhibited. It will be observed with what ingenuity, exactly at the intersection of the triangle formed by the interior courtyard, the architect has drawn a straight line dividing his great triangle into two equal triangles. This line he has made the axis of the chapel, of the terrace adjoining it, and of the courtyard, thus concealing the irregularity of the site to which he was bound to adhere. We need not examine the interior of the *logis*, only observing that it is approached by an external gallery facing the courtyard, exactly as the picture-gallery and "Galerie des Cerfs" are approached by the "Galerie des Offices," which renders them available for habitation. There are three doors on the left of the picture-gallery: the first leads to the "Tribune," the second to the "Cabinet des Chartres," while the third (corresponding to the door leading to the *logis*) opens into a long gallery called the "Galerie de Psyché," extending from the tower where the sketches are to the tower "De Trésor," which forms the west corner of the castle. This gallery, specially constructed to contain the beautiful series of stained-glass windows from Écouen representing the fable of Psyché, thus forms the north-west front of the castle. Entering from the picture-gallery we shall have on our left the windows containing these lovely designs, executed in *grisaille*, probably by Bernard de Palissy himself. The wall on the left is covered with an interesting collection of portraits and sketches. The north-west tower, opening from this gallery as the north tower opens from the picture-gallery, contains the "Trésor," that is to say, the antiques, bronzes, gems, jewels, and other valuable curiosities.

We must now retrace our steps into the "Galerie de Psyché" in order to leave it by the door on the right leading into the "Tribune." This is a perfect sanctuary of art, a hexagonal chamber with a vaulted roof richly

decorated in the taste of Nicolo del Abbate by carvings framing views of the various residences whose memory is dear to the owner of Chantilly. The Tribune contains the cream of the collection, the paintings by Filippo Lippi, by Sandro Botticelli, the masterpieces of the Italian school, Raffaelle's Virgin "des d'Orléans," the Burgundian paintings of the fifteenth century, and a few examples of the modern French school by Ingres, Delacroix, Décamps, &c.

We may now return to the picture-gallery, again pass through the "Galerie des Cerfs" into the vestibule, and leaving the oval staircase in front of us pass from the ground-floor of the great castle into the first floor of the Châtelet, which is on the same level. Outside, this charming little building designed by Jean Bullant about 1540, and forming a rectangle with the south-west front of the castle, affords a perfect type of the architecture of the French Renaissance. Inside, the decoration and furniture of the rooms give a good example of the wealth of the age of Louis XIV. The library and a suite of rooms, the Salon des Chasses, Salon d'Europe, Chambre de M. le Prince, and Cabinet de M. le Prince occupy the main body of the building, fronting on one side the "Parterre de la Volière," on the other the courtyard of the Châtelet. The Salon des Singes and the long "Galerie des Actions de M. le Prince" occupy that part fronting the lake. The smaller façade at right angles looking on to the "Connétable," contains the Salons de Musique and Jean Bullant's rooms. Between the chapel and this part of the façade the old drawbridge is still preserved, and gives the character to this charming façade.

We might now descend from this upper story to the ground-floor and the courtyard of the Châtelet, and so find ourselves on a level with the chapel, but we shall have a better idea of the architectural effect if we retrace our steps into the "Galerie des Actions de M. le Prince," and through the apartments as far as that larger vestibule by which we first had access into the castle. Turning now to our right, we descend the magnificent horse-shoe staircase, which, by the grandeur of its treatment, masks the difference in level between the rock on which the barons of the Middle Ages constructed their fortress, and the Châtelet, the work of a later age.

The importance of the chapel as a portion of the design is greater in the present building than in any previous ones. The chapels of the Middle Ages and of the Renaissance (as far as can be judged from Ducerceau's sketches), projected close to the entrance by the great staircase. The great Condé's was apsidal in plan, and occupied the site of the present vestibule. M. Daumet has made the chapel an important feature in his design. His circular apse has the advantage of abutting on the principal façade, and corresponds on the south-west with the corner tower on the north.

We have already spoken of the magnificent windows from Écouen, which form the principal ornament of the interior of the chapel. The wood carvings from the same chapel have also been noticed, as well as the high altar with its bas-reliefs of the age of the Renaissance, representing the sacrifice of Abraham. M. Daumet has displayed special ingenuity in his arrangement of the fine bronze statues and bas-reliefs of Pierre Sarrazin, upon a circular plan, for which they were not intended when they were erected in the Church of St. Paul in Paris, upon the tomb of a Prince de Condé. He has placed them in a kind of sanctuary in the apse behind the high altar. In the centre is the funeral urn, the receptacle of the hearts of the Princes de Condé.

We have now completed our round of the Castle of Chantilly. Our description, although necessarily superficial, has, we hope, been graphic and practical. We must express our opinion, in conclusion, that M. Daumet has given proof of singular ability in surmounting the obstacles which beset him, chief among them being the extraordinary irregularity of the ground-plan. The only objection we have to make is that the north-west portion of the building, the front façade of the "Galerie de Psyché," does not correspond in height with the underground buildings which descend to the river level. Upon this side the statue is not in proportion with its base.

It is the duty of every architect who undertakes, not a mere restoration, but the complete reconstruction of a building, to stamp it with the character of his time for transmission to future ages. In this case the work was a compromise between restoration and reconstruction. What style would be the necessary result of such a union? Hampered by the neighbourhood of the Châtelet (in the pure style of the French Renaissance), and by the subterranean buildings with their escarpments on the trenches, how could the architect sound a distinct note, giving to the archæologists of the future a key to the secrets of his own age? M. Daumet has been able to solve this problem without weakening the character of his work, for the excellent reason that the programme submitted to him by the Prince being at the same time archæological and modern, lent itself to the joint conception. Following this, the architect could not fail to reflect the ideas which had dictated it. The rebuilder of Chantilly, an historian with a seat in the French Academy, was inspired with the idea of rivalling the Constable Anne de Montmorency and the great Condé. He desired also to do honour to some noteworthy examples of the art of the Renaissance and of the age of Louis XIV. Naturally, too, he took account of those individual requirements which were peculiar to himself. Finally, since *noblesse oblige*, he wished to show himself as a prince of modern days, recognising the necessities of his time and rank. The new Castle of Chantilly thus forms at the same time a national monument of past ages, a museum of art, and the private residence of an historian of royal race, the heir of Montmorency and of Condé. This is the philosophical and æsthetic signification of the new Castle of Chantilly.

## RAILWAY RETURNS FOR 1883.

The railway Returns for 1883 show a considerable increase in the earnings per mile; and that to an extent which, had it not been counteracted by other causes, would have told materially upon dividend. But against a gain of 8 per cent. in gross mileage receipts has to be set an increase of 10 per cent. on capital cost per mile, and an increase of nearly 1·2 per cent. in working expenses. The result is that the proportion of net income to capital, which is the true test of prosperity, is almost identical. The main figures for 1882 and 1883 are as under:—

| | 1882. | 1883. | Increase. |
|---|---|---|---|
| Length in miles | 18,474 | 18,681 | 207 |
| Cost per mile | £41,605 | £42,017 | £412 |
| Gross income per mile | £3,512 | £3,809 | £297 |
| Working expenses per cent. | 52 | 52·6 | 0·6 |
| Net measure per cent. | £1,683 | £1,803 | £117 |
| Profit on capital per cent. | 4·27 | 4·3 | 0·03 |

The feature most to be regretted in the above table is the steady increase in the capital cost per mile. While only 207 miles of new line have been added to our railway system in 1883, the sum of 412*l.* has been added to the cost of every existing mile of line. The contrast that is thus presented to the management, and, we may add, to the prosperity, of the French railways is most striking in this respect. In 1867 every mile of railway in France (taking the main bulk of the railway property comprised in the six great systems) had cost 28,592*l.* In 1882 the cost of each such mile was 28,500*l.* The cost in England in 1867 was 35,254*l.*, which had grown, as before stated, to 42,017*l.* in 1883. The working costs were, in France, 46·7 per cent. of gross income in 1867, and 49·2 per cent. in 1882; but the rates of fares and freights were 11·15 per cent. lower on the Continental than on our own lines. Working costs, in England, consumed 50 per cent. of income in 1867, and 52·6 per cent. in 1883; but, in 1842, the income of the London and Birmingham Railway, which had not then undertaken an immense mineral traffic at low rates of freight, amounted to 6,880*l.* per mile, out of which the working costs only came to 39 per cent. In 1848 the working costs on the Great Western Railway amounted to 40·6 per cent. of the gross income. At the present time, taking into account the lower freights and fares as well as the lower proportionate working costs in France, the rate of working expenditure in that country is nearly 11 per cent. lower than in England. It is on evidence before the Select Committee on Canals (252, 1883, p. 250) that "the proportionate cost of the engineering expenses (locomotion, maintenance, and repairs) on those railways of which the returns have been analysed, rises in a ratio of about half per cent. of gross revenue for every 1 per cent. of gross revenue which is derived from mineral traffic." This computation, taken from English lines, is in remarkable accordance with the fact that the latter derive a little more than 22 per cent. of their revenue from their non-remunerative mineral traffic, which the French lines refuse to carry, and that the working expenses are 11 per cent. above those of the French lines.

Thus from 1854 to the present time, while the net earning on the capital of the English railways has been substantially stationary, rising a little at one time and falling at another, but maintaining no advance, the nett earnings on capital of the six great French lines have increased by 78 per cent., rising from 3·11 to 5·56 per cent. That English shareholders should be content to receive so much less by way of dividend than would be divisible if the sound principle of only carrying at remunerative prices were adopted, is one of those things which can only be understood on the strength of the proverb that what is everybody's business is nobody's business. The non-remunerative traffic tells against dividend in two ways. One is the proportionate diminution which it causes on net, as compared to gross, revenue. The other is the loss of carrying capacity of the lines, due to the difference of speed in the trains; to which the difference of cost between the 28,500*l.* per mile of the French lines and the 42,017*l.* per mile of the English lines, is mainly due. For the difference in gross revenue per mile between 2,964*l.* in France and 3,512*l.* in England in the same year, is almost exactly the sum received for the carriage of minerals.

If the Board of Trade, instead of bringing forward a Bill which collapsed under the disapproval of all parties interested, had taken the advice long since given by their own officers, and insisted that the English Railway Companies should publish accounts as distinct as those of the French, German, and Italian lines, and our own Indian and Colonial railways, the plain facts would have been so unmistakably brought home to the English railway shareholders that they would have been likely to combine for the purpose of ensuring the 8 per cent. dividend which might be earned at less risk to the public than the present average net return of only 4·3 per cent. on their capital of 785,000,000*l.*

## FRANCE AT THE HEALTH EXHIBITION.

There are many points of similarity between France and Belgium exhibited here; not only in general principle, but also in regard to detail, so much so that it becomes difficult to draw a comparison or to clearly determine if any preference could be accorded to either nation for any innovation or improvement. The "object teaching" system is shown in much the usual way,—the manufacture of cotton, paper, &c., being traced through the various stages; and also the use to which plants can be put for colouring purposes or making fibrous material. As might be expected, the art of dress-making receives attention; and part of the children's education is directed in this channel, as cutting-out and making-up their own small garments forms a useful preliminary to the more business-like view which is eventually taken of that happy condition of being well-dressed, which with a Frenchwoman is usually supposed to confer more peace of mind than it is in the power of religion to bestow. China-painting, metallurgy, and wood-working on a small scale are taught in their technical schools, of which some good photographs of both exterior and interior arrangements are shown in working order, apparently carried out very systematically. The idea of specially ventilating the workshops is also recognised; although in this instance the height of the building containing a blast furnace would probably enable the ventilation to be effected without extraneous aid. A drawing of an apparatus for disinfecting clothing and bedding is shown, where the material to be cleaned is passed into a chamber surrounded by hot-air pipes and presumably some disinfectant, and, being subjected to the heat, passes out clean and once more wholesome. The general drawings, of which there are very many in this section, seem to attach more importance to the warming and ventilation of the buildings than to the sanitary arrangements as regards the drainage; for although the schemes for warming are in some cases elabo-

rately shown, the drainage is not detailed to the same extent, but where examples are given they more or less show the ventilation of traps and soil-pipes. Vivisectionists and their opponents may find a good study in M. Pasteur's display of chemical and scientific apparatus, for M. Pasteur does not confine his attention to the animal world, but the prosaic fluids and solids of every-day life are also subject to searching scrutiny.

The ever-recurring question of workmen's dwellings is illustrated in many cases, although we look in vain for the six or seven-storied buildings which we have become accustomed to look upon as inseparable from this movement. M. Lombart, of chocolate renown, has built a small city for his *employés*, two stories and a basement, however, being the extent; and some blocks of buildings, containing three and four sets of rooms, are likewise given, but no special sanitary feature disclosed; but, on the contrary, the few indications that exist would lead one to think that the arrangements in this respect were anything but perfect. One point which strikes us is the absence of the military spirit of education which has hitherto prevailed throughout the kingdom; but, to judge by the illustrations here, the Republic turns its educational tendencies more towards gymnastic and handicraft energy, the secret hope of the soldier under the old *régime* to become the head of the nation has given way to ambitions of a less ephemeral nature. Among the charitable institutions illustrated is the Maternal Charity Society which affords material help to the mother when the child is born and for the first few months afterwards. This society is no respecter of persons, making no distinction of country or religion, but vaccination is insisted upon. Founded in 1784, it was by Louis XVI. in 1788 placed under the protection of Marie Antoinette, and a large subvention granted. In 1810 the First Napoleon decreed that this institution should be founded in forty of the principal towns, and, in 1871, when the Republic was declared, and during the Presidency of M. Thiers, Marshal MacMahon and M. Grévy, until the end of 1882 the subvention of 40,000 francs was inscribed on the budget of the Home Secretary. The Society for the Protection of Infant Life and the "Société des Crèches," founded in 1869, are doing good work,—much needed on account of infant mortality assuming so serious an aspect, and particulars and details are given which will be of interest to those who have given attention to the subject as carried out in this country. The remaining exhibits are mostly of the regulation type, such as school furniture (which appears somewhat unsubstantial after visiting that in the Albert Hall) and drawings from the cast and models from the antique, in which we know the French have always excelled. A few specimens of parquet flooring are added, and where the work is kept quiet it is fairly good, but where they have attempted anything unusual, such as coloured bordering, the effect is meretricious, as the ornament is harsh and angular and badly chosen. In ironwork there are a few well-finished castings and general fittings as well as small pieces of machinery which are creditable. There are also a few miscellaneous drawings of school buildings, large and small, varying much in merit, some of which are very pleasing, but many are of a nature that require no comment, more especially as they illustrate nothing in particular.

**The Footpath Preservation Society.**—This is the name of a society proposed to be formed for the preservation of foot and bridle paths; also for the protection of all rights of way and vacant spaces, such as village greens, &c. A Commons Preservation Society has been established, and doubtless is doing much good; but (say the promoters of the proposed new society), "Footpaths are of equal, or rather of greater, importance than commons,—these latter are comparatively few and far between. It is not every parish that possesses a common, but all localities throughout the length and breadth of the land have numerous footpaths. It may be remarked that, had such a society been established fifty years ago, a considerable number of footpaths would have been saved to the public." It is proposed to form local societies in connexion with the central body. Suggestions on the subject may be forwarded to Mr. Henry Allnutt, *Estates Gazette* Office, 6, Fetter-lane, London.

## WHAT IS ART?

"What is truth"? said jesting Pilate, and did not wait for an answer; "what is art"? says Mr. James Stanley Little,* and does not furnish us with a reply; for it is no reply to say that art is worship, is poetry, is religion, is truth, is the apotheosis of the ethereal, &c. This etymological dance ends where it began and leaves us no wiser. Art, it appears, is pain and anguish; it is also true religion, and true religion is the spirit of theology, so that art is the spirit of theology as well as the apotheosis of the ethereal, and all the rest. If it were worth while a few posing questions might, we think, be culled from this pompous treatise. If art *is* poetry, how can "poetry be the forerunner of art" (p. 16), or "art and poetry be so nearly allied as to be almost indistinguishable." The fact is, the book is without coherence or consistency, and the author uses the same word in fifty different senses. "His work is," he says, "from beginning to end an outcry against oppression and prejudice." Who are the suffering and oppressed?—the victims of prejudice? The author says, in one place, that the writer and artist of merit has no chance unless he has gold or influence to buy his way; that the better his work the greater his chances of failure; and, with delightful complacency, he says a few pages further on that he is "free to admit that there was never a time when merit had so good a chance of being recognised as at present, for it is more possible now than heretofore to break down the barriers of prejudice and misfortune." One instance of oppression or prejudice is given at second hand. A young artist had striven for years to gain admission to the Academy schools, and failed at last because he drew, with the cast, which was to form his probationary test, the dust upon it. We should require proofs more relevant than this, and especially when we appreciate the generally aggressive temper of the author.

There is an old story, which is pat to our purpose, of an emigrant who, landing at New York in the heat of a political contest, was pounced upon by a horde of electioneering agents clamouring for his vote. "Pat's a democrat, Pat's a republican. What are you, Pat"? "Faith, gentlemen, I know nothing about your politics at all. But I'm agin the Government, any way."

And this is exactly the attitude of Mr. James Stanley Little. He expresses himself without reserve upon the subject. "I, for one, strongly believe that the inverse method to the one generally accepted" (whatever that may be, understood) "is the soundest method."

Drawing of at least an elementary character, is generally held to rightly precede exercises in colour and composition; and so, of course, our author would "evolve a picture in an inverse order:—(1) Composition; (2) Tone; (3) Colour; (4) Form; (5) Drawing. Can," he triumphantly asks, "my heresy go further than this"?

Unfortunately, Mr. Little is not only at war with acknowledged methods of art-teaching: he is opposed to the whole of our social ethics. The marriage-tie is an affair of priest and ring, frivolous at best, and sometimes positively unhallowed and pernicious. This is almost as good as the son calling his parents "interlopers." There is much more of this sort of stuff, into which we will not follow the author. His book is an ill-tempered attack upon things in general, and does not in any way answer to its title. Architects have little to thank him for, their art being excluded from his scheme, or named only to be reprobated. The most lovely building in the world adds nothing, in the eyes of a poet, to nature's face, but ugly frowns and hideous contortions (? Melrose); and Decimus Burton's entrance to Hyde Park is a "lean and senseless deformity, meaningless, and positively offensive;" while St. Paul's, the "much vaunted," is "heavy!"

We will not waste more time on this curious and inconsequent essay. There is no satisfactory answer to be given to the question raised by the writer of it. In the present Academy exhibition there are two pictures with an identical title. In each there are husbandmen and horses, trees and sky. Their technical merits are about equal. The one produces no impression whatever upon the beholder; the spirit of the other falls upon him as with a holy calm. The one work is by a painter, the other by an artist, and the quality which differentiates them is art. But who shall further describe it? All essences are inexplicable. Is there a satisfactory definition of the much lower form of art, wit? Art is like electricity,—a *power* which can be felt, but not explained. No man can explain *how* he accomplishes feats in art more than the electrician who employs and directs the tremendous energies of nature can explain their quality. The gifts of art and the discoveries of science are beneficent or malevolent as they are wisely or unwisely used, and we may be sure that indiscriminate railing will not advance the cause of either.

With all the flatulence and coxcombry of the treatise under notice, there is some compensating amusement provided in the self-sufficiency of the writer, who talks of his "argument," and of having "proved" his contentions, as though he had really written upon some system. He is an admirer of Thackeray. Does he remember who "clinched an argument" with the recondite quotation, "Dulce et decorum est pro patriâ mori"?

* What is Art? By James Stanley Little. London: W. Swan Sonneschein & Co.

## ARCHITECTURAL SKETCHING.

The real object and value of architectural sketching appears to be either very little understood or very much disregarded. It is essentially a training, and that, too, of a close and rigorous kind; a means and not an end; one of several necessary courses of study which, if rightly pursued, is calculated to make a successful architect, and if wrongly pursued, to make a very indifferent artist. The volumes of "Leaves from an Architect's Sketch-book" which yearly fall from the press are for the most part collections of very imperfect renderings of the *effect* of ancient buildings intended to be attractive as clever sketches, and nothing more,—fly-leaves cast upon the waters to catch clients. Such sketches have rarely or never the charm of true artistic excellence, because their authors have not had the artist's severe training. To the architect they have little or no practical value.

The motives which actuate the artist and architect are widely separated. The former endeavours to fix upon paper or canvas a sympathetic record of the appearance of things, and to impart something of the sentiment which they raise in sensitive natures. The true business of the latter lies in the analysis of the means by which certain effects in architecture are produced, with a view to future syntheses to be attended by like satisfactory results. To him the effect of a beautiful building might for all practical purposes be noted down in words; but it is of the utmost importance that the means by which the effect is produced should be examined and delineated with care and completeness. This is, however, a long, tedious, and troublesome process; and ladders, tapes, rules, and lead ribbons are very prosaic things. Moreover, sheets of such studies,—more or less weather-stained and dirty as they must necessarily be,—do not make up a portfolio calculated to elicit the raptures of non-professional friends. Whilst, on the other hand, nothing is easier than to secure their applause by a few hasty scratches, and dots and flicks of shadow, which give with a sense of power and freedom in the sketcher a sufficiently accurate suggestion of the subject of his sketch to satisfy the lay mind. And thus it happens that the student for want of caution and guidance enters in at the broad gate, and fills his sketch-book with what will never be of any real use to any human being.

The Institute and Association prizes for measured drawings of old work do something towards correcting this defect; but the cure will never be wrought until the student himself sees clearly how comparatively useless is the system now followed, and how much more he might learn from the patient and systematic delineation of one noble building than from the hasty and casual misrepresentation of a dozen. The volume* before us which has prompted these remarks is an evidence of the great and praiseworthy industry of its author, who has sketched right and left with varying success, and with, we fear, no corresponding advantage, owing to a mistaken course of procedure. The majority of the subjects chosen by him have but little merit as architecture, the minority deserve a

* An Architect's Sketch-book at Home and Abroad. By W. H. Thorp. Leeds: Jackson. London: Batsford.

more deliberate and careful treatment than has been accorded to them by a sketcher whose impartial pencil has dealt with good and bad indifferently. We see no evidence of care in the selection of the examples and no proportion in the respective treatment of them, the general views are often slight and coarse representations of commonplace buildings, and where details are given there is as a rule nothing worth the trouble of exhibiting at large. We would gladly exchange the whole for half the number of plates devoted to the close and complete illustration of a selected tenth part of the buildings portrayed. But then the book would have been addressed to architects and not to clients *in posse*, and one object of its publication would have been defeated. There is still room for a model architectural sketch-book,—Nesfield, Norman Shaw, and Burges notwithstanding.

## A RELIC FROM DOLLY'S CHOP-HOUSE.

"Farewell: and on Tuesday next expect me in London among the booksellers."—*Milton to Gill.*

Amongst his forthcoming reprints, Mr. Elliot Stock announces an early issue from Paternoster-row of the first editions, in facsimile, of "Rasselas" and "The Vicar of Wakefield." The *admonitus loci* will be revived by the binding of some copies in wood preserved from the panels of the dining-room at Dolly's,—a haunt, it is asserted, of Goldsmith, Garrick, and Johnson. That they frequented this tavern is by no means improbable; for it formed one of the four or five coffee-houses in a district which the booksellers have made peculiarly their own for more than a century past. The booksellers, indeed, especially favoured the Chapter in their street, where collected also a large company of University men, country parsons, and college dons. Goldsmith we know constantly visited the Chapter. "I am quite familiar," writes Chatterton to his Bristol home, "at the Chapter house, and know all the geniuses there: a character is now unnecessary; an author carries his character in his pocket." Again, writing from the King's Bench, May 14th, 1770 (three months before his death), he mentions that a friend had undertaken to introduce him to the Duke of Northumberland* with view to a foreign tour; "but, alas!" he adds, "I spake no tongue but my own." A City club at the Queen's Arms, comprising Clutterbuck a mercer, Patterson a solicitor, Samuel Sharpe a surgeon, and Draper a book-dealer, constituted Garrick's standing committee in all matters of theatrical management. At that house, too, Dr. Johnson met his City Club, renewing fellowship with a few survivors of his club in Ivy-lane of some thirty years previously. This was the club from which he stipulated that patriots should be excluded, thus aiming a shaft at Wilkes, and consistently with his definition of a patriot as a factious disturber of his country's government, of patriotism as the last refuge of a scoundrel. Turning for the present from Queen Anne's clergy, Dr. Mead and the Fellows of the Royal Society, together with Addison and his "honest country gentleman"† at Child's; as well as from the trade meetings, the Wet Paper Club and the "Witenagemot" at the Chapter, we come to those who may with certainty be identified with the better fortunes of Dolly's. Amongst its patrons are reckoned canonists and doctors of the civil law from the Commons; Wilkes, Dr. Gower, Dr. Buchan, and Dr. Fordyce. These are followed in less remoter times by Brougham, Orsini, Denman, and Charles Sumner, the American statesman. Bonnell Thornton celebrates in rapture the gill-ale and beefsteaks to be had at Dolly's.

Dolly's stood in Queen's Head-passage, on the western side, a thoroughfare leading from Newgate-street into Paternoster-row. A coffee-house was opened here, hard by the supposed site of Tarleton's ordinary, the Castle, many generations ago; it escaped the Great Fire which played such havoc in the immediate neighbourhood. But at Queen Anne's accession the house became famous. She established here one of her favourite servants, Dorothy, a kitchen-maid, on the latter's marriage. The story further runs that Anne herself visited her old servant at a house which thereupon had taken the Queen's Head for its sign and Dolly's for a name. The royal patronage gave celebrity to the tavern, which speedily found high favour with the *beaux esprits* of that reign. The house itself had been most substantially built; and covered an extensive cellarage, ranged on two floors. Amongst its more notable features were the handsome staircase, an oaken wainscoted parlour conspicuous besides for two curious fireplaces and their mantel-shelves; and a posthumous painting of Dorothy, in Kneller's manner, variously ascribed to Opie or Gainsborough. The original building was demolished about thirty months ago, for the extension of a warehouse in Newgate-street. The new premises are in course of re-erection, having suffered severely in the fire which broke out last April in Lovell's-court, on the northern side of Paternoster-row.

* Sir Hugh Smithson, bart., created Earl Percy and Duke of Northumberland 22nd of October, 1766,—the nobleman to whom Goldsmith pleaded not for himself, but for his brother Henry, in Ireland.

† The *Spectator*, Nos. 1 and 609.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

FOURTH NOTICE.

From the province of New Brunswick appear forty different specimens of the woods indigenous to the country. There is hung on the walls of the Court allotted to this province a map upon a large scale, prepared by Dr. Bayley, showing the forests and unsettled land of New Brunswick and the geological nature of the various localities. There is also a map of the Dominion of Canada taken from the Geological Survey. In the northern portion, up to the sixty-fifth degree, are found the spruce, the larch, and the balsam-poplar; whilst to the southward, the bird's-eye maple, ash, and birch are common; whilst the hemlock tree (*Abies Canadiensis*) abounds. This latter tree is chiefly valuable on account of the tannin extracted from its bark, which is exported in a liquid state. The wood was, until lately, considered of no commercial value, and was left to rot on the ground; it is now, however, worked up into interior fittings. Where the soil is poor, especially in the central and eastern districts, the forests consist principally of spruce and pine, which are formed into deals and transmitted to England. Along the St. John and its tributaries, where the soil lies on the upper silurian formations and is very fertile, there are splendid forests composed chiefly of black-birch, beech, ash, elm, and maple. These hard woods remain almost untouched, and afford a large reserve supply for future use. They frequently suffer from fire and blow-downs; but when they are placed under proper supervision, of which there is none as yet, these casualities may be greatly mitigated. Many of the aboriginal Indians have settled down on reserve lands specially designed for them, whilst others are employed as lumbermen. They consist of two tribes, the Mic Macs and the Melicetes, and are, along with the early French settlers, with whom they are interspersed, members of the Church of Rome. The timber is generally floated down the small streams into the Miramichi and St. John in early spring when the freshets come on, where it is formed into rafts for transport down these rivers. The newly-formed railway which runs parallel to the St. John is also called into requisition for the transport of the timber. The value of the wood exported is about 800,000*l.* a year, and is likely to increase considerably as the resources of the country are opened up. The total acreage of the colony is 17,393,410, that portion of it along the banks of the St. John being fertile, but along the coast it is bare and uninteresting; and the same may be said of a great central track estimated at 10,000 square miles, where, however, excellent coal abounds, which may yet form an important item in the products of the colony. According to the census of 1880-81 the population numbers 321,233, of whom one-fifth are descendants of the original French settlers, and who adhere tenaciously to the use of the French language.

The small island of St. Vincent (forty miles by ten miles; population in 1831, 27,122), enters a very creditable appearance. This island, which was ceded to Great Britain at the peace of 1763; taken by the French in 1799; and restored to Britain in 1783, is generally mountainous and rugged. The intermediate valleys, however, are fertile in a high degree, the soil consisting chiefly of a fine mould, composed of sand and clay. In 1812 St. Vincent was almost desolated by an eruption of the Souffrier mountain, which had remained quiet for nearly a century before, but from which a torrent of lava and clouds of ashes issued which nearly covered this island. The chief products used to be sugar, rum, and molasses, but the cacao, from which chocolate is made, is now becoming more extensively cultivated than the sugar-cane, and it is more easily reared,—specimens of the fruit are exhibited, as are also specimens of the root of the lilaceous plant, from which arrow-root is obtained, an article which forms an important item in the commerce of the island. Seeds of various plants used as beads, calabashes as water-bottles, and woods from which dyes are produced, appear on the table. There is also a display of long tough fibres used in rope-making, a peculiar-looking seaweed, designated "Old Man's Beard," used for stuffing seats; a model of a woodman's hut (constructed of bamboo, and thatched with grass) such as is run up for temporary use; models of native boats, hats, and baskets formed of grass.

Sierra Leone is not of great commercial value to this country, but, as it consists of one vast and almost impracticable forest with only occasional spots cleared and cultivated, it is well that attention should be directed to it. Founded as the colony was from motives of philanthropy rather than from any political or commercial advantage, cultivation has made very slender progress, except so far as it has been introduced by Europeans. Little has been done towards utilising the wood which grows on the banks of the Gambia, although labour is cheap and the means of export easy. The wood is not, perhaps, of the best quality as regards grain or texture, but, when a useful wood can be supplied at 2d. per cubic foot, there seems no reason why a market cannot be found for it. Thirty-two specimens of the wood of native trees are exhibited. One of the hardest of these woods is the koorooloongo, which resembles oak in texture, and is mostly used for stockades. There are also inferior varieties of mahogany and rosewood, which might be turned to advantage in the manufacture of cheap articles of furniture, &c., as well as in the building of canoes, to which work they now appear to be confined. Several of the trees of Sierra Leone are said to be possessed of good medicinal qualities, the bark of one of them, the Singocko, being used as an aperient, and a decoction of the leaves as a cure for toothache. From the Taube-coombah fruit oil is obtained, and the native soap is made from the refuse. From the fruit of the Hewere the natives manufacture a red wine, and from the Tallum-baro poison is extracted, which is used for ordeal purposes. The manufactured articles exhibited are rude in design, but appear substantial and display considerable ingenuity in their construction. Sofas and chairs, ranging in price from 2s. to 6s., of very creditable workmanship, are manufactured in Combo and largely exported to Senegal. Several specimens of rubber are shown, both in the crude and the pure form; these are obtained from the rubber taul, which grows on the banks of the Gambia and reaches a height of from 30 ft. to 40 ft. The trade in this article is yet in its infancy, having only been established two years ago, and may yet, with care and attention, be developed. Another plant indigenous to the country is the indigo, which has been little cultivated hitherto but is now attracting attention; specimens of the dye are exhibited. Other products of the colony exhibited are samples of wax, gum, brimstone, logwood, palm-oil, rice, &c.

The chief deterrent to the development of the colony is the malarious nature of the climate, which unfits it as a residence for Europeans, who might supplement the want of mechanical skill possessed by the natives, and reduce their labour to a state of discipline. In 1820 the population stood at 12,000, whilst in 1839 it had increased to 42,000. This rapid increase was chiefly owing to the great number of slaves rescued by British cruisers and settled in this place of refuge.

The Maharajah of Johore has shown an enlightened spirit in sending for exhibition a large number of specimens of timber grown in the country over which he holds sway, as well as samples of its finest produce. The timber trees of Malacca are numerous, and of these 350 varieties are shown. Amongst the products are gum, camphor (*camphor officinalis*), gum dammar, used for varnish, gutta-percha, caouchouc, gambier, varieties of incense, pepper, &c. The first gutta-percha known to commerce came from Johore, and it continues to be an important article of export. A set of

the tools used by the Malays in cutting timber and building houses and boats is produced. Samples of ratan canes, barks for making native houses, and ropes are shown; a model of a raft, with photographs illustrating its descent to the sawmills, as also views of the saw-mills which belong to a younger brother of the Maharajah and a gentleman who is a native of Edinburgh. The walls of the court are gracefully draped, and a portrait of the Maharajah, which conveys a pleasing impression of this ruler, occupies the place of honour. The collection is, at the close of the Exhibition, to be presented to the Edinburgh Museum of Science and Art.

## SEWAGE CONTAMINATION OF WATER.

Under the title, "The Detection of Sewage Contamination by the Use of the Microscope and of the Purifying Action of Minute Animals and Plants," the following paper was read at the Society of Arts Conference on water supply last week, by Mr. H. C. Sorby:—

"By studying with the microscope the solid matters deposited from the water of a river, the previous contamination with the sewage can usually be detected without any considerable difficulty. If the amount be serious, the characteristic particles of human excrement can easily be seen; and even if it be small, and has been carried a long way by the current, it can usually be recognised by means of the hairs of cats derived mainly from the droppings of horses, which resist decomposition for a long time, and are not consumed as food by minute animals. I, however, do not propose to enter into detail in connexion with this part of my subject, but specially desire to call attention to the connexion between the number of minute animals and plants, and the character of the water in which they live, and also to their influence in removing organic impurities.

The chief animals met with in fresh water are various entomostraca, rotifera, and the worm-like larvæ of insects. I find that the number per gallon and per-centage relationships of these mark, in a most clear manner, changed conditions in the water, the discharge of a certain amount of sewage being indicated by an increase in the total number per gallon, or by an alteration in the relative numbers of the different kinds, or by both. All my remarks apply to the warm part of the year, and not to winter.

It is known that entomostraca will eat dead animal matter, though probably not entirely dependent on it. I have myself proved that they may be kept alive for many months by feeding them on human excrement, though they soon died without it. If the amount of food in any water is small, not many of such animals can obtain sufficient; but, if it be abundant, they may multiply rapidly, since it is asserted that in one season a single female cyclops may give rise to no less than four thousand millions of young. In stagnant muddy ponds, where food abounds, I have found an average of 200 per gallon. In the case of fairly pure rivers the total number of free-swimming animals is not more than one per gallon. I, however, found that where what may be called sewage was discharged into such water the number per gallon rose to twenty-seven, and the percentage relationships between the different groups of entomostraca were greatly changed. In the Thames at Crossness, at low water, the number was about six per gallon, which fell to three or four at Erith, and was reduced to less than one at Greenhithe.

There is, however, a very decided limit to the increase of entomostraca when the water of a river is rendered very impure by the discharge of too much sewage, probably because oxygen is deficient, and free sulphide of hydrogen present. Such water is often characterised by the great number of worm-like larvæ of insects. Thus, in the Don, below Sheffield, in summer, I found the number, per gallon, of entomostraca only about one-third of what it is in pure waters; whilst, on the contrary, the number of worm-like larvæ was more than one per gallon.

Now if the minute free-swimming animals thus increase when a certain amount of sewage supplies them with ample food, it is quite obvious that they must have a most important influence in removing objectionable impurities. The number of the excrements of entomostraca in the recent mud of such rivers as the Thames is most surprising. In one specimen, from Hammersmith, I found that there were more than 20,000 per grain; and the average number at Erith, in August, 1882, was above 7,000, which is equivalent to about 200,000 per gallon of water at half ebb, from the surface to the bottom. This enormous number must represent a very large amount of sewage material consumed as food; and though, as in the case of larger animals, a considerable part of their excrements, no doubt, consist of organic matter capable of putrefaction, yet there can be no less doubt that the amount entirely consumed in the life processes of the animals is also great.

As named above, I kept cyclops alive for many months by feeding them on human excrement. It is thus easy to understand why, when they abound in the Thames, the relative amount of human excrement is very considerably less than in the winter, when their number must be much smaller.

We thus appear to be led to the conclusion that when the amount of sewage discharged into a river is not too great it furnishes food for a vast number of animals which perform a most important part in removing it. On the contrary, if the discharge be too great, it may be injurious to them, and this process of purification may cease. Possibly this explains why in certain cases a river which is usually unobjectionable may occasionally become offensive. It also seems to make it clear that the discharge of rather too much sewage may produce relatively very great and objectionable results.

Though such comparatively large animals as entomostraca may remove much putrefiable matter from a river, we cannot suppose that, except incidentally, they remove such very minute objects as disease germs, but it would be a subject well worthy of investigation to ascertain whether the more minute infusoria can and do consume such germs as a portion of their food. If so, we should be able to understand how living bodies, which could resist any purely chemical action likely to be met with in a river, could be destroyed by the digestive process of minute animals. Hitherto I have had no opportunity for examining this question critically, but have been able to learn certain facts which, at all events, show that it is well worthy of further examination. It is only during the last month that I have paid special attention to the number of the larger infusoria, and various other animals of similar type, met with per gallon in the water of rivers and the sea, which can be seen and counted by means of a low magnifying power. At low water in the Medway above Chatham, in the first half of June, the average number per gallon has been about 7,000, but sometimes as many as 16,000. Their average size was about $\frac{1}{1000}$ inch. Possibly the number of still more minute forms may be equally great; but, even if we confine our attention to those observed, we cannot but conclude that their effect in removing organic matter must be very considerable; and judging from what occurs in the case of larger animals, those $\frac{1}{1000}$ of an inch in diameter may well be supposed to consume as food particles of the size of germs. Up to the present time, I have, however, collected so few facts bearing on this question that it must be regarded merely as a suggestion for future inquiry.

So far, I have referred exclusively to the effect of animal life. Minute plants play an important part in another way. The number per gallon of suspended diatoms, desmids, and confervoid algæ is, in some cases, most astonishing, and they must often produce much more effect than the larger plants. As far as I have been able to ascertain, their number is, to some extent, related to the amount of material in the water suitable for their assimilation and growth. In the mud deposited from pure rivers their number is relatively small, but in the district of the Thames, where the sewage is discharged, I found that in summer their number per grain of mud at half-ebb tide was about 400,000, which is equivalent to above 5,000,000 per gallon of water. This is two or three times as many as higher up or lower down the river, and, out of all proportion, more than in the case of fairly pure rivers like the Medway. Their effect in oxygenating the water must be very important, since, when exposed to the light, they would decompose carbonic acid, and give off oxygen, under circumstances most favourable for supplying the needs of animal life, and counteracting the putrefactive decomposition so soon set up by minute fungi when oxygen is absent.

Taking, then, all the above facts into consideration, it appears to me that the removal of impurities from rivers is more a biological than a chemical question; and that in all discussions of the subject, it is most important to consider the action of minute animals and plants, which may be looked upon as being indirectly most powerful chemical reagents."

# Illustrations.

## THE BRITISH CHAPEL, MOSCOW.

The new building will, it is expected, be opened for service during the present month (August). It takes the place of the old chapel which had been in use since 1825.

The British Colony at Moscow dates from about 1555, when the Russia Company obtained their first charter, but from 1714 when the court and principal foreign factories were removed to St. Petersburg to 1825 they seem to have been unable to maintain a separate place of worship. In raising the requisite funds for the new building local efforts have been largely aided by the Russia Company and by liberal subscriptions from England and elsewhere.

The nave is 41 ft. 6 in. wide, with apsidal chancel at east end, and large cloak-room at the west separated from the nave by a traceried stone screen with swing doors, and over this room are placed in the gallery the organ and choir, caretaker's house; vestry, committee-room, and library are placed on the south side. The lower story of the tower is formed into the porch; above this are fire-proof, safe, and muniment rooms, specially made for the use of the British residents. The roof is in one span, with inner boarded ceiling, coved and vaulted over the windows, the central part being wagon-shaped, the principals wrought and filled in with tracery; this treatment is carried into the apse without any chancel arch, the space between this ceiling and the roof being filled in with earth to equalise the temperature. The walls are of brick, with terra-cotta tracery and dressings. The internal fittings are of oak and pine, the floors of asphalte and marble mosaic, of Russian manufacture.

All the windows are fitted with movable interior frames of oak, and glazed with lead lights. The accommodation is for 300 persons.

Mr. R. K. Freeman, F.R.I.B.A., of Bolton-le-Moors, is the architect, the greater portion of the ornamental woodwork, &c., having been executed in England, the other parts being carried out by Russian tradesmen.

## SCULPTURE AT THE ROYAL ACADEMY.

NO. IX., "ISAAC AND ESAU."
BY MR. E. ROSCOE MULLINS.

This group, which in the Academy catalogue bears for a title the pathetic appeal of Esau to his father, "Bless me, even me also, O my father," is a life-size composition in terra-cotta which, in this year's exhibition has occupied a conspicuous position in the Central Hall, opposite the entrance. The work has given its author a more prominent position among the sculpture contributors than he has previously held, and deservedly, for it is unquestionably the best thing he has produced, and marks a decided step in advance. The two heads are very expressive in themselves, and the hands also of Isaac; and the two group into a fine and truly sculpturesque outline.

## THE CATHEDRAL OF OUR SAVIOUR, MOSCOW.

Some particulars of this building will be found in the article on p. 154.

## THE CHÂTEAU OF CHANTILLY.

For particulars relating to the subject of these illustrations, see article on p. 156.

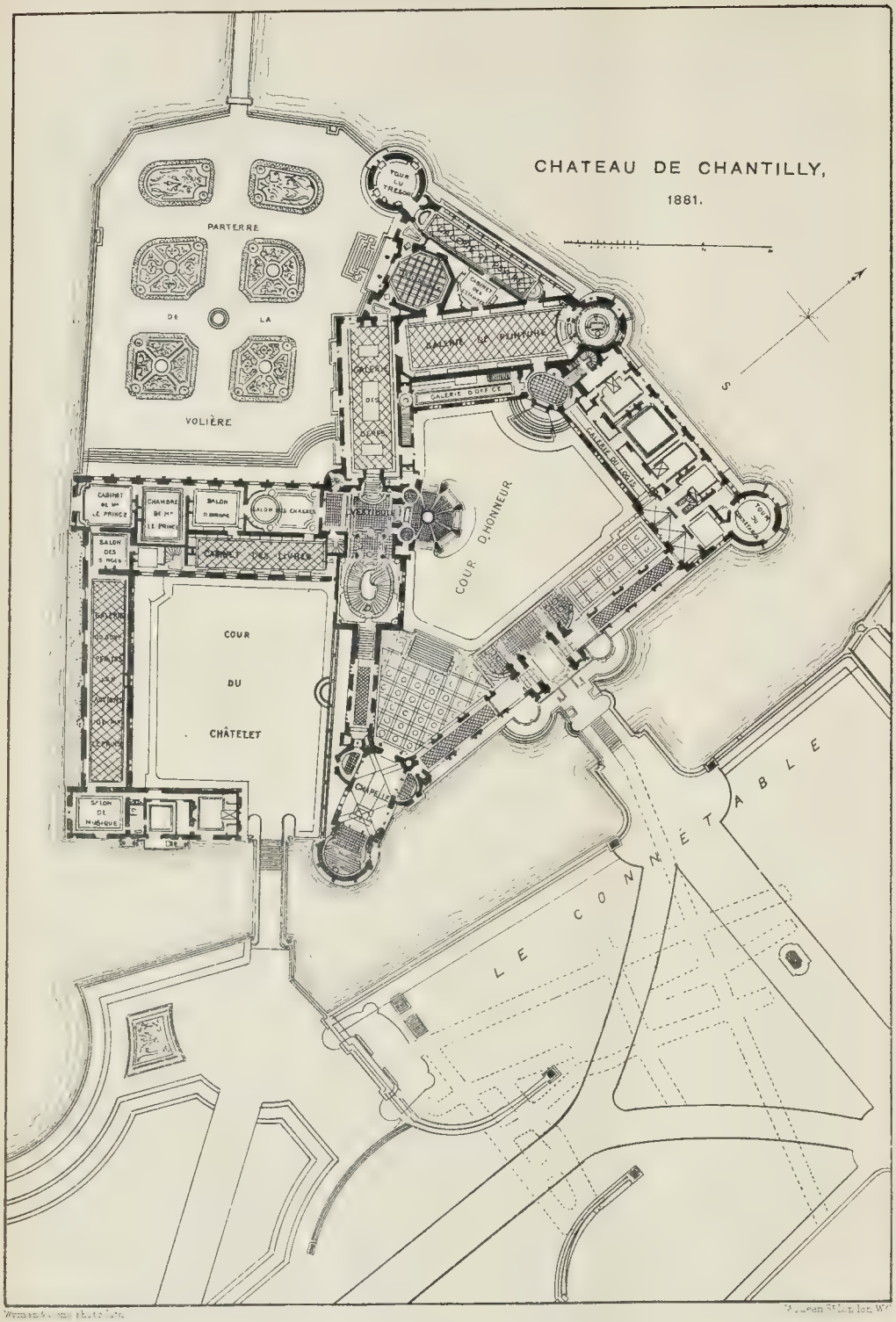
**Social Science Association.**—The Presidency of the Economy and Trade Department in connexion with the forthcoming Congress, which is to be held at Birmingham from the 17th to the 24th September, has been accepted by Viscount Lymington, M.P.



INK PHOTO SPRAGUE & Co LONDON

SCULPTURE AT THE ROYAL ACADEMY.

No. 9.—"Bless me, even me also, O my Father." BY MR. E. ROSCOE MULLINS.




PLAN OF CHANTILLY, AS RESTORED FOR THE DUC D'AUMALE.——M. Henri Daumet, Architect.



THE CHÂTEAU OF CHANTILLY: AS RESTORED FOR THE DUC D'AUMALE.

PRINCIPAL ENTRANCE.

M. HENRI DAUMET, ARCHITECT.



INK PHOTO SPRAGUE & Co LONDON

THE CHÂTEAU OF CHANTILLY: AS RESTORED FOR THE DUC D'AUMALE.

GRAND STAIRCASE AND ENTRANCE TO THE GALERIE DES CERFS.

M. HENRI DAUMET, ARCHITECT.



INK PHOTO. SPRAGUE & Cº LONDON

THE CATHEDRAL OF OUR SAVIOUR, MOSCOW.

## THE THAMES AND THE PUBLIC HEALTH.

Under this title Mr. G. Phillips Bevan read a paper at the "Balloon Society's" meeting last week. Going briefly into the history of the London water supply and the extent to which it was now depending on the Thames, and, pointing out that the water demand had increased at an even greater ratio than the increase of population, he said:—

Directly, then, at least 72 million gallons a day are taken from the river at Hampton and Thames Ditton, and the question even now is simply this:—Can the Thames afford to be tapped daily to such an extent? But, if we project ourselves into futurity for even ten or twenty years, bearing in mind the almost incredible rate at which London is growing, and chiefly too in the directions of north-west, west, and south-west, which altogether depend upon the river companies, we shall not, I think be deemed immoderate in our calculations if we estimate the demand to be at least 85 or 90 millions by 1894, 110 millions by 2004 (if the world lasts so long). Adding this river supply to that of the other Companies we shall, probably, require 210 million gallons a day in twenty years time. That the Companies are aware of the increasing inability of the river to meet the demands upon it seems evident by the endeavours that they make to extend their gathering grounds; but even this must have its limits, and, in itself, is not free from contamination dangers. I see it frequently remarked that the flow of water cannot be seriously interfered with below Kingston, inasmuch as there is a daily quantity of 400 million gallons going over Teddington Weir, but this I believe to be mere guesswork or the result of a measurement taken a considerable period ago and not in the least to be relied upon now. Indeed, it is on evidence that for as much as twelve days together in the years 1858, '59 and '64 the daily flow at Hampton has not exceeded 350 million gallons, and the well-known engineer, Mr. Bateman, put it as low as 308,720,000 gallons per day for a considerable period. At any rate, the question would be easily answered by taking daily gauges of the flow at Teddington for the next few weeks, and it is a matter of extreme importance that this should be done, as one of the standpoints of our knowledge of the hydrometry of the Thames, which appears at present to be extremely limited.

Having now arrived at the tolerably patent fact that the river flow is greatly diminished, —it may be from one or all of the causes that I have mentioned,—we ask the question, where are we to find the remedy? And the answer groups itself into two distinct modes,—1. That of husbanding the existing Thames supplies; 2. The obtaining an existing new and independent supply. Under the first heading, the favourite proposal seems to be the construction of one or more half-tidal locks. Mr. Labouchere, who has excellent opportunities for studying the condition of the Thames at Twickenham, suggests that the river-banks between Battersea Bridge and Teddington be faced with stone, and that there be a half-tidal lock at Isleworth and another at Putney. Just above the lock weirs a certain amount of dredging would be needed, while from the Putney lock to Teddington there would be a wide sheet of water available for boating purposes, and covering all the mud banks. This sounds very nice, but judging from the opposition that was given to the Richmond proposal some little time ago, to make a lock at Isleworth, there is evidently a strong feeling that the inhabitants above these locks will be benefited at the expense of those below them, and that the large river trade will be seriously injured thereby. Every one naturally thinks of his own interests first, but in dealing with such a vast question, we cannot afford to entertain any proposal which will not benefit the whole river. Others consider, and I believe amongst them is the worthy President of this Society, Mr. Le Fevre, that a series of locks should be placed at intervals, but extending far below the upper river reaches, and coming as low down as Gravesend.

It must, of course, be assumed that, whatever the means adopted, the river companies should be precluded from tapping a single gallon of water more than they are already doing. They already abstract two-thirds of the daily flow, and we see what are the consequences. The question of flood-water seems a very important and neglected one, and surely our engineering authorities can devise some storage schemes which will insure us a large additional supply without any extra call on the river.

The second heading, that of more extended supplies, is a very wide subject, and has been fruitful in the bringing forth of many schemes, of more or less value. They must be classed under the two first divisions,—1. Schemes affecting the Thames basin; 2. Schemes entirely independent of it, and involving the obtaining of water from other sources and by other means. A vast number of persons appear to be under the impression that the water difficulty is quite a recent feature, and would perhaps be surprised to learn that it is a very old one,—a difficulty, indeed, which impressed the scientific men of ten and twenty years ago much more forcibly than the present generation seems inclined to appreciate.

A brief sketch of these various schemes was then given, and the lecturer proceeded to touch upon "the fearful shortcomings of our drainage system." From Henley to Gravesend comes the same cry, that our noble river is nothing but a sewer, and a sewer of extremely filthy and dangerous nature. Of all the many fearful muddles and failures of systems with which we have become so familiar within the last few years, that of the Thames drainage stands out in gigantic prominence, and it is hard to say whether the Lower or Upper Thames has come the worst off, although from different causes. Below bridges, we have expended millions in constructing what appeared to be the most perfect drainage system in the world,—and after the experience of a few years' working, we find that we have succeeded in paving the bed of the Thames with a new and fictitious bed of excremental matter; that, instead of getting rid of our sewage far out to sea, as was hoped and intended, it is, like the poor, always with us, churned backwards and forwards with the tide, and each day presenting a more threatening aspect to the public health. Above bridges, millions have certainly not been spent, but thousands have, not in perfecting a system of drainage, but in most ingeniously contriving to prevent any system at all being made. Let us for a moment glance at the facts which characterise both sections of the river at the present time. The London area of drainage north of the Thames is 53 square miles, the sewage of which is collected in reservoirs of 9½ acres at Barking, the capacity of these being 35 million gallons, or 5,600,000 cubic feet. The drainage south of the Thames is 66 square miles, the sewage being collected at Crossness in reservoirs of 6½ acres, and in capacity of 25 million gallons, or 4 million cubic feet. The average daily discharge of sewage into the Thames is 164 million gallons, the Lower Thames receiving about 60,000,000,000 gallons in the course of a year, the amount of suspended matter being estimated by Professor Frankland, as long ago as 1879, at 1,354,000 tons. Of course, it is a matter of gigantic difficulty to deal with this mass of filth, and up to the point at which it is received at the outfalls, no fault can be found with the system. But here the mistakes appear to begin. At the time of high water, all that is done is to open the sluice-gates of the reservoirs for four hours during the ebb, and let the sewage pass into the tide way. As a matter of course, some will go out to sea, but the bulk only travels a short distance down the river to be brought up by the next tide, while a certain proportion is deposited, and, in point of fact, the volume of the river is physically unable to carry it away. Two questions naturally strike one here. 1. Why is not the public health better protected? 2. Why are no endeavours made to utilise the sewage and reduce the expenses? Here we are met with the old bugbear of expense, as if the health of the people was a matter to be regulated by pounds, shillings, and pence, and was not paramount over all such faulty considerations. If we are too poor to devote a few millions to this end, let us do away with the luxury of an annual war in our foreign possessions for a few years,—let us cut down some of the extravagant expenses of the School Board,—anything, indeed, to ensure the primary duties of a Government towards the population. To begin with, at any cost this mass of pestilence-breeding sewage should be deodorised or rendered innocuous, if nothing else is done; but that is not enough,—it should also be taken out of sight and out of smell of London city, and not be let go until it is cast fairly into the sea. We are told that to extend the outfall works to Tilbury, fifteen miles lower down the river, would cost nearly three millions sterling, and that the pumping would represent another million. Very good, so far. But why stop at Tilbury? It is only partially lessening the evil, besides ruining the navigation of the river below Gravesend. I say that the only plan, and the cheapest in the end, is to convey the sewage of London straight across the Essex marshes to Foulness Island, a little to the north of Shoeburyness, and there, if possible, cast it into the German ocean, from whence there is not much chance of its returning. And why I say emphatically that this plan will be the cheapest in the end is because you will have here all the elements of a successful locality to deal with the sewage from a manufacturing point of view. Surely, unless our boasted scientific knowledge is all a sham and a delusion, some one of the many projects for converting sewage into a practical manure, and therefore of financial value, may be, after due consideration and further experiments, adopted with success. Space is of no object in Foulness or Wallasea Islands, and I see no reason why a busy manufacturing district should not arise here, and a brisk trade in artificial manure carried on from a harbour on the river Crouch, to which ships from all parts might resort; inland also, by means of railway extension. Even in the case of failure we should, at all events, secure a fair amount of immunity from epidemics and pestilence, which, even at a money computation, would be invaluable.

After speaking of the recent collapse of the Thames Valley sewerage scheme, on which we have already commented, Mr. Bevan concluded:—My belief is (whatever it may be worth) that an automatic power is needed to deal with the whole subject *ab initio*, so that the drainage of the Thames, from Windsor to Gravesend, should be under one strong hand, and should be made part and parcel of one scheme. I believe also that that one scheme should be the transportation of all this sewage to some place like Foulness Island, there to be dealt with commercially by the most approved form of treatment, and that at the same time, while not interfering unduly with the vested rights of the existing water companies, I believe that an additional and independent supply of the very best water possible should be procured and brought to London.

After the lecture and some discussion, the following tolerably tough "resolution" was proposed:—"That in the opinion of this meeting the system adopted by the people of Kingston, Richmond, and the adjoining districts, of drinking the water into which they put their sewage, is filthy, foul, abominable, and barbarous in the extreme, and calls loudly for an immediate remedy; and the disgraceful defilement of the river Thames at Barking and Crossness by the Metropolitan Board of Works ought to be at once stopped by the use of some such purifying process as that at Aylesbury, and also by a law compelling those inhabitants who have sufficient gardens to use earth closets, or some other equally efficient remedy." The above resolution was moved by Mr. W. H. Le Fevre, C.E., and seconded by Mr. J. J. Young, C.E., and carried unanimously.

**Lead Works in the Auction Market.**—The well-known lead works of Messrs. Walkers, Parker, & Co., were last week offered for sale at the Auction Mart, by Messrs. Fuller, Horsey, & Co., under an order made by Mr. Justice Chitty, in the Chancery suit of Walker *v.* Walker. The property, which is said to comprise the most extensive lead works in the country, was described in the printed particulars as situated in different parts of England and Wales, including the London lead works and shot tower in the Belvedere-road, Lambeth; the lead works and shot towers at Elswick, Newcastle-on-Tyne, and Chester; the lead works at Dee Bank, on the Flintshire side of the river Dee; the Bagillt works, in Flintshire; and the lead works in Glasgow and Liverpool. The estimated aggregate value of the several properties was put at upwards of 300,000*l.*, the value of the stock-in-trade of the works on the banks of the river Dee alone being set down at 90,000*l.* The property was offered in eight lots, but the highest prices bid for the several lots was limited to prices ranging from 15,000*l.* to about 30,000*l.* and 40,000*l.*, which the auctioneer observed were very much below the reserve sums fixed by the Court, and all the lots were consequently withdrawn.

## NEW SCHOOLS FOR EDMONTON UNION.

The two foundation-stones (one at the corner of the boys' block and one at the corner of the girls' block) of the new schools erecting at Enfield for the Guardians of the Edmonton Union, were laid by the chairman, Mr. M. Latham, and the vice-chairman, Mr. Joseph Clark, on the 19th ult. The schools will ultimately accommodate from 500 to 600 children, the administration being designed for that number. The general scheme may be described as follows:—Entrance-lodge next road; some distance in from road, right and left of the ground, two receiving-wards; in rear, main building, divided into several groups, so that floors or blocks may be isolated in cases of epidemics or fire, extension made with ease, and the character of a public school imparted, the children meeting for instruction and recreation, and then filing off to different blocks or separate houses. The centre of the group contains master's and matron's quarters, committee-room, and bedrooms for servants, with stores, bakery, kitchen, dining-hall, lavatories, bath, laundries, engineer's shop, boiler-house, and workshops, with boys' and girls' and infants' schools grouped round and connected by corridors. These departments overlook large playgrounds open to the sun and not overshadowed by buildings. Beyond is a broad road running transversely to the estate, along the sides of which will be cottage homes, each home to have thirty-one children and two foster parents; the man, being a mechanic, will teach the boys his trade and the woman will instruct the girls in domestic work. In a distant part of the site is an infirmary made up of pavilions, and more distant still are farm buildings. Spade husbandry and gardening will form part of the industrial training. The infants' department has school mistresses' and nurses' quarters in centre; the boys and girls have chief master and mistress and sub-master and mistress at either end. The estate is 42 acres in extent. The architect of the buildings is Mr. T. E. Knightley; and the builder is Mr. Charles Wall. The contract amount is 54,000*l.*

## SURREY ARCHÆOLOGICAL SOCIETY.

The recent excursion of this Society to Leatherhead, Mickleham, Effingham, and Fetcham was attended by upwards of eighty members and visitors. The first meeting was at Leatherhead Church, where a paper, written by Mr. R. H. Carpenter, was read by Mr. Thomas Milbourn, who said the writer was unable to be present. Mr. Carpenter in his paper said that the church was dedicated to SS. Mary and Nicholas. The plan of the church now consisted of nave and chancel, north and south transepts, north and south aisles, north porch, and western tower. There was evidence that the Norman and Early English church had a central tower at the intersection of the arms of the cross. In 1344 Queen Isabella obtained the living of Leatherhead for the Convent of Leeds about the time when the tower collapsed. The windows were very charming, and the church had recently been restored, yet there was much to be done. The plinth of the church could now be seen, and gave evidence of what the rest was before it was covered with plaster in 1766. This covering was put on in consequence of the decay of the soft Reigate stone, which was also used and had perished at Westminster Abbey. The company then drove off in carriages to Mickleham, where Mr. Ralph Nevill, F.S.A., read a paper, in which he stated that in 1823 the church was restored by Mr. Robinson, who showed unusual enlightenment as a restorer, considering the period. The church was erected in the reign of Edward I. on the site of an old one. The windows were put in in 1840, and the font was very ancient.

The excursionists having proceeded to Effingham, Major Heales, F.S.A., read a paper on the church and its history. He said this was one of the few old churches of Surrey not mentioned in Domesday. The oldest document he could find referring to the church was of the fourteenth century, and this document referred to the oldest part of the church as being of the twelfth century. The walls were of extraordinary thickness, some of them being upwards of 3 ft. thick. The bench-ends were good, and the font was of the fifteenth century.

Mr. Granville Leveson-Gower, F.S.A., next read a paper on the "Howards of Effingham," after which the excursionists proceeded to Fetcham Church, where the architecture of the church was described by Mr. Chas. Forster Hayward, F.S.A. Mr. Hayward said the church was of very early date; there were Roman bricks used in the walls, and the columns were good examples of Norman work. The original form of the church was, like that of all Norman churches, cruciform. This church was restored by Mr. Joseph Clarke, F.S.A.,—the chancel in 1872 and the nave in 1877. Another paper was afterwards read by the Rev. W. H. F. Edge, M.A., on the "Parochial Records." The company were next invited to inspect the mansion of Mr. Hankey, J.P. (adjoining the church), and here some paintings, particularly one in the centre of the drawing-room ceiling by Sir James Thornhill, were much admired. The whole party then returned in their carriages to the Swan Hotel, Leatherhead, to dinner. Major Heales, F.S.A., presided. After the usual loyal toasts, the Chairman proposed "Success to the Surrey Archæological Society," and said they had now been established over a quarter of a century. Mr. T. Milbourn, hon. sec., responded, and said they now numbered 420 members. Other toasts followed, and several new members were proposed, and the company soon afterwards dispersed.

The annual general meeting of the Society took place on the 23rd of July, at 8, Danes' Inn, Strand. Major Heales, F.S.A., presided, and the report of the council and balance-sheet for the past year were unanimously adopted. Mr. T. H. Maudslay, C.E., moved the re-election of the retiring members of the council, which was adopted. The auditors, Messrs. J. T. Lacey and W. F. Potter, and the hon. sec., Mr. Thos. Milbourn, were also re-elected.

## ROYAL ACADEMY.

The following is the list of admissions to the Architectural School of the Royal Academy in July of this year.

| *Upper School.* | *Lower School.* |
|---|---|
| Fell, R. D. | Hall, S. |
| Fox, Frank. | Mitchell, A. B. |
| Simpson, F. | Newberry, J. E. |
| Thomson, J. | Sedding, E. H. |
| | Selby, E. H. |
| | Troup, F. W. |

*Probationers.*

| | | |
|---|---|---|
| Anderson, P. | Ford, L. R. | Masey, F. |
| Allen, N. W. | Gill, C. | Meadway, C. L. |
| Ayling, R. S. | Harvey, G. | Newton, W. |
| Boney, W. H. | Hitchin, T. H. | North, R. O'B. |
| Burr, W. A. | Howie, W. H. | Schultz, W. R. |
| Buxton, W. L. | Hutchings, H. | Steinthal, A. |
| Cresswell, J. J. | Jemmett, A. R. | Sykes, A. |
| Day, F. M. | Lancaster, G. J. | Taylor, A. S. |
| Dennis, L. | Leck, W. | Thorp, J. B. |
| Downing, H. P. B. | Manning, H. C. | Webb, F. J. |
| Druery, H. | Marks, F. W. | Wetherell, T. G. |

## VALUE OF PROPERTY AT THE EAST END.

*Large Sale of Leaseholds at Stepney.*—Last week, Messrs. Fox & Bousfield offered for sale at the Auction Mart a large amount of leasehold property at Stepney. The property, consisting of 132 houses, included the whole of Albert-square, together with several shops in the Commercial-road, and nearly the whole of Havering-street and Bower-street, producing altogether an annual rental of 3,823*l.* The property was stated to be held on three leases, of which forty years are unexpired, at ground-rents amounting to 352*l.* per annum. The property was offered in three lots, for all of which there was a severe competition amongst the numerous company present. The first lot submitted comprised ninety-three houses, producing a rental of 2,257*l.* per annum. It was put up at 15,000*l.*, the biddings of 1,000*l.* and 500*l.* each rapidly following upon each other until 27,550*l.* was reached, at which it was sold. The next lot offered consisted of thirty houses on the east and west sides of Albert-square, producing a rental of 852*l.* per annum. In this lot, 9,000*l.* was the first offer, and after a spirited competition, the hammer fell at 10,550*l.* The third lot consisted of the houses on the south side of Albert-square, extending in the rear to the London and Blackwall Railway. This property produces an annual rental of 361*l.*, and amongst the competitors for it was a representative of the railway company, and several other parties, the competition being very close, and the biddings following each other in rapid succession. It was ultimately sold to the railway company for 7,250*l.*, and it was afterwards stated in the room that the company have purchased it in view of widening the line in the locality of Stepney Junction. The total proceeds of the day's sale amounted to 45,350*l.*, representing about 7½ per cent. on the rentals, after deducting the amounts of the ground-rents.

*Freehold Property in Whitechapel.* Messrs. Weatherall & Green submitted for sale several freehold houses in Whitechapel. Amongst them were eight houses in Fieldgate-street, the rentals of which were stated to be between 400*l.* and 500*l.* per annum. They were sold for 8,000*l.* Seventeen houses in Greenfield-street, producing an annual rental of upwards of 400*l.*, were next offered. After some spirited biddings, they were knocked down at 9,000*l.* The King's Arms public-house, in Fieldgate-street, with a warehouse in the rear, was sold for 1,520*l.*, the aggregate sum realised by the sale being 18,520*l.*

## OUR PUBLIC BUILDINGS.

Sir,—May I be permitted space in your columns to direct attention to the works which are now being carried out in the Royal Exchange? Entering the building a few days ago I was astonished to find a number of workmen engaged in the erection of a ponderous roof of the inartistic railway station type. We have not many fine buildings in the City, and among these we have hitherto numbered the finely-proportioned work of Sir William Tite. An edifice such as the Exchange, with its fine Palladian court, was certainly intended to be hypæthral, and a roof would be as incongruous as on the temples of Greece or Asia Minor. The exigencies of our insular climate, however, render it necessary that a roof should be added. In the construction of such a work care should have been taken that the main features of the ironwork framing should be harmonious in proportion and style with those of the building, and, at the same time, of such slender construction as to exclude as small a proportion of light as possible; one of the chief requirements of such a building being a free and uninterrupted skylight. It is manifest on the most cursory inspection that these requirements are not met by the work in process of erection.

The girders are of the massive railway-bridge type, and there is not throughout the whole work a single line, curve, or moulding in harmony with the Classic features of the building. The work is sufficiently strong to carry a second Exchange, and there results consequently an exclusion of over 50 per cent. of light, while a series of heavy shadows are produced, which hide some of the finest details of the building. That such an inartistic treatment is a necessity is fully contradicted by the designs which have been submitted in previous competitions. In the first competition in 1861, when the project of roofing the Exchange was first mooted, several leading architects competed. On the exhibition of the drawings, Sir William Tite, the architect of the building, withdrew his design in favour of that of Mr. F. Sang, who had been employed in the mural decoration of the Exchange, as he considered it exhibited a treatment of iron and glass fulfilling all the above-stated requirements. In this design the framing of the roof was extremely light, the necessary support being obtained by an external framework to which the glass roof was tied. To this design the first prize was awarded. The competition, as is so often the case, proved a farce, and in this case a comedy in two acts, for a second competition was also abortive, and the designs sent in were shelved. The objections raised by some to the original design of Mr. Sang, that it was too artistic to admit of construction, and only a picture design, was met by the preparation of a complete series of working drawings, which proved to the satisfaction of both engineers and architects the practicability of the work. Notwithstanding this claim the design was neglected, and the present architect has failed to invest his structure with artistic merit. But a greater and more serious objection is to be found. In order to carry the massive framing the fine balustrade on the parapet has been cut away, and in order to bed the heavy girders, the templates of several columns have been removed. If this work is allowed to go on and the roof erected, a few years' accumulation of London soot and dirt will render the meeting-place of City merchants as dark as an Egyptian tomb.

In conclusion, I should add that my knowledge of Mr. Sang's drawings and the result of the previous competition has been derived from an inspection of the original design, which is now exhibited near the Exchange, and from the correspondence which took place at the time. W. St. C. Boscawen.

*British Museum.*

## "TENDERS FOR SURVEYORS' WORK."

Sir,—Allow me to disclaim any connexion with the Mr. W. H. Nash whose name appeared in your last issue [p. 148], as tendering for surveyors' work in respect of a new district map for the Burgess Hill Local Board, and allow me at the same time to endorse the remarks you made as to its being a practice which is strongly to be deprecated.

W. Hilton Nash, A.R.I.B.A.

**Erratum.**—In a mention of "New Buildings in Gracechurch-street" (p. 147, *ante*) the name of the contractor was erroneously given as Mr. J. Bangs; it should have been Messrs. W. Bangs & Co.

## THE EARTHWORKS OF WARWICKSHIRE.

Sir,—It is always a source of gratification to an antiquary to see the studies he has pursued taken up by younger men with zeal, and I, in common with others, looked forward with pleasurable anticipation to the contributions of your correspondent "W." Though much has been done in late years to explore and survey the comparatively little-known earthworks in central England, there is much yet to do, much that is intensely interesting to those who trace unwritten history on the face of the earth and in the mounds and tumuli, which the "fathers of the land" have left us to mark alike their dwelling-places and their graves. From some cause or other "W." has not availed himself of the best information published on the subject; and hence, whilst describing the well-known earthworks of Brinklow and Chesterton on the Fosse, he has propagated a wilderness of errors, some of omission and others of commission. As these papers have been freely extracted in the Warwickshire newspapers, I have been pertinently asked, in some cases, and somewhat in pertinently in others, what I think of these old-new revelations, particularly as I have been recently led into a controversy about the proper name of Roman Leicester, *Ratæ*, which "W." uses in the ablative, *Ratis*, an error which Dr. Guest and Mr. T. Wright (both high authorities) long ago pointed out. That is not of so much importance as the incomprehensible manner in which the "perfect chain of fortresses" is bandied about and mixed up in admirable geographical confusion. Berrow Hill (near Daventry), Edgehill, Brinklow, Breedon Hill (which is in Worcestershire, many miles to the westward), Corley (which is north-east of Brinklow), back again to Brownsover, and then to Oldbury on the ridge above Manduesedum (Mancetter). Here are ancient camps and positions which every observer has ascribed to two distinct tribes, the Dobuni, whose frontier fortresses were undoubtedly occupied by Ostorius, and the Cornavii, or the Coritani (Mr. M. H. Bloxam thinks the latter), on whose boundary the Roman general paused. A glimpse of the country will show the reason of this. Between the two lines of fortresses lies the great midland plain watered by the Avon, the Leam, the Welland, and the Soar, or, as it is surmised, the Leir, which gave Leicester its distinctive name. On the west of this line, lying like an island in the sea, is Bredon Hill, and this was probably one of the outposts of Ostorius. A recent writer, in allusion to Knebworth, or Nebworth, on the Ilmington Hills, appears to think the small quadrangular entrenchment visible on the summit could hardly have been held by even a cohort; but I have before me a complete plan of the encampment made many years ago which shows entrenchments of great extent, which have been removed by modern improvements. In advance of this is the great oppidum of Meon Hill, more than thirty acres in extent, and which, from the small Roman encampment on its side, appears to have been taken by assault. The hill at Brailes is also a British post of importance outside the recognised line of posts presumably alluded to by Tacitus in the oft-debated and well-known quotation, and which stretched away to the eastward as far as Peterborough. Your contributor alludes to some "slight opposition" Ostorius met with from the natives, and thus ignores the more than twenty years' war with Caractacus. Venusius, the great military chief of the Cornavii, who, with the Silures, inflicted a disastrous defeat on the Roman legions. To him may be fairly ascribed the line of forts which yet remain intact, in Warwickshire, from Brownsover to the Ridgeway and into the Severn Vale. These are interspersed with "specula" or tumuli. That the struggle was fierce and long is evidenced by the remains of Roman posts in the forest land of Arden on the north of the Avon, at regular distances, and so frequently do they occur that until you reach the Scottish frontier their number is not equalled in any given space.

With respect to Brinklow, which has been so often described, and which has been the subject of an exhaustive paper by Mr. G. T. Clark, F.S.A., in the *Journal* of the Royal Archæological Institute, "W." has the credit of being the first to suggest that it was utilised by the Romans as a station on the Fosse. That it had a pre-Roman origin there is no doubt. The covered ways adjoining, and the relics which have been found and preserved, are evidences of this, but the actual Roman stations exist in the neighbourhood, of which, notwithstanding their extent and importance, your contributor makes no mention, but passes them to describe and reproduce the well-known plan of Chesterton Camp.

He tells us, however, that the Saxons, Jutes, and Angles, between the years 450 and 550 "destroyed much of the Roman defences in the Midlands." The most careful researches into the remains and graves which belong to that period show conclusively that it was the Angles, and the Angles alone, who penetrated by the Fosseway from the north into Mid-England; and except the raid of Ceawlin and Cutha into the Severn Valley (A.D. 584), we have no record or remains of the Jutes north of Fairford. The graves there mark the boundary of the Angle inroad.

With respect to the type of earthwork, of which Brinklow is a fine example, and which Mr. G. T. Clark terms a "Saxon worth," these mounds defended by ramparts are common in Warwickshire, without going to Laughton-en-le-Morthen for example, and without mentioning Tamworth and Warwick. There is an historical specimen at Seckington, another at Kineton (King John's Castle), near which early British pottery has been found. There is a small one at Kenilworth, hitherto unsurveyed. There is another at Allesley, adapted in more recent times to a Mediæval fortress, and in addition to these there are nearly two hundred moated areas existing.

Chesterton Camp was one of the regular stations (*mansiones*) on the Roman road. In Warwickshire there is one at Mancetter, and another, now partially removed, at High Cross (Benones or Venonis), and some others less known. I wish, however, to point out that though Highdown Hill is a conspicuous feature in the landscape to the north of Chesterton, not the slightest sign of early occupation can be discerned on its wooded summit. On the contrary, Chesterton Hill is full of remains of an early settlement. The famous windmill, designed by Inigo Jones, is built on a mound which, in position and distance, is in a line with the signal-posts which stretch from the south-east to the north-west diagonally with the lines of fortification and the Fosseway. The square fortification at Lodge Coppice is merely the enclosure of the keeper's lodge, a square stone building of singular appearance now removed, a sketch of which is now before me. That some ancient dwelling existed near the Royal Oak House, the black ground testifies, and the remains found prove, but the Roman station at Chesterton was to the west of Windmill Hill, where coins and spoils of the Roman period are constantly found to the present day, together with Saxon coins and those of the Conqueror, whose soldiers apparently rested here after ravaging Harbury, and on their return from Scotland, as coins of the Scottish contemporary kings have been found mingled with them. It is strange that "W." does not allude to this significant fact.

Space will not permit me now to pursue the subject farther, but perhaps you will permit me to point out that the site of Holm, or Hom Castle, has been so cut about by the landscape-gardeners that its original contour is lost, and whilst giving us again the interesting story of the "wroth money" at Knightlow *verbatim*, we have a conjectural site assigned for the place of assembly of the Stoneleigh Manorial Court, when Dugdale tells us that it took place at Motslow Hill, overlooking the village of Stoneleigh, and gives us the mode of procedure thereat in full.

I have only alluded to a few salient points, which are beyond the reach of controversy, and in a few days I shall be prepared to show my large map of Warwickshire Antiquities of the pre-Domesday Book period to any one who cares about the subject. On this map every known earthwork and historic site is laid down, and their connexion with those in the neighbouring counties, as well as those places where pre-Norman remains have been found. This map is intended to illustrate in detail my long-promised work on "Ancient Warwickshire," now approaching completion.

J. Tom Burgess, F.S.A.

*London*, July 23, 1884.

*** It rests, of course, with "W.," according to our usual rule in regard to signed articles, to make his own reply.

## PROPOSED PLUMBERS' CONGRESS.

Sir,—I am thoroughly of opinion that if the London and Provincial plumbers were to hold a congress some time early in the coming autumn, and before the National Health Exhibition closes, one would very much benefit the other by the interchange of ideas respecting sanitary work generally, and with a view of establishing a union whereby we could form ourselves into a company for the fostering and encouraging of good plumbing; for the establishing a code of rules on good plumbing; and for the protection of the trade generally from being murdered by the alarming growth of quack sanitarians who are dabbling in the plumbing trade to the great detriment of substantial work; and also to see if we could not establish some kind of regulation whereby we could petition Parliament to enforce a code of rules or laws whereby all sanitary work should be examined after being done, which test would prevent unqualified persons doing sanitary work, to wit, such as ironmongers, gasfitters, zincworkers, and such like, who are not capable of carrying such work out, and to inflict penalties upon all established and recognised plumbers who are found doing slop-work, and which would be likely to prove in any way detrimental to health. For my part I am willing to assist in getting up a congress; and I have every reason to believe that we could get many well-known provincial plumbers; such, for instance, as Mr. W. P. Buchan and other well-known sanitary authorities. I should like to see the Master of the Plumbers' Company, Mr. George Shaw, head the list.

Perhaps some of your readers would give me their views upon the subject, and send in their names as persons who would join in the affair. I can at any time command a very large hall in Kensington, which would be within a few minutes' walk of the Exhibition. P. J. Davies.

78, *Earl's Court-road, Kensington, W.*,
23rd July, 1884.

## IMPERMEABLE FLOORS AND ECONOMICAL FIREPROOF CONSTRUCTION.

Sir,—The papers read on the 11th inst. at the Health Exhibition Conference on the above subjects are of considerable interest, and with your permission I should like to make a few observations thereon.

One of the speakers drew attention to the usual practice in so-called fireproof (or more accurately fire-resisting) floors, above those on the ground level, to construct over the concrete a complete wood floor of the old type, *i.e.*, with small joists and boards, so that there is a series of horizontal flues supplied with fresh air through the perforated bricks inserted to prevent dry rot of those joists, which air feeds the flames arising in the room over the wooden floor, and attention was drawn to Messrs. Clarke & Co.'s new "patent," by which the joists are abolished and floor-boards are laid on a bed of mastic directly on the concrete. But in this patent there are fillets of wood bedded in the concrete, which I venture to think are unnecessary and a source of weakness, for it is evident that being put into a liquid bed of concrete the wood swells, and when it becomes dry it shrinks and remains loose in the material. Now, sir, I have often constructed floors which are exactly like Messrs. Clarke's, minus the fillets and mastic. My concrete I make of coke or pan breeze floated to a level surface, and when this is quite dry I lay dry boards on it and nail them to the concrete just as ordinary boards are nailed to wood joists. It is impossible to draw the nails; indeed, I have seen boards forced up, leaving every nail standing. The boards may be laid in tar or other bituminous material, as block floors are laid on the ground.

There can be no question that a floor so laid avoids the evil of the usual practice, and from the point of view of health it is vastly superior; it is drier, warmer, and there are no spaces for vermin, disease germs, dust, or filth to accumulate.

It was properly pointed out that in fire-resisting floors large iron girders, where necessary owing to the span, should be cased in fireclay to shield them from the direct action of the fire, but a very necessary further precaution is to leave the ends of the girders loose on their bearings and with a cavity at the back, because, though the fire does not directly attack the iron girders, it heats them and they expand. If bound at the ends they will burst out the walls.

Nothing was said of an evil which frequently, I believe, causes the complete destruction of warehouse buildings, having the most approved "fireproof" floors, and that is the ordinary lift-shaft. A fire breaks out between two such floors, the windows break and supply the requisite air, and the story thus becomes, from the very impermeable character of its floors, like the furnace of a Cornish boiler, the lift-shaft furnishing the requisite draught like a tall chimney.

To avoid this, I have adopted the following method. The enclosure to the lift I abolish. All that is wanted is a high balustrade around the opening in the floor, and during the absence of the employés (when most fires occur) this opening is closed by means of hatches of tongued oak. Remember the object is not to resist direct action of the fire, but to stop draught. In fact, the hatches are dampers. They may be of concrete, if required, on wheels like trolleys. When the lift is in use the concrete platform will be docked flush with the floor. When not in use, small iron rails can be inserted in sockets and the platform rolled out.

We must all thank Mr. Horace Jones for his instructive suggestions on the casing of wood by iron plates. The samples he showed after their exposure to fierce heat were very interesting, and it is probable that the oak hatches sheeted with iron would be absolutely fire-resisting.

Lastly. Stress was laid by many speakers on the desirability of abolishing wood laths to ordinary wood ceilings, but no reference was made to a system largely adopted in London, at least, which does this, and at the same time is sufficient to resist the fire arising from the destruction of the furniture of an ordinary room. This consists of nailing near the bottom of an ordinary joist an angle fillet, erecting a temporary flat platform (of the nature of ordinary centreing for an arch) say 1½ in. below the joists, and then filling in with concrete, averaging some 2½ in. thickness (as sketch). When dry, the centreing is removed, and the ceiling rendered. I have used this in a thousand or more squares. It takes the place of pugging, and saves the ceiling from the stain of any small quantity of water that may be spilled overhead.



Edwin T. Hall, A.R.I.B.A.

57, *Moorgate-street*.

**Mossley** —The fine five-light east window of Mossley Church, near Manchester, has just been filled with Munich stained glass to the memory of the late Mr. J. M. Kershaw, J.P., of Ashton-under-Lyne. The subject introduced is the Ascension. The artists are Messrs. Mayer & Co.

## THE CONSTRUCTION OF SILOS.

SIR,—So many are now erecting silos that we think it desirable to call attention to the fact that we have proved most conclusively that there is little or no lateral pressure from silage, and that consequently there can be no occasion to erect very thick walls unless as retaining walls against the thrust of the ground outside.

We had erected on the Royal Show Ground at Shrewsbury three of our circular portable wooden silos, the largest of which holds 50 tons of silage. In this we put about 16 tons of grass, and applied our patent mechanical pressure, equal to 16 tons of dead weight, and thus reduced the bulk from 9 ft. in height to 3 ft., and, in order to afford the public an opportunity of seeing the whole process, we had placed a ¼ in. plate-glass door, 30 in. high and 20 in. wide, which was flush with the interior of the staves, which are only 1½ in. in thickness, and notwithstanding the great pressure, this glass door did not break, and neither did any of the staves bulge. The silage was cut out, after having been in the silo barely a week, in perfect condition.

We think this is so important a fact that it ought to be generally known, as the thicker the walls are constructed the greater the expense of silo-building will be.

We would also suggest to those who still prefer using dead weight to mechanical pressure, that in our opinion loose sand forms a most undesirable method of weighting. If used at all, it should most certainly be confined in boxes or bags: as, if otherwise, it mixes with the silage, and we are quite sure will not be appreciated by the cattle for whom the silage is intended.

F. W. REYNOLDS & CO.
*Edward-street, Blackfriars road.*

## "STANLEY'S PATENT PLASTERING."

SIR,—My attention has been directed to a notice in your last week's issue [p. 148] referring to Stanley's patent plastering process." The directors request me to call your attention to the fact that this is practically an infringement of the process adopted by this company,—a process which some few years ago you had the opportunity of investigating when the public test on the Embankment took place, when you kindly reported favourably of the merits of the same under date the 3rd of May, 1883.

The system adopted by Mr. Hitchins was only perfected after many and various trials. The material now in course of manufacture by this company has, I am happy to state, met with the cordial approval of the leading metropolitan and provincial architects, and is being largely specified by them.

Hitchins's system not only possesses the qualifications stated in your paragraph, but is likewise a fire-resisting and sanitary material.

The Company is just completing the works at the Stock Exchange under Mr. Cole, and is about commencing the restoration of a very large block of buildings recently destroyed by fire at Messrs. Whiteley's, whilst nearly the whole of the buildings that were destroyed in Wood-street have had their interior finishings formed of this material.

I may also mention that the Sanitary and Insanitary Houses in the grounds of the Health Exhibition have been covered with Hitchins's material, the advertisements for which have now appeared in your columns for some time past.

R. E. EMSON,
Secretary Hitchins's Fireproof Plastering Company.

## A LEAKY SLATE CISTERN.

SIR,—I erected a slate cistern on the top of my house some months ago, and although it was filled repeatedly without showing any leakage, it commenced leaking a fortnight ago, and on examination we found a slight shelving or vein on the floor, and close to the centre where "tongued." The cistern, 1½ in. thick, is well jointed, and we applied some kind of substance with varnish over the crack. To our surprise the tank leaked as badly, or even worse, than ever. Can any of your readers answer the following queries:—

1. Does alternation of heat and cold cause slate tanks to contract and expand when empty, notwithstanding their being (as in my case) built between two solid walls,—in fact, with three walls around, and covered with a heavy timber lid?

2. Would a piece of slate, 5 ft. 6 in. by 3 ft. 6 in. (size of floor), ¾ in. thick, and bedded on ¼ in. of Portland, cure the leakage, if properly cemented all round?

I have applied red lead, but fear it will not answer. BOMBAZEEN.

**Callington Public Rooms.**—The directors of the Callington Public Rooms recently offered a premium of 25*l.* for the best set of plans and specifications submitted for building public rooms, with stable and carriage accommodation in connexion with its coffee tavern. The competitors were seven in number, and the design of Mr. C. D. Cooke, of Frankfort-street, Plymouth, who gave as his motto, "Cups and Saucers," was ultimately selected.

## Books.

*Outlines of Historic Ornament.* Translated from the German. Edited by GILBERT R. REDGRAVE. London: Chapman & Hall.

THIS is a useful treatise in the catechetical form of question and answer,—which certainly favours conciseness, and is so far commendable. The part played by the editor is not very clearly stated, and a few foot notes in amplification of the original, attested by the editor's initials, would have been welcome. For example, at p. 66 the especial characteristics of the Byzantine capital are given without touching upon its peculiar variation from the Classic type in the lateral increase of the mass above the abacus beyond the diameter of the column,—as in the Gothic styles. This feature more than any other differentiates the Byzantine or mixed from the pure Classic styles. Another characteristic of Byzantine art,—which we do not see referred to, but which we may have overlooked,—is the relation of the diameter of the column to its structural function, and not merely to its height.

Some of the answers are not quite conclusive, *e.g.*, "Of what importance are figures in Gothic decoration?

"Of very great importance; *for* in the larger buildings *they are used* in all prominent situations." (!)

Considering its German origin there is surprisingly little in the book about the architecture of the Fatherland; but what is there is no doubt trustworthy. The illustrations are very numerous, and some of them are very good, and altogether it is a handy little volume which students may do well to possess.

*Concerning Carpets and Art Decoration of Floors.* London: Waterlow & Sons.

THIS advertisement in masquerade is evidently the work of two or more authors, and it may be that the entire strength of Maple & Co. were engaged in its production. The first or historical portion is short but learned, all the sages of antiquity being brought upon the *tapis*, their testimony noted, and their opinions recorded. The second portion of the work is an ingenious variation of the assurance that Messrs. Maple & Co. are up,—or rather down,—to everything in the carpet and floor covering line and "will be happy on the receipt of particulars to advise," &c. The name of this eminent firm occurs on an average three times on each page,—say two hundred times in all,—and is not likely to be forgotten by the patient and conscientious reader; and so the end of the book will have been attained if only readers enough can be found. The scribe has acquitted himself fairly well of his very thankless task, and with such gratuitous cautions as that against choosing carpets with large patterns for small rooms, has mingled much that is both sound and suggestive. He has set his sails to catch the prevailing wind, and what can we wish but success to his enterprise?

## CHURCH BUILDING NEWS.

*Shirwell (near Barnstaple).* — St. Peter's church is about to undergo complete restoration at the hands of Mr. William White, F.S.A. Very little work of interest is now to be found, as the church was "beautified and restored" in 1704 by the then correct process of sweeping away all that was good and beautiful in the church. The nave oak roof has entirely disappeared, and plaster ceilings, "boxed" deal pews, hideous windows, and a stuccoed tower, are the main features of the eighteenth-century "restoration." New roofs of oak will be placed in the south aisle and chancel, and portions of the dilapidated walls will be rebuilt, and fourteen new windows of Ham Hill stone will be inserted to replace the present ones. The stucco will be cleared off the tower, and new copings and crosses put to the five gables. The interior will be fitted with pitch-pine seating, with wood block and tile floors. Carved oaken stalls will be placed in the chancel. Some very interesting fragments of carved bench-ends have been discovered by the workmen stowed away under the deal seats. Mr. Wm. Dart, of Crediton, is the contractor, and Mr. W. J. Dart is foreman of works.

*Manchester.*—The corner-stone of the Church of St. Agnes, Slade-lane, Longsight, was laid by the Bishop of the diocese on the 19th ult. The site is on the higher ground in the lane, and the plot devoted to the sites of the church and parsonage is triangular, the church standing at the base, or northern side, Slade-lane on the easterly side, and St. John's-road, a continuation of the street which passes Longsight Church, on the westerly side. The parsonage will therefore stand on the south side of the church, with a southern aspect for the garden. The church, as now being built, will seat rather more than 500 adults, but the scheme provides for an addition of 100 or more. The plan comprises a broad nave of four bays, another narrower bay marked off from the wider portion by the Pointed arch of two "orders" of mouldings. On the south side, at the south-west corner of the nave, is a spacious porch, gabled to the south. At the centre of the west end is a semi-octagonal baptistery, with a tall pointed arch opening into the church, and tall pointed windows piercing three of its sides. At the east end of the nave are a wide central pointed arch and two narrow ones. The left-hand archway leads to the organ-chamber, and to the choir and clergy vestries. A cluster of four arches, springing from a central stone pillar, marks a transeptal projection at the south-east corner of the church. The chancel, semi-hexagonal in shape at its eastern end, is raised seven steps in all up to the Lord's Table. It has around the four easterly sides twelve arches, eight of them pierced with long pointed windows, with stone cusped heads, and four with panels only, with cusped and pierced circles above them. These window-cills are kept well up, and the space below them is panelled or arcaded in brick. On the south side there will be sedilia and a credence. The roofs are to be open-timbered, and boarded. There is no plaster about the church. The walls inside will be lined to about window-cill height with brown glazed brick; above this with yellowish bricks from Ruabon. The windows are framed, as it were, in red brick. The cornices and arches generally are of the same material. But the chancel arch has stone voussoirs alternating with the brick. The walls generally are to be of grey brick, with red for the framing-in of the windows and for quoins and other parts. The strings, labels, and moulded parts are of terra-cotta. Though there will be stone in pillars, capitals, and bases, and in cills and cusps, heads of windows, and elsewhere, the church is a brick one. It is designed by the architects (Messrs. Medland and Henry Taylor) in brick, and would not be suitable for erection in any other material. The foundations have cost under 150*l.* The superstructure, as above described, has been let for 2,700*l.*, with 112*l.* for additional cost of a wood-block floor.

## The Student's Column.

### HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—V.

ROMAN.

THE general idea of Greek and Roman architecture, as conveyed to a superficial observer by their "orders," might be that they were much alike; moreover, there are instances of Roman architecture in Greece, such as the huge temple of Jupiter Olympus at Athens, which, Fergusson says, ("Handbook," p. 274), belongs strictly to the Roman school, and the sequel will show that the Greeks had a great deal to do with the introduction of the "orders" into Rome. There are, however, unmistakable distinctions between Greek and Roman architecture resulting from the usual causes of all architectural distinctions, namely, those of race, character, requirements to be fulfilled, and the means at hand for fulfilling them.

As to race, the architecture of Rome is traced back to the early inhabitants of the neighbouring district of Etruria, the modern Tuscany, who, according to Fergusson (p. 285) were an Asiatic people, who, twelve or thirteen centuries before the Christian era, emigrated from Lydia and settled themselves between the fertile valleys of the Tiber and the Arno, where they founded twelve cities, and established a federal union of twelve states, which is the peculiar institution of the race. He adds that they kept up a constant communication of commerce and arts with the cognate Pelasgic races of Greece and other parts, whose art we have already described.

Here, then, we get a clue to the artistic merit of Etruscan work, which is famous throughout

the world, especially in regard of the Goldsmiths' craft. Of their architecture, the oldest remains consist of town walls and gateways. Here again we meet with the polygonal or cyclopean masonry, and the openings tapering upwards, such as we saw in the curiously similar work in Peru, and with the same progress towards refinement in the use of carefully-hewn squared stones. In Rosengarten's Handbook, on p. 103, will be found an Etruscan gate at Perugia. Here may be noticed a band of masonry, ornamented in a manner suggestive of the triglyphs and metopes of a Greek temple, in connexion with arches, which the Greeks from choice never used, but which we saw were used by the Assyrians. Thus we see that different races are like the subjects of the song, "some like coffee, some like tea," and, as pointed out in a former article, the national character or temper of a people,—in other words, their ethnology,—is no mean factor in the study of their architecture.

There are no Etruscan temples preserved, and the representation of them on tombs, says Rosengarten, are not calculated to lead to any conclusive idea. We are therefore left to a description of them drawn up by Vitruvius ("Marcus Vitruvius Pollio, a celebrated writer on architecture who flourished in the reigns of Julius Cæsar and Augustus"). He had laid down the proportions for a prostyle form of temple which has given rise to any amount of discussion amongst archæologists and architects. The result given by Ramée (vol. ii., p. 591) seems the most likely-looking one, and is borne out by some slight existing remains. It should be compared with the very different result given by Fergusson on p. 287. From such temples is derived what is known as the "Tuscan" order, a shade simpler than the simplest Doric.

Etruria was long contemporary with Rome, in her early times her equal, and sometimes her mistress; therefore many characteristics of early Roman architecture are really Etruscan, and their influence survived after the Romans threw off the Etruscan yoke. The Etruscans were great tomb builders, and seem to have taken the most lively interest in their defunct relations. They provided them with all the furniture necessary for sitting (not forgetting the footstools), reclining to eat, and otherwise leading a happy existence, in spite of the lack of the important item, breath. Such tombs were cut in the rock; others were built in form of circular conical mounds, surmounting a cylindrical base or drum, illustrated by Fergusson on p. 291.

A valuable book to study on this subject is Denis' "Cities and Cemeteries of Etruria," 1848, 2 vols., octavo. The circular form of building remained a favourite one with the Romans, and was applied by them to their temples, while they also retained the passion for visiting the remains of their dead, more compactly disposed, however, in cinerary urns of portable size, and placed in recesses so like pigeon-holes that the buildings containing them were called "columbaria."

The examples of Etruscan masonry in Rome may be recognised by the regularity in the shape of the stones, which are the double cube of 2 ancient Roman feet, viz., 1 ft. 11 in. × 1 ft. 11 in. × 3 ft. 10 in. The buildings of this time are described by Taylor in a paper read at the Institute (Loan Collection of Transactions, vol. i.). Of this period, also, is the Cloaca Maxima, or great sewer, of Rome,—big enough, says Gwilt, for a cart loaded with hay to pass through it. Without a visit to the spot, it is rather difficult to describe the exact form of the bottom of it. On p. 253 of Fergusson's Handbook it is shown to have upright sides and a flat bottom, but the portion below the springing-line is concealed by the water in other illustrations of it.

In 145 B.C. Greece was subjugated by Rome, and the result was a great change in Roman architecture. Grecian forms were freely adopted, rather for the sake of adding ornament to the Roman constructions than anything else (see "Rosengarten," p. 110). "It is important to understand clearly that hereby is meant no structural and organic combination of the arch with the Greek columnar construction, for the latter must be considered merely as an imposing decorative system, originating just as little as the other from the structure of the building, and, therefore, without any structural importance. Viewed independently, the columnar construction forms only the outside covering of the building completed in the rough, which might be at pleasure removed and replaced by another; whereas the removal of the decorative parts in Grecian architecture would have rendered the whole structure an impossibility."

Roman constructions, with the "decorative system" of the Greek orders applied to them, increased in number and magnificence, until Cæsar Augustus, who reigned at the time of the birth of Christ, boasted that he had found Rome of brick and left her of marble. Let us see on what class of buildings this magnificence was displayed. The Greeks have left us chiefly temples, some tombs and some theatres, consisting of an auditorium, rather more than semicircular, facing a stage, whereas Rome teemed with a far greater variety of buildings. Temples of course; tombs, in which the circle formed an important element of the plan; amphitheatres, in which the auditorium entirely surrounded the arena, as distinguished from the Greek stage; basilicas, or halls of justice; baths, which included several departments for recreation and study; circuses for chariot and horse races; forums for the public transaction of business; rostrums or hustings for public speaking; and arches for the triumphal entry of conquering Emperors or Generals. Besides all these, there were the wonderful engineering works, consisting of streets, viaducts, aqueducts, and bridges. Nor were these buildings confined to Rome,—she was the mistress of the world, and has left her mark in subject countries and colonies, far and wide. A few shillings spent on a return-ticket to Lincoln will enable the student to measure up a Roman archway, to say nothing of the ground floors of buildings that are constantly being unearthed around us.

Perhaps the best idea of ancient Rome may be obtained by asking at the Institute Library for Ashipitel's two views of it, as it was and as it is, and also for the key to them. The recently-excavated Forum will throw additional light on it. A shilling or two spent on some of the numerous excellent photographs of the neighbourhood will make one feel almost at home in the place.

In order to obtain a more detailed acquaintance with the buildings, Canina's folio works should be examined. They are "Gli Edifizi di Roma Antica," in 6 vols.; "Architectura Antica," in 2 vols.; "Pianta" (maps), in 1 vol. There is also his "Veii," in 1 vol. The maps of Rome show the city so crowded with enormous public buildings, that one wonders where the people lived. Piranesi's "Architectura de' Romani" is another folio work, which is useful on account of the Roman "orders" given on plate 6, *et seq.*, in vol. i. A more practical work is Taylor and Cresy's "Architectural Antiquities of Rome," 2 vols., quarto, containing general drawings and details to a large scale. It also contains a most useful frontispiece with all the principal Roman buildings drawn to the same scale and many of them in their relative positions to each other. Of course, Norman's "Parallels" is as useful in the study of Roman as of Grecian architecture. The late Mr. J. H. Parker spent much of his life in Rome, making notes of the excavations, and has published a series of octavo volumes, illustrated by photographs. It will be found that he differs from other authors in the names that he assigns to certain ruins. The amusement of restoring ancient buildings on paper (at which point it should usually stop) is demonstrated in an old book by Cameron, 1775, called "Baths of the Romans, with Restorations by Palladio." A work by Carloni, on the "Baths of Titus," is devoted to the coloured decorations of that building.

The Roman "orders" will be easily distinguished from the Greek ones. The Doric especially, which has a base, no flutings, and an utterly different capital and arrangement of the triglyphs next the angles. The Ionic differs somewhat less, but is sometimes found without flutings, as is also the Corinthian order, which became a greater favourite than it had been with the Greeks. It was, however, not rich enough for the sumptuous taste of the Romans, so they mixed it up with the Ionic and produced the Composite order.

The portico of the Pantheon at Rome is very similar in size and number of columns to the Parthenon at Athens, and they may be fairly compared as good examples of their respective orders (see Taylor and Cresy).

The Pantheon brings us to the consideration of a great distinction between Roman and Greek architecture, namely, the use of the arch and dome. This building consists,—besides the portico, which Fergusson considers the oldest part, see p. 311 of his "Handbook,"—of a vast circular chamber, 145 ft. 6 in. in diameter, covered with a hemispherical dome, 147 ft. high to the top, which is pierced with an enormous "eye" 27 ft. in diameter, through which a flood of light illumines the whole interior. This building is more fully illustrated in Smith and Slater's "Classic Architecture" (p. 166 *et seq.*) than in the other handbooks, and there is a discrepancy between the drawings of the front elevation as given by Fergusson and by others.

There is also a circular Temple of Vesta at Tivoli, near Rome (the "order" of which is copied at the Bank of England), and several circular tombs in which the dome is, or has been, used as a covering; but the Romans also used the barrel and groined vault, as in the Basilica of Maxentius (or of Constantine), which is fully illustrated by Fergusson on page 320. Labour and material being of no object, they could afford to build huge abutments, to restrain the thrust of these vaults. Viollet-le-Duc's "Lectures on Architecture," vol. ii., contain excellent illustrations of this method of construction, as shown, for instance, in the Baths of Caracalla. The portion illustrated looks vast, but it only represents about one-sixtieth part of the entire area of this huge establishment.

A greater sense of vastness must be conveyed by the Flavian amphitheatre, known as the Colosseum, of an elliptical plan, 620 ft. along its greatest diameter, and 513 ft. broad, and capable of seating 80,000 spectators. Compare this with the Albert Hall, which seats an audience of nearly 7,000.*

Of decorative sculpture that has come down to us, the triumphal arches exhibit the richest examples. The arch of Titus is well known on account of the bas-relief representing the carrying off of the seven-branched candlestick from Jerusalem, in the year 70 A.D. The column of Trajan is another rich example of decorative sculpture. There is a full-sized cast of it in the Architectural Court of the South Kensington Museum.

We know a good deal about the private houses of the Romans from the remains that have been so fortunately preserved for us at Pompeii,—though the circumstance of their preservation by an eruption of Mount Vesuvius was unfortunate for the inhabitants themselves. There was much Greek influence about Pompeiian work, so that we may learn a double lesson from these ruins. Viollet-le-Duc, however, points out, in his "Habitations of Man," several distinctions between the Greek and the Roman manner of living and of planning their houses. The painted decorations at Pompeii have served as a model for many a building of our own day. It is, indeed, difficult to surpass them in treatment, though one would like to see them more modern in subject.

The arch, dome, and vault having now appeared on the scene as characteristic features of Roman architecture, we can pass on to the next thread in our web.

## BUILDING PATENT RECORD.†

### APPLICATIONS FOR LETTERS PATENT.

*July* 11.—10,032, W. Fullwood, Cork, Window Ventilation without Draught.—10,045, G. Parsons, Birmingham, Curtain-holder.—10,049, A. Besson, Paris, Stoves.

*July* 12.—10,104, T. Durrans, London, Closing the Openings of Cesspits and Manhole-chambers, &c., of Drains or Sewers.

*July* 14.—10,125, E. Jagger, Oldham, Slow-combustion Stoves.—10,144, W. R. Lake, London, Mosaic and similar work. Com. by H. F. Belcher, Irvington, U.S.A.

*July* 15.—10,164, S. Bivort, Jumet, Belgium, Flooring.—10,174, G. H. Reynolds, London, Cornice Pole.—10,175, D. T. Lee, London, Anti-friction Bearing for Furniture Castors, &c.

*July* 16.—10,219, R. H. Holme and N. F. Arreschong, Newcastle, Receiving and Discharging Refuse, and doing away with House Ashpits, &c.—10,221, R. Mason, Hemsworth, Window-frames and Sashes.—10,230, W. H. Luther, Glasgow, Sheet Metal Sash-bars and Fittings for Glazing, &c.

*July* 17.—10,254, G. F. Busbridge and J. H. Turvey, East Malling, Manufacture of Cement.—10,261, E. Verity, J. M. Verity, and B. Banks, Leeds, Automatic Pivot for Looking-glasses, &c.—10,263, J. F. Sang, London, Improving the Foothold of Roads, Footpaths, &c.—10,268, E. Midgley, London, Ventilation of Drains and Disinfection of

* The gallery gives promenade accommodation for 4,000 more.

† Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

Sewage Gas. — 10,270, W. Harrison, Sheffield, Spindles for Door-handles. — 10,277, J. Gate, Plymouth, Water-heaters for Baths, &c.

*July* 18.—10,287, D. Raine, Over Darwen, Smoke and Hot-air Conductor.—10,293, W. R. Pullen, London, Embossing Leather Paper, &c.— 10,294, W. R. Pullen, London, Wall-paper, &c.—10,295, W. R. Pullen, London, Stained-glass Work, &c.—10,299, A. G. Rumley, Bristol, Ventilating Drains and Sewers. -10,301, G. Skudder, London, Supplying Disinfectants to Water-closets, Urinals, and Drains.—10,311, R. Hodges and J. J. Gaunt, Birmingham, Roller-blind Furniture.

*July* 19.—10,328, W. Erck, Dublin, Stoves for Domestic purposes.—10,332, D. P. Low, Glasgow, Cesspool and Filtering Deposit Removal Pan.—10,336, R. W. Brownhill, Handsworth, Self-acting Revolving Cooking Stove.

*July* 21.—10,378, D. Plumbley, Newport, Rack Pulleys for Window-blinds, &c.—10,381, S. Turner, Barrow Haven, Clapper for Forming Ridges, Finials, &c.—10,393, C. Lawrence and T. F. Wintown, London, Ventilating Apparatus.—10,394, C. Lawrence, London, Ventilating Greenhouses, &c.

*July* 22.—10,431, G. F. Busbridge and J. H. Turvey, East Malling, Manufacture of Cement.—10,434, G. H. Brown and A. Brown, London, Domestic Fire-places.—10,442, B. Haigh, London, Disinfecting and Deodorising Closets, Urinals, &c.—10,454, H. Trott, London, Ball Valve for High and Low Pressure Water.—10,460, E. Newton, Hitchin, Trap for Water-closets, &c.

*July* 23.—10,471, R. Chattwood, Bury, Ventilators.—10,480, C. O. Sortie, Christiania, Window-blinds.—10,503, W. P. Buchan, Glasgow, Water and Earth Closets.

*July* 24. -10,532, W. S. Rogers, London, Brickwork Facing. — 10,540, J. E. Tilling, London, Suspending Curtains over Doors, &c. — 10,547, A. G. Brookes, London, Pavement. Com. by G. F. Zeigler, New York, U.S.A.—10,557, W. Hayward and W. Eckstein, London, Window-sashes.

SPECIFICATIONS ACCEPTED.*

*July* 15.—2,881, J. H. Yeo. Brixham, Sewer-gas Preventer and Sewage Collector. 6,127, T. Durrans, London, Connecting Water-closets, &c., with Ventilated Soil-pipes.—8,544, S. H. Rowley, Swadlincote, Water-closet Basins.

*July* 18.—3,725, G. Crapper, London, Ventilation of House drains, &c.

*July* 22.—523, R. Pollock and T. H. Herbertson, London, Ventilators.— 801, T. P. Bache and G. Salter, West Bromwich, Door-springs.—2,379, S. Willett, London, Window-fastener.—7,203, W. J. Hopkins, Worcester, Expanding and Contracting Grate.—7,838, H. Steven and J. Walker, Glasgow, Cast-iron Skylight Frames.

*July* 25. -1,744. V. Skinner and H. C. Board, Bristol, Ventilation of Horticultural Houses and Buildings. - 4,459, J. C. Garrood, Folkestone, Safety Lock or Latch.—6,037, T. Grimbleby and H. Grimbleby, Barrow-upon-Humber, Lock-wing Roofing Tiles.

ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending July* 19, 1884.

5,650, R. Hall & C. C. Woodcock, Leicester, Wood Paving (Dec. 5, 1883, price 4d.).

The blocks have grooves or recesses formed in their upper surfaces into which concrete or other cement is poured.

5,734, H. H. Lake, London, Door Handles. Com. by C. E. Lacey, Calais. (Dec. 13, '83, 2d.)

The loose handle has a spring in its tube which, when the handle is pushed on the spindle, engages one of a set of ratchet-teeth thereon, and prevents the handle being taken off. A pin is passed through a hole in the knob to lift the spring and disengage it from the teeth when required to remove the handle. (*Pro. Pro.*)

5,840, C. D. Abel, London, Manufacture of Moulded Ornamental Articles in Imitation of Wood and other Carvings. Com. by C. W. Radeke, Berlin. (Dec. 27, '83, 4d.)

This is an improvement on Patent No. 2,914, of 1881, in using sawdust, powdered resin, and slaked lime, which are reduced to a fine powder, and then, when quite dry, are fed into heated moulds and are subjected to great pressure therein.

*Published during the week ending July* 26, 1884.

5,796, A Lorrain, Richmond, Producing Fluid Currents available for Ventilation. (Dec. 18, '83, 6d.)

A sail or flexible sheet has one end fixed to a bar while the other end is attached to a crank-pin which is made to revolve. The centre or fulcrum of the crank is so placed that when the pin is in its upper position the sail is stretched tight from the bar, while in its lower position the pin passes just under the bar. The sail is thus consecutively stretched and collapsed, and by its revolutions the current of air is produced.

5,821, G. M. Morgan, London, Working of Marble and other Stone, &c. (Dec. 20, '83, 6d.)

The marble, &c., is fixed on a travelling table which traverses backwards and forwards under a to-and-fro wheresin are fixed a number of tools,—first roughing and then finishing tools.

5,855, C. D. Abel, London, Impregnation of Wood, &c., with Preservative Substances. Com. by J. A. Koch, Galveston, U.S.A., and W. Herre, Berlin. (Dec. 24, '83, 4d.)

The wood is first placed in a closed vessel containing water, and is heated therein up to from 176° to 245° Fahr., when sulphate of iron, common salt, and alum are added, and afterwards the vessel is allowed gradually to cool down.

* Open to public inspection for two months from the dates named.

## Miscellanea.

**Eye Hospital, Birmingham.**—The new premises of the Birmingham and Midland Eye Hospital were opened on the 24th ult. by Lady Leigh. The Rev. B. Jones Bateman, chairman of the Committee, in opening the proceedings gave a short sketch of the history of the Institution, which was founded in 1823. Lady Leigh having declared the Hospital open, Lord Leigh, in thanking the Committee on behalf of her ladyship, congratulated the Governors and Committee on the long list of subscriptions, especially the munificent gift of 5,000*l.* from Mrs. Barrs, of Dudley. The hospital is a brick building with stone dressings, embellished with a small amount of carving. It stands upon 1,080 square yards of land, and has three frontages, namely to Church-street, Edmund-street, and Barwick-street. It consists of four floors and a basement, the kitchen department being in the top story. There are two stone staircases leading from the main entrance to the top of the building, one passing through the side set apart for the male patients and the other that of the female patients, and a third stone staircase leading from the basement to the top story. The out-patient department is entirely isolated from the rest of the building; the large waiting-hall occupying the internal space on the ground floor is under its own roof, thus forming a large internal area to assist the lighting and ventilating of the upper floors. This waiting-hall is arranged to accommodate about 250 patients daily. The hospital is arranged to accommodate beds for seventy patients, with ample cubical space per bed. The building has been erected by Mr. William Robinson, builder, under the superintendence of Messrs. Payne & Talbot, architects.

**Public Halls at Brixton.**—Brixton Hall, situate in Acre-lane, is at present undergoing very considerable enlargement. The works in progress include the extension of the present hall by increasing its length to the extent of 20 ft., and erecting a spacious gallery at the south end. The platform orchestra at the north end is likewise being reconstructed and enlarged. In addition to the extension of the large hall a second hall, with several apartments in connexion, is in course of erection. Messrs. Fowler & Hill, of Serjeants' Inn, Fleet-street, are the architects, and Mr. W. Downs, of Hampton-street, Walworth, is the contractor. Mr. E. Smith is the clerk of the works. The estimated cost of the works is between 4,000*l.* and 5,000*l.*—Gresham Hall (formerly known as the Angell Town Institution), in Gresham-road, having been destroyed by fire a few months since, is now in course of rebuilding and enlargement. Mr. T. Goodchild, of Duke-street, Adelphi, is the architect, and Messrs. Fish, Prestige, & Co., of Pimlico, are the contractors. Mr. Roberts is the clerk of the works. The cost of the works will be about 3,000*l.*

**700 Per Cent. Increase of Value in a Century-and-a-Quarter.**—The freehold house, No. 63, Lincoln's Inn-fields, with large forecourt and premises at rear extending to Queen's Head-yard, and covering an area of 11,350 square feet, was purchased in the year 1758 for the sum of 1,721*l.*, by Mr. Norton, a barrister, who afterwards became Speaker to the House of Commons, and subsequently the first Baron Grantley. It was put up to auction on Wednesday last by Messrs. Driver & Co., of Whitehall, and realised the sum of 13,000*l.*, thus showing more than 700 per cent. increase upon the price paid for the same property in 1758.

**The National Association of Master Builders of Great Britain** held their thirteenth half-yearly meeting at the rooms of the Central Association of Master Builders of London on Tuesday, the 29th ult., Mr. Stanley G. Bird, the president, in the chair. The meeting was largely attended by representatives from the provincial and local associations. After the routine business had been disposed of, several matters affecting the trade were discussed, more particularly the question of quantities. The next meeting will be held at Lincoln.

**Old and New Melbourne.**—The *Australasian Sketcher* for June 2 contains some interesting sketches of Old Melbourne,—not, indeed, that Melbourne is of any great antiquity, for many people now living have witnessed the growth of the city from babyhood to its present vigorous condition. Many of the earliest buildings erected on the site of the city have been removed to make way for modern improvements, and the few that remain are likely soon to disappear. The *Sketcher*, while doing its part in perpetuating the memory of the past, is not backward in recording the facts of the present, and in the same number gives a view of the new City of Melbourne Bank, at the corner of Collins and Elizabeth streets, on the site of the Clarence Hotel, one of the bits of "old" Melbourne included in the sketches referred to. It is stated that the "rookeries" on the adjoining blocks are being replaced by buildings worthy of the site and the city. The City of Melbourne Bank is in the style of the Italian Renaissance. It has frontages of 49 ft. to Collins-street, and 88 ft. to Elizabeth-street side. The chief features in the façades are large Corinthian columns, each about 30 ft. in height, which extend upwards to the summit of the first story. These rest upon bases of bluestone, each 7 ft. high, and when complete this will probably be the largest colonnade of the kind in the city. The doorway, which is at the corner, will be recessed, thus forming a portico. The doorway opens in the base of a tower. The architects of the new building are Messrs. Terry & Oakden.

**Lifts at the Great Eastern Hotel, Liverpool-street.**—The whole of the lifts at this building are almost completed. They have been erected by Messrs. Archibald Smith & Stevens, of Janus Works, Queen's-road, Battersea, and consist of one Stevens and Major's hydraulic balance passenger lift, 82 ft. travel; one hydraulic luggage lift, same travel (these receive passengers and luggage on the platform of the station and carry them to all floors in the hotel); one hydraulic stores lift, about 70 ft. travel; one direct-acting wine-cellar lift; one hydraulic continuous lift for kitchen purposes; two hydraulic kitchen lifts with jigger cylinders. The whole of these lifts are driven by water from a large accumulator supplied by a set of treble-barrel force-pumps, in turn actuated by a 6-h.p. Crossley "Otto" gas-engine. There are, in addition, several hand lifts. The whole of the contract has been carried out under the supervision of Mr. T. W. Worsdell, Locomotive Engineer of the Company.

**The Manchester Ship Canal.**—At the sitting of the House of Commons Committee on the Manchester Ship Canal on Wednesday, the opposition evidence of the Liverpool Corporation was continued. Sir W. Forwood made an offer that if the promoters would be content this year with their canal down to Runcorn, and would next year produce a scheme for carrying the low-water channel along either the north or south bank of the estuary, no opposition would be offered by Liverpool. The case for the London and North-Western Railway, the last of the petitioners, was opened, Mr. Findlay, general manager, being examined.

## TENDERS.

For additions to the Britannia Hotel, Sheerness-on-Sea. Messrs. Jeffery & Skiller, architects, Hastings:—

| | | | |
|---|---|---|---|
| England, Sheerness | £1,900 | 0 | 0 |
| Mower, Hackney | 1,496 | 0 | 0 |
| Stephenson, Hampstead | 1,485 | 0 | 0 |
| Scharien & Williams, South Kensington | 1,468 | 0 | 0 |
| Cephas Foad, Whitstable | 1,454 | 0 | 0 |
| G. White, Shepherd's Bush | 1,360 | 0 | 0 |
| Houghton, London | 1,346 | 0 | 0 |
| H. Wood & Co., Merton | 1,331 | 0 | 0 |

For alterations and repairs to 12, Tottenham-court-road, and 32 and 33, Grafton-street, W., for Mr. H. Eisenberger. Messrs. J. Saville & Son, architects, 1, Argyle-square, W.C. Quantities by Mr Arthur W. Saville, 99, Strand, W.C.:—

| | | | |
|---|---|---|---|
| Tymas | £1,088 | 0 | 0 |
| Ward & Lamble | 1,073 | 0 | 0 |
| W. Smith | 989 | 0 | 0 |
| Spencer & Co. | 980 | 0 | 0 |
| Perkins | 973 | 0 | 0 |
| Anley | 947 | 0 | 0 |
| Royal | 930 | 0 | 0 |
| Jackson & Todd | 895 | 0 | 0 |
| S. Lamble (accepted) | 879 | 0 | 0 |

For the erection of a new chancel, &c., at Christ Church, Stone, Staffordshire. Mr. W. Hawley Lloyd, architect, 79, Colmore-row, Birmingham:—

| | | | |
|---|---|---|---|
| R. Bradbury, Stoke-on-Trent | £1,399 | 0 | 0 |
| H. & R. Inskip, Longton | 1,338 | 0 | 0 |
| W. Trow & Sons, Wednesbury | 1,320 | 0 | 0 |
| W. Collis, Longton | 1,288 | 0 | 0 |
| J. Gallimore, Newcastle | 1,195 | 0 | 0 |
| T. Lowe & Sons, Burton (accepted) | 1,160 | 0 | 0 |

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Public Baths | Corporation of Stockport | £50, £30, £20 | Sept. 15th | ii. |
| Winter Garden, &c., Tenby | Committee | 25 Guineas | Sept. 29th | ii. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Iron Galleries, Infirmary | Guardns of St. Leonard, Shoreditch | J. Wallace Peggs | August 6th | xxii. |
| Brick and Pipe Sewers | Willesden Local Board | O. Claude Robson | do. | xx. |
| Cart-Shed, Stores, &c. | Wandsworth B. of Wks. | *Official* | do. | ii. |
| Road Making and Paving | Fulham Board of Wrks | do. | do. | ii. |
| Drainage Works | Teignmouth Local Brd | Geo. Crow | August 7th | xxii. |
| Shelter Houses, &c., on Landing Stage | Wallasey Local Board | A. Dowson | do. | xxii. |
| Swimming Bath | Croydon Town Council | *Official* | do. | xxii. |
| Painting, &c., Offices | Lewisham Brd of Wks | | do. | ii. |
| Wood Paving | Vestry of St. James, Westminster | | do. | xx. |
| Re-paving, Brick Paving, Laying Curb, Tar Paving | Croydon Town Council | *Official* | August 11th | xx. |
| Granite Pitchings | Bermondsey Vestry | | do. | ii. |
| Pipe-laying | Corporation of Burton-upon-Trent | James Mansergh | do. | xxii. |
| Coastguard Buildings, near Weymouth | Admiralty | *Official* | August 12th | ii. |
| Broken Granite | Willesden Local Board | O. Claude Robson | do. | xxii. |
| Enlarging Station, Delph | Lon. & N. W. Ry. Co. | S. B. Worthington | do. | ii. |
| Mercantile Marine Offices, Garston | do. | do. | do. | ii. |
| Flints (pit and picked) | Southgate Local Board | C. G. Lawson | do. | ii. |
| Painting, R. A. Barracks, Woolwich | War Department | *Official* | August 14th | ii. |
| Alterations and Additions, Lucton Foundation School | Governors | F. R. Kempson | August 18th | xxii. |
| Sewerage | Dorking Local Board | Smith & Austin | do. | xxii. |
| Stone Wall, Iron Railing, &c. | Cor. of Southampton | W. B. G. Bennett | do. | xxii. |
| Construction of Dock, &c. | Corporation of Preston | Edward Garlick, C.E. | August 20th | xxii. |
| New Brewery, Vauxhall | Barrett's Screw-Stopper Bottling Co., Lim. | H. Stopes & Co. | do. | xx. |
| Alteration of Levels, and New Station, Liverpool | Lan. & Yorks. Ry. Co. | *Official* | August 25th | xxii. |
| Ironwork for ditto | do. | do. | do. | xxii. |
| Press-House, &c., for treatment of Sewage | Wimbledon Local Brd | do. | August 26th | xxii. |
| Passenger Station, Langley Green | Great Western and Oldbury Ry. Co. | J. S. Macintyre, C.E. | Not stated | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Clerk of Works | Crewkerne Water Co. | August 7th | Not stated | xviii. |
| Surveyor | Wigmore Highway Bd. | August 14th | 150*l.* | xviii. |

For alterations, &c., at the Holy Well, Shoreditch. Messrs. Horenden, Heath, & Berridge, surveyors:—

| | | | |
|---|---|---|---|
| W. Shurmur | £387 | 0 | 0 |
| G. S. Pritchard | 319 | 0 | 0 |
| Hearle & Son | 315 | 0 | 0 |

For alterations, &c, at the King's Arms, Old Kent-road. Messrs. Wilson, Son, & Aldwinckle, architects —

| | | | |
|---|---|---|---|
| Lusk | £1,768 | 0 | 0 |
| Hearle & Son | 1,649 | 0 | 0 |
| W. Shurmur | 1,593 | 0 | 0 |
| Staines & Son | 1,592 | 0 | 0 |
| Drew & Cadman | 1,588 | 0 | 0 |
| Hancock | 1,533 | 0 | 0 |
| Mills | 1,495 | 0 | 0 |
| Jackson & Todd | 1,470 | 0 | 0 |
| D. D. & A. Brown | 1,350 | 0 | 0 |

For repairs to the School Board Schools, Barnes. Mr. Frank E. Thicke, architect:—

| | | | |
|---|---|---|---|
| Hunt | £154 | 0 | 0 |
| Aichin | 139 | 10 | 0 |
| Sale | 134 | 5 | 6 |
| Stansby | 133 | 15 | 0 |
| Hill (accepted) | 116 | 5 | 0 |

For works to the Mews, Compton-street, Eastbourne. Messrs. William Reddall & Son, South-street, Finsbury, E.C., and Terminus-road, Eastbourne, architects and surveyors:—

| | | | |
|---|---|---|---|
| Bainbridge | £512 | 10 | 0 |
| Newman & Hart | 387 | 17 | 0 |
| White | 350 | 0 | 0 |

For internal painting and decoration at Freemason's Hall, Great Queen-street, from the designs and under the direction of the Grand Superintendent of Works. Quantities by Messrs. William Reddall & Son:—

| | | | |
|---|---|---|---|
| Read | £1,121 | 13 | 7 |
| Homan & Son | 1,047 | 0 | 0 |
| Campbell, Smith, & Co. | 890 | 0 | 0 |
| McIntosh | 684 | 3 | 6 |

For the erection of residence and studios at Chelsea. Messrs. Bailey Denton, Son, & North, architects. Quantities by Mr. A. J. Bolton:—

| | | | |
|---|---|---|---|
| T. Richards | £8,789 | 0 | 0 |
| C. Bowden & Co. | 8,700 | 0 | 0 |
| J. T. Chappell | 7,185 | 0 | 0 |
| G. S. S. Williams & Son | 7,070 | 0 | 0 |
| Staines & Son | 6,969 | 0 | 0 |
| Macey & Sons | 6,923 | 0 | 0 |

For cleansing out docks, for the Brentford Local Board. Mr. J. W. Lacey, surveyor:—

| | | | |
|---|---|---|---|
| Thomas & Cardus (accepted) | £300 | 0 | 0 |
| Brunsden & Co. | 285 | 0 | 0 |

For the erection of a new hall and offices for the Most Worshipful the Butcher's Company, in Bartholomew-close, City. Mr. Alexander Peebles, architect. Quantities supplied by Mr. W. E. Stoner, Bucklersbury:—

| | £. | Alternative works. £. s. d. | Total. £. s. d. |
|---|---|---|---|
| E. Conder | 8,282 | 1,867 0 0 | 10,119 0 0 |
| F. & F. J. Wood | 8,458 | 1,581 19 4 | 10,039 19 4 |
| Lawrance | 8,067 | 1,621 0 0 | 9,688 0 0 |
| J. Morter | 7,963 | 1,711 0 0 | 9,674 0 0 |
| Hall, Beddall, & Co. | 7,897 | 1,625 0 0 | 9,522 0 0 |
| Brown, Son, & Blomfield | 7,939 | 1,592 0 0 | 9,531 0 0 |
| J. Chappell | 7,965 | 1,562 0 0 | 9,527 0 0 |
| Colls | 7,886 | 1,565 0 0 | 9,451 0 0 |
| Killby & Gayford | 7,836 | 1,578 0 0 | 9,414 0 0 |
| Brass | 7,777 | 1,547 0 0 | 9,324 0 0 |
| Ashby & Horner | 7,755 | 1,547 0 0 | 9,302 0 0 |
| Greenwood | 7,881 | 1,407 0 0 | 9,288 0 0 |
| Clarke & Bracey | 7,665 | 1,533 0 0 | 9,198 0 0 |
| Nightingale | 7,658 | 1,385 0 0 | 9,043 0 0 |
| Architect's estimate | 8,000 | | |

Not estimated.

For the erection of shops and offices in Eastcheap, for the Aërated Bread Company. Mr. George Edwards, architect. Quantities by Mr. H. Lovegrove:—

| | | | |
|---|---|---|---|
| Scharien & Williams | £8,764 | 0 | 0 |
| Shaw | 8,578 | 0 | 0 |
| Bywaters | 8,470 | 0 | 0 |
| Downs | 8,269 | 0 | 0 |
| Stimpson & Co. | 8,218 | 0 | 0 |
| Perry & Co. | 8,198 | 0 | 0 |
| Jarrant & Son | 8,190 | 0 | 0 |
| Higgs & Hill | 7,940 | 0 | 0 |
| Chappell | 7,863 | 0 | 0 |
| Scrivener & Co. | 7,859 | 0 | 0 |
| Brass | 7,793 | 0 | 0 |
| Morter | 7,790 | 0 | 0 |
| Green | 7,745 | 0 | 0 |
| Reading | 7,734 | 0 | 0 |
| Nightingale | 7,658 | 0 | 0 |
| Conder | 7,650 | 0 | 0 |
| Martin Wells & Co. (accepted) | 7,549 | 0 | 0 |

For alterations to 91 and 93, Westbourne-grove, for Mr. R. Beardall. Mr. George Edwards, architect:—

| | | | |
|---|---|---|---|
| | £338 | 0 | 0 |
| Sanders | 299 | 0 | 0 |
| Smith | 294 | 0 | 0 |
| Scharien & Williams | 285 | 0 | 0 |
| Drew & Cadman (accepted) | | | |

For four semi-detached villas, for Mr. Lester, in the Gratton-road, Midland-road, Bedford. Mr. F. T. Mercer, architect:—

| | | | |
|---|---|---|---|
| Watts & Lester (accepted) | £1,400 | 0 | 0 |

[No Competition.]

For alterations and additions to the Union Workhouse, High-street, Poplar, for the Guardians of the Poplar Union. Mr. George Morris, architect, Oriental-street, Poplar:—

| | | | |
|---|---|---|---|
| Smith | £4,100 | 0 | 0 |
| Sherwood | 3,995 | 0 | 0 |
| Alexander | 3,895 | 0 | 0 |
| Deacon | 3,600 | 0 | 0 |
| Evans | 3,505 | 0 | 0 |
| Stephenson | 3,503 | 0 | 0 |
| Hack | 3,498 | 0 | 0 |
| Brown | 3,490 | 0 | 0 |
| Robson | 3,365 | 0 | 0 |
| Aldridge & Jenvey | 3,293 | 0 | 0 |
| H. well & Son | 3,279 | 0 | 0 |
| Welker | 3,270 | 0 | 0 |
| Johnson | 3,124 | 0 | 0 |
| Harper | 3,040 | 0 | 0 |
| Curnow | 3,033 | 0 | 0 |
| Hunt | 3,028 | 0 | 0 |
| Harris & Wardrop (accepted) | 2,994 | 0 | 0 |

For making roads at Chatham, for the Rock Freehold Land Society (Limited):—

| | | | |
|---|---|---|---|
| J. Capon, Wellington-road, St. Mary Cray | £5,335 | 0 | 0 |
| J. Cardus & C. Prouse, Acton | 4,570 | 0 | 0 |
| A. T. Catley, Lloyd-square, Pentonville | 4,000 | 0 | 0 |
| W. H. Dearle, Eastbourne | 3,500 | 0 | 0 |
| Peill & Sons, Bromley-common, Kent | 3,250 | 0 | 0 |
| G. Impey, Leytonstone | 3,125 | 0 | 0 |
| G. Bell, Tottenham-wharf, Tottenham Hale, N. | 3,090 | 0 | 0 |
| Rowland Bros., Fenny Stratford, Bucks. | 2,810 | 0 | 0 |
| Beadle Bros., Erith, Kent | 2,768 | 0 | 0 |
| T. Adams, Amhurst-road, Hackney | 2,693 | 0 | 0 |
| A. Blake, Sydenham-road, Sydenham | 2,200 | 0 | 0 |
| L. Etheridge, Lower-road, Deptford | 2,150 | 0 | 0 |
| H. Potter, Redwall-road, Lower Clapton | 1,898 | 0 | 0 |
| J. W. Hastrick, New Brompton | 1,728 | 0 | 0 |
| G. Siddons & Sons, Cundle | 1,707 | 0 | 0 |
| J. Heaven, High-street, Rochester | 1,600 | 0 | 0 |
| J. C. Trueman, 57, Penshurst-road, South Hackney, E. (accepted) | 1,549 | 0 | 0 |

For the erection of a class-room to St. Peter's Church Schools, Great Yarmouth. Messrs. Bottle & Olley, architects:—

| | | | |
|---|---|---|---|
| William Borking | £120 | 0 | 0 |
| Rand & Cooper | 105 | 0 | 0 |
| James Leggett | 102 | 0 | 0 |
| James Bray (accepted) | 94 | 0 | 0 |

For Wesleyan Chapel, Halden, Kent. Mr. James Weir, architect. Quantities by Mr. C. G. Maylard:—

| | | | |
|---|---|---|---|
| J. Bingham, Headcorn, Kent* | £496 | 15 | 3 |

* Accepted.

For Park-street Bridge, Hertford. Mr. Urban A. Smith, county surveyor:—

| | | | |
|---|---|---|---|
| Heff Bros., Park-street | £500 | 0 | 0 |
| W. Gray, Hertford Heath | 450 | 0 | 0 |
| C. Masken, St. Albans | 431 | 0 | 0 |
| Cooke & Co., Battersea | 428 | 0 | 0 |
| Thos. Turner, Watford | 399 | 0 | 0 |
| Homer & Co., Holborn | 374 | 0 | 0 |
| S. Redhouse, Stotfold | 356 | 0 | 0 |
| Homer & Co., amended (accepted) | 350 | 0 | 0 |

For Hitchin Lockup. Mr. Urban A. Smith, county surveyor, architect.

| | | | |
|---|---|---|---|
| E. Twelvetrees, Biggleswade | £6,060 | 0 | 0 |
| Glasscock & Son, Bishop Stortford | 6,020 | 0 | 0 |
| G. Stapleton, Hitchin | 5,765 | 0 | 0 |
| Henry Hicks, Peterborough | 5,725 | 0 | 0 |
| Thos Turner, Watford | 5,397 | 0 | 0 |
| Wm. Gray, Hertford Heath | 5,200 | 0 | 0 |
| A. Bunting, Fenstanton | 5,100 | 0 | 0 |
| S. Redhouse, Stotfold (accepted) | 5,010 | 0 | 0 |
| R. Ranson, Arlesey Siding | 4,998 | 0 | 0 |

For making up and improving the Venner-road, Byne-road, Wyverton-road, Penge, for the Beckenham Local Board. Mr. Geo. B. Carlton, surveyor:—

| | | | |
|---|---|---|---|
| J. Etheridge | £5,034 | 0 | 0 |
| Wheeler & Hindle | 5, 25 | 0 | 0 |
| H. Rogers | 5,010 | 0 | 0 |
| Nowell & Robson | 4,730 | 0 | 0 |
| Watt & Lovedale | 4,658 | 0 | 0 |
| H. Brookes | 4,255 | 0 | 0 |
| Gabriel | 3,977 | 0 | 0 |
| W. J. Botterill | 3,849 | 0 | 0 |
| Beadle Bros. | 3,794 | 0 | 0 |
| G. B. Marshall | 3,532 | 0 | 0 |
| Mowlem & Co. | 2,988 | 0 | 0 |

[Engineer's estimate, £3,678].

For addition of infant school and offices to present School Chapel, Temple Cowley, Oxford. Mr. A. Mardon Mowbray, architect, Eastbourne. Quantities supplied:—

| | | | |
|---|---|---|---|
| James Stroud, Littlemore | £784 | 0 | 0 |
| Castle & Martin, Charles-street, Iffley-road, Oxford | 777 | 0 | 0 |
| J. Horn, George-street, St. Clement's, Oxford | 656 | 10 | 0 |
| G. Castle, Pembroke-street, Cowley-road, Oxford | 650 | 0 | 0 |
| W. Colley, Temple-terrace, Cowley | 583 | 5 | 0 |
| W. H. Morris, Cowley | 425 | 0 | 0 |
| A. W. Collett, 5, Pembroke-street, Cowley-road, Oxford (accepted) | 393 | 15 | 0 |

For alterations and repairs, 8, South-hill Park-road, Hampstead Heath, for Mr. H. M. Clark. Mr. Thomas Millbourn, architect:—

| | | | |
|---|---|---|---|
| G. S. Archer, Featherstone-street | £287 | 10 | 0 |
| W. Pickett, Hampstead (accepted) | 275 | 0 | 0 |

For alterations to the Cock and Woolpack, Finch-lane, E.C., for Mr C. Deakin. Mr. Arthur W. Saville, architect, 94, Strand, W.C.:—

| | | | |
|---|---|---|---|
| W. Royal (accepted) | £59 | 0 | 0 |

For new Wesleyan Chapel, Tenterden, Kent. Mr. Jas. Weir, architect, 9, Victoria-chambers, Westminster, S.W. Quantities by Mr. C. G. Maylard, 21, King William-street, Strand, W.C.:—

| | | | |
|---|---|---|---|
| Howland Bros. | £2,590 | 0 | 0 |
| Russell | 2,430 | 0 | 0 |
| Sulter | 2,216 | 0 | 0 |
| Punnett | 2,145 | 0 | 0 |
| T. Bingham, Headcorn, Kent* | 1,987 | 0 | 0 |

* Accepted at £1,633.

For erection of new schools at Wright's-road, Bow, for the School Board for London. Mr. E. R. Robson, architect :—

| | | | |
|---|---|---|---|
| W. Bangs | £12,606 | 0 | 0 |
| Priestley | 12,576 | 0 | 0 |
| W. Shurmur | 12,275 | 0 | 0 |
| G. S. Pritchard | 12,203 | 0 | 0 |
| Perry & Co. | 12,186 | 0 | 0 |
| C. Cox | 12,174 | 0 | 0 |
| Patman & Fotheringham | 12,125 | 0 | 0 |
| J. R. Hunt | 12,058 | 0 | 0 |
| Wall Bros. | 12,024 | 0 | 0 |
| F. & F. J. Wood | 11,999 | 0 | 0 |
| S. J. Jerrard | 11,983 | 0 | 0 |
| J. Grover | 11,927 | 0 | 0 |
| Stimpson & Co. | 11,920 | 0 | 0 |
| C. Wall | 11,850 | 0 | 0 |
| Atherton & Latta | 11,600 | 0 | 0 |

For erection of new schools at Montem-street, for the School Board for London. Mr. E. R. Robson, architect :—

| | | | |
|---|---|---|---|
| W. Goodman | £17,883 | 0 | 0 |
| Patman & Fotheringham | 17,878 | 0 | 0 |
| Kirk & Randall | 17,774 | 0 | 0 |
| W. Downs | 17,707 | 0 | 0 |
| J. Grover | 17,338 | 0 | 0 |
| W. Shurmur | 16,980 | 0 | 0 |
| Stimpson & Co. | 16,524 | 0 | 0 |
| C. Wall | 16,428 | 0 | 0 |
| Priestley | 16,398 | 0 | 0 |
| W. Bangs & Co | 16,237 | 0 | 0 |
| Niblett & Co. | 16,229 | 0 | 0 |
| S. J. Jerrard | 16,127 | 0 | 0 |
| Wall Bros. | 15,992 | 0 | 0 |
| Atherton & Latta | 15,990 | 0 | 0 |

For the erection of new schools at Trafalgar-square, Stepney, for the School Board for London. Mr. E. R. Robson, architect :—

| | | | |
|---|---|---|---|
| Harris & Wardrop | £15,550 | 0 | 0 |
| Scrivener & Co. | 14,940 | 0 | 0 |
| W. Bangs | 14,899 | 0 | 0 |
| Patman & Fotheringham | 14,783 | 0 | 0 |
| T. Boyce | 14,750 | 0 | 0 |
| W. Johnson | 14,730 | 0 | 0 |
| C. Wall | 14,621 | 0 | 0 |
| C. Cox | 14,500 | 0 | 0 |
| Kirk & Randall | 14,470 | 0 | 0 |
| Atherton & Latta | 14,360 | 0 | 0 |
| Perry & Co. | 14,157 | 0 | 0 |
| J. Smith & Son | 14,154 | 0 | 0 |
| W. Brass | 14,134 | 0 | 0 |
| G. S. Williams & Son | 14,111 | 0 | 0 |
| S. J. Jerrard | 13,983 | 0 | 0 |
| Wall Bros. | 13,934 | 0 | 0 |
| M. Gentry | 13,917 | 0 | 0 |
| F. & F. J. Wood | 13,689 | 0 | 0 |
| W. Shurmur (accepted) | 13,590 | 0 | 0 |

For rebuilding the Ship Tavern, Little Tower-street. Messrs. Hills & Fletcher, architects.

| | | | |
|---|---|---|---|
| Rider & Son | £2,934 | 0 | 0 |
| Higgs & Hill | 2,940 | 0 | 0 |
| Scrivener & Co. | 2,890 | 0 | 0 |
| Wall Bros. | 2,828 | 0 | 0 |
| Longmire & Burge | 2,773 | 0 | 0 |
| T. Boyce | 2,743 | 0 | 0 |
| W. Shurmur | 2,583 | 0 | 0 |
| Cocks & Co. | 2,580 | 0 | 0 |
| Harris & Wardrop | 2,572 | 0 | 0 |
| B. E. Nightingale | 2,530 | 0 | 0 |
| Perry & Co. | 2,500 | 0 | 0 |
| S. Salt | 2,500 | 0 | 0 |
| Alexander | 2,295 | 0 | 0 |

For building new parish room at West Hackney Church —

| | | | |
|---|---|---|---|
| W. M. Macey | £868 | 0 | 0 |
| W. Shurmur (accepted) | 774 | 0 | 0 |

For alterations and additions at 43, Ovington-square, for Major C. Mercier. Mr. E. Clark, architect :—

| | | | |
|---|---|---|---|
| W. & H. Salmon | £1,950 | 0 | 0 |
| Bray & Pope | 1,798 | 0 | 0 |
| Scharien & Williams | 1,793 | 0 | 0 |
| W. R. Cubitt | 1,775 | 0 | 0 |
| Mower | 1,725 | 0 | 0 |
| A. G Bolding | 1,479 | 0 | 0 |
| Felton Bros. | 1,398 | 0 | 0 |

For alterations, &c., to the Pitt's Head Tavern and houses adjoining in Henry-street and Charles-street, St. John's Wood, for Mr. W. T. Pryer. Mr. Alfred Hopkins, architect, 10, Berners-street Quantities not supplied :—

| | | | |
|---|---|---|---|
| J. Anley | 1,970 | 0 | 0 |
| J. Adams | 1,967 | 0 | 0 |
| C. P. Mills | 1,803 | 0 | 0 |
| Hopkins | 1,314 | 0 | 0 |

For erection of Methodist Free Church, Peckham. Mr. F. Boreham, architect —

| | | | |
|---|---|---|---|
| J. Grover | £5,342 | 0 | 0 |
| A. Reed | 5,254 | 0 | 0 |
| T. Richards | 5,243 | 0 | 0 |
| G. S. Williams & Son | 5,040 | 0 | 0 |
| J. H. Johnston | 4,992 | 0 | 0 |
| Smith & Son | 4,987 | 0 | 0 |
| W. Shurmur | 4,896 | 0 | 0 |
| W. Gregar | 4,778 | 0 | 0 |
| Holloway Bros. | 4,655 | 0 | 0 |
| J. Holloway | 4,630 | 0 | 0 |
| T. Allen | 4,420 | 0 | 0 |

For new buildings next the Liberal Club, in Northumberland-avenue, for Mr. McSheehan. Messrs. Francis & Sons, architects, 177, Palmerston-buildings, Old Broad-street :—

| | | | |
|---|---|---|---|
| Scurrah | £12,190 | 0 | 0 |
| Dove Bros. | 10,945 | 0 | 0 |
| Manley | 10,749 | 0 | 0 |
| Brass | 10,577 | 0 | 0 |
| Perry & Co. | 10,284 | 0 | 0 |
| Lawrence | 9,790 | 0 | 0 |
| R. Conder | 9,645 | 0 | 0 |
| Bangs & Co. | 9,630 | 0 | 0 |
| Baylis (accepted) | 9,512 | 0 | 0 |

For new dome at the Town-hall, Hackney. Mr. Thornton Green, architect :—

| | | | |
|---|---|---|---|
| J. Sargeant | £172 | 0 | 0 |
| W. Shurmur (accepted) | 165 | 0 | 0 |

For alterations, &c., at No. 20, Worship-street. Mr. J. Groom, architect :—

| | | | |
|---|---|---|---|
| Mattock Bros. | £858 | 0 | 0 |
| Saxby | 835 | 0 | 0 |
| Kilby & Co. | 736 | 0 | 0 |
| W. Shurmur | 693 | 0 | 0 |

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# The Builder.

VOL. XLVII. No. 2166. SATURDAY, AUGUST 9, 1884.


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### *The War Office and Admiralty Competition Designs.*

THE more careful and detailed examination of the nine designs now exhibiting at No. 18, Spring-gardens, which we have had time to make since last week, only confirms our first impression, and that of the profession generally, that the results can scarcely be deemed satisfactory so far as architectural design is concerned; and if the statement be true, as announced in the *Times* of July 31st, that the elevations and sections of Messrs. Leeming & Leeming's design were all drawn by one of the brothers (and they certainly seem to be all by the same hand), the reason is not far to seek. It would be quite impossible to expect that in the short period given (eleven weeks) for the working out of the second set of drawings, there would be time for both study of design and draughtsmanship. Of the latter we have only to speak in the highest terms of praise: both in the first set of sketch designs and in the final development the draughtsmanship is as fine and delicate as we have ever seen; but there is a woeful absence of any attempt to study the relative proportions of the various details of the elevations, the result being, as we have already observed, that as many as three or four different scales are to be found in the same drawing. Taking Messrs. Leeming & Leeming's detail, for instance, the same design for the balustrade is employed for the area railing, for under the windows of the several floors, and as a crowning feature to the building, and there are as many as four different scales to them, and that not proportionately to their relative heights, for the area balustrade is larger than those in the floors above, the topmost one being double the size of any. Again, the subordinate orders of the windows reproduce on a very small scale all the features of the larger order which rises through the first and second floors, even to the curved "Queen Anne" frieze; a feature, by the way, quite out of place on a large scale, in serious Classic architecture. These are some of the defects which strike us at first in our examination of the drawings; to others we may have to refer later on. They are all capable of reconsideration before the detail drawings for execution are worked out; and we are of opinion that if Messrs. Leeming & Leeming had indicated the stone joints (which they say they had intentionally left out) the want of scale of the several parts might have been observed. We would recommend them, as young men, to study carefully Sir Charles Barry's works, and notably the Treasury Buildings, in which they will find the same relative proportions between the mouldings of the windows and the principal order. We consider also that they will find in that building the utmost projection it is safe to give to a columnar order rising through two floors, and also to the rusticated piers supporting it. The projections which they have given, both on the Whitehall and St. James's Park fronts, would not only seriously interfere with the light admitted to the windows between, but would mar the breadth of their elevation and create a want of repose. Looking now to the plans of the nine competitors generally, they seem to reproduce, more or less exactly, to a larger scale, those first sent in, and we are anxious, therefore, to ascertain the principle on which the selection was made. It is evident, on looking at some of them, that architectural design was not much considered, and this may account for the fact that of the 128 who sent in (many of whom were well known for their skill in architectural composition), so few known names figured among the fortunate nine. We understand that at first six only were chosen, but it having been suggested that a sort of promise was made to nominate ten, three others were added to the list. It was quite impossible, however, to find a tenth, which proves that, either prior to the drawings for the first competition being sent in, or on a consideration of them afterwards, some distinct principle of plan was adopted for selection, entirely different from that which has hitherto obtained in Government buildings, and notably so from the plan published in illustration of an article by Mr. Shaw Lefevre, which appeared in the *Nineteenth Century* of November, 1882. The block-plan there distinctly shows on the west and north fronts, and in the central blocks at right angles to one another, the principle of a central corridor, with rooms on each side; it being recognised that this scheme of plan concentrates the offices of one department together, rendering intercommunication easier; though it has the serious defect of making the corridor very dark, unless special means are taken to obviate this defect. Now, every one of the plans selected departs more or less from this principle, by the adoption of a double corridor with courts between to light the corridor direct; and this, it seems to us, has guided the judges in their decision. It has added considerably to the cubical contents of the building and has necessitated the introduction of a supplemental plan (as in Messrs. Verity & Hunt's design), or a mezzanine or extra floor (as in Messrs. Webb & Bell's design), to provide for the required accommodation; but, except in less important departments of some of the designs, this scheme of plan has provided for direct light and ventilation of the corridors. It has also enabled most of the competitors to arrange for those private corridors which were deemed desirable in some of the departments (notably that of the First Lord of the Admiralty), though no doubt this was provided for in some of the unsuccessful designs.

In order to explain more clearly the working of such a principle in the setting-out of the plan and to compare it with the single corridor system as employed in the Foreign Office, we note that the depth of the blocks of the north and south fronts in this latter building averages about 70 ft., being about 30 ft. for offices on each side of the corridor, including walls and projections, and 10 ft. to 12 ft. for the corridor. With the double corridor system a court from 20 ft. to 30 ft. wide must be added, and a second corridor, making the total depth about 105 ft. Now, applying this system in its integrity and taking Messrs. Verity & Hunt's plan as the simplest solution of the problem, it will be seen that it dispenses with all secondary courts, and provides for one large central court and a number of corridor courts. One double corridor block runs across the Whitehall front, and three others from the south, west, and north fronts, leaving a narrow slip at the end of the *cul-de-sac* in Spring-gardens (which Messrs. Verity & Hunt have utilised as their exit gateway with a corridor over on the first floor). This scheme rendered it necessary to decentralise the entrance gateway from Whitehall, which is treated as a subordinate feature, the central feature containing a foot entrance only to the War Office.

Messrs. Leeming & Leeming adopt a similar principle, except that on the north side they carry their double-corridor block through from front to back (leaving what seems to us to be too narrow a central court, only 80 ft. wide by 219 ft. long). On the remainder of the site (110 ft. deep) they project two double-corridor wings, leaving a 30-ft. space between; their main carriage entrance (also decentralised in the Whitehall front) enters in the centre of the long court and takes its exit between the two wings.

Messrs. Hall & Powell employ a similar principle, except that instead of two wings on

the north side they enclose a secondary court, and they make their carriage exit into the *cul-de-sac* before spoken of.

Messrs. Spalding & Auld adopt the double-corridor system round a court on the back of the site, and provide a second court on the block facing Whitehall, but with one corridor and offices on one side only of the same. They provide for two carriage entrances in Whitehall, a third leading from the first court to the second court, and a fourth taking its exit into Spring-gardens,—an arrangement which, on the ground-floor, has the disadvantage of interfering too much with the intercommunication of the departments.

Messrs. Glover & Salter adopt the double-corridor block for the rear of the site in St. James's Park, enclosing a large court, and provide three secondary courts on the Whitehall side (the central one not inclosed on the Whitehall side); they provide four carriage entrances, one down the central secondary court into their main court, one out of the latter into the *cul-de-sac*, and two through the blocks of the north secondary court; these latter might have been dispensed with.

Mr. Porter places a double corridor block round a large central court in the rear of the site, and another at right angles to it running into Whitehall. On the left hand side of the Whitehall front he provides a secondary court with offices on one side of corridor only, and a central secondary court open to Whitehall, which is, perhaps, the best feature of the plan, through which he takes his carriage entrance into his great court, with an exit through the centre of the north front.

Messrs. Stark & Lindsay adopt the double corridor block for the St. James's Park front only, providing three secondary courts on the Whitehall side, and a wing to the great court through which carriages enter, the exit being into Spring-gardens.

Messrs. Maxwell & Tuke (whose plan is in some respects the best submitted) provide a large central court, 113 ft. wide, and four surrounding courts. This plan is somewhat similar to that of Messrs. Hall & Powell, except that what we have described as corridor courts in the latter become secondary courts in consequence of their greater width. They provide two carriage-ways, one leading to the central court and an exit thence into the *cul-de-sac* of Spring-gardens.

Messrs. Aston Webb & Ingress Bell's plan we have reserved to the last, because it presents features totally different from any of the others. It is by far the most picturesque plan of the whole series, but the sacrifice they have made of the area of site in order to obtain their two courts, has necessitated an addition to the number of floors, so that their building towers above all the others. Messrs. Webb & Bell commence their design by setting back the main front of the building in Whitehall, retaining only two end wings. This is an excellent idea, and would, at all events, make the building to be seen fairly well from what is almost the narrowest part of Whitehall. At the back they provide a large court in the shape of a Maltese cross on plan; in three of the angles of the blocks surrounding it they provide corridor courts covered with glass roofs,—in the fourth angle the *cul-de-sac* of Spring-gardens comes in. There is a carriage-way from Whitehall to the centre of the great court, and an exit on the right into Spring-gardens. It may also be noted here that they have suggested a scheme for laying out the vacant space in Spring-gardens in which they utilise the screen now existing in front of the Admiralty buildings.

Looking generally at all the plans, we cannot help regretting that the requirements scheduled for the two offices left no margin whatever for courts and areas of proper size, and it is well known that a great number of intending competitors, many of them of eminence in the profession, relinquished at an early stage what seemed to them to be the hopeless task of providing the accommodation required with due regard to the lighting of the corridors and to the supply of courts of a proper size for light and air. This is painfully evident in the accepted design of Messrs. Leeming & Leeming, who, we may presume, have just succeeded in meeting all the requirements of the schedule. A court 219 ft. long by 80 ft. broad is not a favourable proportion, and yet it has only left them a width of 25 ft. for the corridor court; this court on the Spring-gardens side is only 30 ft. wide, and will form a long dark hole. This is, however, not the most serious defect in the plan. The areas which were given for the rooms of the principal officers were all multiples of twenty, which seemed to suggest that 20 ft. was considered to be as great a depth of room as would be desirable; 300 ft., 320 ft., 340 ft., 360 ft. superficial areas therefore gave 15 ft., 16 ft., 17 ft., and 18 ft. as the width of the several rooms. Now, the average depth of the offices provided by Messrs. Leeming & Leeming is 25 ft., and in some cases the rooms are actually only 12 ft. wide, clear evidence that the competitors must have been at their wits' ends to comply with the demands and yet provide rooms of natural proportions. The general tendency of all public buildings is towards increased demand for space as the scheme becomes developed, and we recollect that in the India Office, waiting and interview rooms had to be utilised as office rooms,—other rooms devoted to purposes for which they were not originally intended, and open corridors enclosed in order to provide increased accommodation. It is much to be regretted, therefore, that at the first start an area so limited in space should have been decided on for requirements of so extensive a character. It has left little opportunity for a display of architectural effect; and, what is more important, has resulted in the curtailing of the proper width of the office rooms, and in an insufficiency of light and air in the areas and courts.

Having said thus much on the general scheme of the plans, we propose, before entering into detail, to glance at the general character of the architectural elevations, comparing them with one another as regards the grouping of the various projecting blocks, the sky-line, the relative treatment of the several floors, and the fenestration. Messrs. Leeming & Leeming, in the St. James's Park fronts, place square towers at the angles, which rise some 40 ft. above the crowning balustrade of the building, and are surmounted with circular towers and cupolas. The line of front between, on the west and south sides, is broken by two projecting blocks, about 45 ft. wide, each crowned with corner turrets rising above the balustrade, which they couple together by throwing an arch across; exception has been taken to this feature, which, however, appears to us to be novel and pleasing. It unites the turrets with more elegance than if a solid wall had been carried up, and needs only one thing, a group of sculpture to give a *raison d'être* for the arch, which would then take the character of a large niche for its protection. This would mask the sloping sides of the roof at the back, the effect of which is unpleasant. The intervening portions of wall are broken up by the Corinthian columns running through the first and second floors and their bases, to the extravagant projection of which we have already taken exception; if between the two projecting blocks three-quarter columns were introduced, and omitted altogether between the towers and the blocks, the design would gain in repose and breadth. The same omission might be made in that portion of the west elevation which runs in the same line as the Horse Guards front (except in the centre projecting block of the same), so that its character might be more assimilated to the simpler design of the Horse Guards. The corner tower adjoining the latter might be rusticated up to the level of the Corinthian outer cornice, and the stone work above, including the tower and octagonal turret, omitted, so as to lead down gradually to the level of the Horse Guards front. This, in fact, was suggested in the admirable article before referred to by Mr. Shaw-Lefevre, and apparently not issued in the instructions, or Messrs. Leeming & Leeming would have thought twice before they reduced the present Horse Guards to absolute insignificance by the design for a lofty tower close up to it on the Whitehall front. No perspective is shown of the Whitehall front, which appears to us to be incoherent in design. It is not symmetrical, it is not grouped, and it contradicts the blocks of buildings which lie behind it. In their treatment of the several stories, Messrs. Leeming & Leeming seem to us to have adopted the only principle which gives architectural grandeur and support, such as should be the characteristic of a public building. The ground-floor, and such portion of the basement as appears above ground, are treated as a podium to carry the Corinthian order, which rises through the first and second floors, the third floor being treated as an attic to the same. One exception, however, we have to take to the actual working out of the ground-floor story. The rustication ought to have been continued between the piers or pedestals carrying the columns instead of the panelling round the windows, which is suggestive of plaster or wood construction; it would further have the advantage of detaching less the piers or pedestals which now count as part of the Corinthian columns and interfere with their due proportion. The adoption of an order running through two floors has this one disadvantage, that it increases the dimensions from centre to centre of window when only one window is provided, which is the usual and only pure Classic treatment. Messrs. Leeming & Leeming have felt this, and have introduced two circular-headed windows coupled together on the second floor, and a group of three windows (one large and two small) on the first-floor, and by so doing have destroyed the otherwise pure Classic character of the design and reduced it to that of a warehouse type. Whether the requirements of light will hereafter necessitate their adhering to this treatment we know not, but the architectural character of their design would gain immensely if single square-headed windows, with 5 ft. to 5 ft. 6 in. opening, were employed instead.

Messrs. Verity & Hunt, in their St. James's Park fronts, have failed to group their elevations satisfactorily, in our opinion, owing, first, to the enormous width of their projecting blocks, which on the side facing the Horse Guards Parade are larger than the intermediate wall-space; secondly, because they mask this wall-space by projecting columns; thirdly, by the introduction of a bow-window on the St. James's Park front, which partially destroys the breadth of the wall-space; and fourthly, because they have not attempted to break the sky-line of the roofs by towers or other features rising above the main balustrade. They may have thought that such features were useless, and served no immediate practical purpose; but such are columns, and cornices, and window mouldings, and to adopt the one and refuse to accept the other seems to us to be unnatural. In the Whitehall elevation, however, they do venture on a central dome and two square turrets at the angles of the building rising above the roofs. They might be higher, but, either way they are a positive advantage to the architectural effect. This elevation is in other respects superior to the St. James's Park front, in that between the central and two side blocks with which they have broken up the front they omit the Doric order which, in their design, runs through the first and second stories. In their relative architectural treatment of the several stories Messrs. Verity & Hunt adopt the same principle as Messrs. Leeming & Leeming, viz. a rusticated podium for ground-floor and basement, and an order (Doric) rising through first and second floors and an attic. Their windows are single ones, and square-headed, in which respect their design is superior to that of the successful competitor. Their ground-floor is rusticated throughout. In the Whitehall front the centre block is emphasised in the principal foot-passage entrance to the War Office. The great court lies on the right of this the carriage-entrance is placed in the centre of the wing, between the centre and right-hand block. There is, however, no similar feature to place with it on the opposite side, and it is unfortunate that they should have emphasised the carriage-entrance in so marked a manner by figure sculpture, and on so large a scale;

that respect they seem also to have vulgarised their archway exit into the *cul-de-sac* of Spring-gardens, as shown in the large perspective of the interior court. Otherwise, we consider the architectural treatment of this design to be purer and more Classic in character than that of Messrs. Leeming & Leeming.

Messrs. Stark & Lindsay adopt to some extent the suggestion made by Mr. Shaw-Lefevre before alluded to, viz., to keep the block of buildings on the south corner of the site lower, so as not to dwarf the Horse Guards, and, in addition to this, they round off the angle overlooking the same. The remaining length of front, about 270 ft., they break up by two wide projecting blocks, which rise above the roof. By thus shifting the main features of their elevation towards the north, they are enabled to place in the centre between the projecting blocks the carriage-way to their courtyard. In the St. James's Park front they have lofty corner towers rising above the main roof, and crowned with features resembling those of the western towers of St. Paul's Cathedral, and too large in scale. The centre portion of the remainder of the front is relieved again by a projecting block with corner towers, and crowned by lofty French roofs; similar treatment is employed on the two other fronts. The lower stories, basement, and ground-floor are richly rusticated; the first and second floor enriched with three-quarter detached columns, and the circular-headed windows between with archivolts carried on smaller columns or shafts, a treatment derived from the Pesaro Palace at Venice, and which was employed for the Army and Navy Club, in Pall Mall. The attic above is kept plain. This is the only elevation which, treating each story by itself, and not running the order through two floors, has, nevertheless, obtained a certain palatial effect, and we attribute it to the fact that the two stories (first and second floor) are equally enriched, so that they count in the mass as one. Their richness is emphasised by the rusticated ground-floor and the plain attic, and the completeness of the design is carried out by the elaborate leadwork of the lofty roofs, and the rich corbelled cornice.

Messrs. Hall & Powell treat the left-hand block in Whitehall in a similar way to Messrs. Stark & Lindsay, that is, by keeping it one story lower. The centre portion of the 270 ft. remaining they set back 25 ft., its width being equal to that of their central court. The projecting blocks, therefore, represent the double corridor blocks behind. They are relieved again by corner projections crowned with mansard roofs. The carriage entrance is placed in the centre of the front, set back, and a portion of this is emphasised by a pediment. The St. James's Park front shows similar treatment. Considering the skill in the grouping of the projections which *agrees in all cases with the actual buildings behind*, one is surprised at what must be called the monotonous and commonplace effect of the whole building, which seems to us to be deficient in similarly good grouping in the stories. The ground-floor is rusticated, the first floor divided up by an order; then it would seem that the resources began to fail, and the two stories above are left quite plain and bare; in fact, it would seem as if another architect had been called in to complete above the first floor. The buildings also are all carried up the same height. If between the centre and side blocks of the St. James's Park front the upper portion of attic had been omitted a much better sky-line would have been obtained. The figure-sculpture is beautifully designed and drawn in this set of drawings. We should note that Messrs. Hall & Powell place a low building next the Horse Guards in the Parade Elevation. Messrs. Stark & Lindsay the contrary.*

**"Preparations for Meeting the Cholera"** will be the subject of a lecture to the members of the Association of Public Sanitary Inspectors, at 1, Adam-street, Adelphi, on Monday next, by the President, Mr. Edwin Chadwick, C.B. Chair to be taken at seven o'clock.

* To be continued.

## RAILWAY GOODS RATES.

THE Bill introduced by Mr. Chamberlain to amend the Railway Regulation Acts has brought this subject into prominence, and much has been said and written about it. There is one phase of it, however, which has received but little attention, and that is the charges imposed upon small consignments. This is probably due more to the want of information as to how this class of traffic is dealt with than to any lack of appreciation of its importance. It is pretty generally known that the tonnage rates are not applicable to small consignments. In fact, a consignment must weigh 500 lb. or over or it is technically known as a "small," and is subject to an additional charge beyond the amount arrived at by calculating at the rate per ton. For instance, while 5 cwt. of goods chargeable at 30s. per ton would be charged 7s. 6d., the sum of 4s. 2d. would be demanded for 2½ cwt. at the same rate. This is in accordance with a scale of charges agreed upon by all the English railway companies in 1877, and as the former scale of "smalls" only extended to 1 cwt., the change must have increased their receipts very appreciably. Many a railway account contains scores of items ranging up to 500 lb., upon all of which this additional charge is imposed. The weights are in groups, advancing upwards from 1 qr. by 14 lb. at a time, and the method will be best explained by the following extract from the scale :—

| Weight not exceeding. | Above 38s 4d. and not exceeding 40s. per ton. | Above 40s and not exceeding 43s. 4d. | Above 43s 4d. and not exceeding 46s. 8d. | Above 46s 8d and not exceeding 50s. |
|---|---|---|---|---|
| cwt. qr. lb. | s. d. | s. d. | s. d. | s. d. |
| 0 1 0 | 1 0 | 1 2 | 1 3 | 1 3 |
| 0 1 14 | 1 3 | 1 5 | 1 6 | 1 6 |
| 0 2 0 | 1 6 | 1 8 | 1 9 | 1 9 |
| 0 2 14 | 7 9 | 8 5 | 9 0 | 9 7 |
| 3 0 0 | 8 0 | 8 8 | 9 3 | 9 11 |
| 3 3 14 | 8 3 | 8 11 | 9 7 | 10 3 |
| 4 0 0 | 8 6 | 9 2 | 9 10 | 10 6 |

In the smaller weights the additions are, of course, very considerable (as the product at the rate per ton would be far too small to allow of any profit), and the percentage added decreases as the weights advance, so that upon the higher weights shown in the extract it only amounts to some five to ten per cent. The remark just applied to the small weights as to the insufficiency of the tonnage-charge to yield any profit is alleged by the companies to be applicable to all weights up to 500 lb., though, of course, they will only bear additions decreasing *pro ratio*, as above explained. In the case already given, the extra charge is about ten per cent., which is a little below the average, and it is frequently much more than this on account of the grouping system by which goods are advanced both in weight and rate for charging purposes. Thus, a consignment weighing 2 cwt. 1 qr. 16 lb. is treated as weighing 2 cwt. 2 qrs., and if rated at 29s. 2d. per ton would come under the 30s. per ton group. It would therefore be charged 4s. 2d., precisely the same as the example first quoted, but in this case the extra amount would be 8d., or nearly twenty per cent. on the actual product at 29s. 2d. per ton. The additional charge is still further increased if the goods are of several different descriptions, and come under more than one of the five classes into which general merchandise is divided. For example, a person may have a consignment weighing, in the aggregate, 5 or 6 cwt., but consisting of articles in different classes in the railway books. Each portion will be charged in accordance with the scale. The following extract from a railway bill will serve to illustrate this :—

| | | | Rate. | | | Amount. |
|---|---|---|---|---|---|---|
| cwt. | qr. | lb. | s. | d. | | s. d. |
| 2 | 0 | 18 ... | 48 | 4 | (as per scale) | 6 2 |
| 0 | 2 | 22 ... | 38 | 4 | ,, ,, | 1 11 |
| 2 | 1 | 2 ... | 65 | 0 | ,, ,, | 8 7 |

These goods were all for one firm, would be carted all together at both the sending and receiving stations, yet it will be seen that there is an additional charge of 2s. 10d., or fully 20 per cent. The regulation for charging goods of this mixed description allows of the aggregate weight of the consignment being charged at the highest rate to which any of the articles belong, if such amount is less than if the charges were in accordance with the scale. Thus, if in the example just given, the charge on the aggregate weight (5 cwt. 0 qr. 14 lb.), at the highest rate (65s.), had been less than 16s. 8d., the scale would not have been brought into requisition; but at the same time the consignment must have been subjected to a considerable addition, through some of the articles being treated as belonging to a higher class than the one they really stood in. On the other hand, another regulation provides that when parcels and packages consigned as if to be delivered in one lot, are afterwards found to involve separate deliveries in portions weighing each 500 lb. or under, an additional charge is to be made for each such separate delivery.

The foregoing scheme has been adopted by all the English railways, and also applies to traffic passing between England and Ireland. Scotland still holds aloof and keeps to the old system, only recognising three "smalls," viz., not exceeding 1 qr., 2 qrs., and 1 cwt. respectively. It is not to be expected that the system we have attempted to describe has been acquiesced in by the public without protest, but no action that has been taken has effected any modification of the scheme. It is doubtful if the railway companies would consider that Mr. Chamberlain's demand for revised classifications of rates affected them in this respect. Some of them actually possess Parliamentary authority for charging what they please for weights not exceeding 500 lb., and the classification which the new Bill requires them to submit refers more to the basis upon which the rates per ton are fixed, the proportion claimed for various services performed, &c., than to any minor matters of this sort. If, as seems extremely probable, the Bill should fall to the ground through opposition and pressure of other business, it is to be hoped that this question will not be overlooked in any future measure, for it may be regarded as certain that the companies exceed the powers intended to be conferred upon them in this matter. In cases, for instance, where the aggregate weight of a consignment is over 500 lb., it seems unfair to single out a portion to be subjected to the "scale." It is quite possible under this rule to have portions of a consignment weighing quite a ton in the aggregate thus "excessed," and it is very improbable that Parliament would have intentionally legalised such a practice. In fact, many of the Parliamentary powers enjoyed by the railway companies were conferred when the system was in its infancy, and do not meet the requirements of the present time when it has grown out of all proportion to anything then anticipated or provided for. The companies have of late,—under pressure in some cases, and voluntarily in others,—made various concessions in favour of the public, but in this matter of "smalls" they press very heavily upon several trades, and as it is very necessary in these days to "look after the pence" it is a sore point with many. In fact, it was found to be absolutely necessary in some cases to alter terms of delivery through the increased freight expenses, caused by the introduction of this scale, and it is very unlikely that the companies would lose much by making some modification in the system, as an increase in traffic would probably follow such a step.

## NOTES.

IN the course of a brief conversation in the House at the close of last week, in regard to the new proposals for dealing with Westminster Hall, the First Commissioner said, in answer to a question from Mr. Peddie, that no doubt two architectural journals had written against the scheme, but "he had observed that they were not unfrequently critical of such proposals." Now, supposing that is so, will not some people think it a fair conclusion that, inasmuch as architectural journals at all events are likely to understand architecture better than other journals, the cause of such frequent

adverse criticism is that architectural matters are generally wrongly managed by the official authorities of Government? But, waiving that, certainly our own criticism was in no hostile spirit, but a fair consideration of both sides of the question. We opposed one part of the scheme, and supported another, on grounds of pure architectural criticism, which do not seem to be understood. We showed that the cloister would be inadequate for its proposed practical use, and would not have the effect shown in the views placed in the House of Commons; and we protested, as we always have protested and always will, against the idea that architecture is a matter of archæological sentiment. Architecture, whenever it has been a living art, has been a practical one dealing with contemporary buildings according to the necessities of the day; and Barry, the architect of the Houses of Parliament, was the last great English architect who worked in this spirit. The proposed cloister is an archæological toy, and we oppose the expenditure of money on it. The proposed raising of the towers is for purely architectural reasons, such as we hold to be sound, and we therefore support it. That is the philosophy of the matter.

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PARLIAMENTARY Committees seem bent on giving us shocks of surprise at present; and shortly following the unexpected murder of the Lower Thames valley drainage scheme comes the announcement of the rejection of the Manchester Canal Bill, which its promoters had begun, not unreasonably, to regard as safe. Whatever the ultimate result may be, the Parliamentary history of the Bill demonstrates anew the unfitness of the present Parliamentary arrangements for the authorisation of public works. Bearing in mind the evidence given that it now costs more to convey raw and manufactured cotton backwards and forwards between Liverpool and Manchester than it did before the construction of railways, the public interest demanded the action of an impartial and competent tribunal, which should not only be able to hear and weigh the evidence adduced on both sides, and to originate any inquiry of its own motion, but further to suggest and to sanction such modification of the original plan as might commend itself to the court, when fully informed. Instead of this, the promoters of this important measure have had to run the gauntlet before four several committees. In 1883, after an enormous expenditure of time and money, the Commons Committee, admitting the principle of the measure, so truncated it (not without considerable excuse) that the Lords Committee threw it over. In the present year, with hardly less effort and hardly less expenditure, the Bill was carried through the House of Lords, only to be thrown over at the last hour by the four members of the Select Committee of the Commons. That this further waste of time and of money is little short of a public scandal, will be very generally felt. It has been held by many persons conversant with the subject that the inauguration of the scheme as a bone of contention between Liverpool and Manchester was a mistake. The navigability of the Mersey is a national question. The first enemy of the Manchester manufacturer, as well as of the Liverpool merchant, is the bar of the Mersey; and if Lancashire will resolve, in the first instance, to make the Mersey as accessible as the Thames, the common action thus set up will not cease until Manchester possesses the cheapest mode of communication with the sea.

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THE collection of antique casts at the South Kensington Museum, which has been arranged under the able direction of Mr. W. C. Perry, is now complete, and the private view took place on Thursday last. The room is a fine and well-lighted one, and the collection is a very large and typical representation of sculpture of the archaic Greek, Greek, and Roman schools. The general arrangement is chronological, the archaic work commencing on the wall on the left of the spectator on entering, and continuing round till the Græco-Roman school is reached on the opposite wall. The floor is occupied with a number of the larger works which require to be seen all round, and here, of course, the chronological grouping has necessarily given way to considerations of space and effective arrangement, which considerations have also partially interrupted the chronological arrangement round the walls. But the whole collection is admirably disposed for study; and, with the aid of the very full and excellent annotated guide prepared by Mr. Perry, the educational value of the whole is as excellent as its general effect. We have the greatest pleasure in announcing the completion of the collection, which we shall consider more in detail on another occasion.

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THE most recent step in the Thames Communications Question has been the resolution of the Common Council to build a low-level bridge with swing openings below London Bridge. We fear this will be found to be a mistake, as it has been found to be elsewhere. To have one swing bridge is not so unpractical, certainly, as the idea of the double or "duplex" bridge, between the arms of which vessels were expected to stand quietly in a strong tide-way, like horses and carriages pulled up on a roadway, while one arm of the bridge was closed behind them and the other opened in front of them. But even the single-swing bridge, with piers in the stream, will probably be found to be a great obstacle in the way of shipping. It will either have to be open too long for convenience to the land traffic, or the opening must be left till the vessel is dangerously near. It is a great pity that specially-constructed ferry-boats are not tried first. It has been objected that they would equally be in the way of traffic up and down stream, but few people seem to be alive to the fact that when two objects are both free to move on the water the danger from the current is, at least, got rid of, as it acts on both of them equally, while the difficulty of avoiding collision is much greater when one object (the bridge) is fixed and the other moving with the current as well as with its own motion. But the fact is, scarcely any of the people who talk about the matter have any correct notion of the behaviour of ships on water.

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THE French archæological schools at Rome and Athens do admirable work, not only by the issue of their "Bulletin" containing the account of the most recent discoveries, but also by the publication, from time to time, of a treatise devoted to some special topic. The "Bibliothèque" thus formed already numbers thirty-six volumes, on such diverse topics as "Monuments relating to the Myth of Psyche," "Christian Painting and Sculpture in the East," "The Dialect of Cyprus," &c. The volume to which we would call special attention is a treatise by E. Pottier, on "White Athenian Lekythoi with Funeral Representations." These white lekythoi are a class to themselves; their authenticity is certain, their date almost equally so. On artistic grounds their importance is, therefore, for the history of art, very great. M. Pottier devotes the second part of his treatise to the consideration of questions of *technique*; he reserves the first part for the consideration of the religious and social meaning of the designs painted on them. These have reference to,—1, funeral ceremonies. M. Pottier collects nine vases, which depict the "exposition" of the dead man, five which show his "deposition" in the tomb. The intermediate ceremony of the funeral procession never appears. 2. An allegorical scene from the descent into Hades, on seventeen vases; the dead man is led to Charon's boat by Hermes Psychopompos. 3. Offerings made at the tomb. This scene appears on no less than 500 lekythoi, of which 102 are described for the first time by M. Pottier. The composition is always conceived after one and the same definite type: a stele in the centre with acanthus ornament, and decorated with ribands; this stele stands sometimes on steps, sometimes is simply raised on a mound. Women and, less frequently, men, approach in attitudes of grief, but not in mourning garments; they bear offerings in their hands. Sometimes the dead man himself is seated below the stele, sometimes a tiny winged figure (an eidolon) flutters about the tomb. Four plates accompany the treatise, giving the most interesting specimen of each scene,—the exposition, the deposition, the passage to Hades, and the offerings at the tomb.

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THE Committee of the House of Commons appointed to inquire into the question of the steps necessary to secure the enjoyment of the river as a place of recreation, and into the legislation affecting the use of the Thames, issued their report on the 4th. The main points of the report are clearly in favour of the public, and against the selfish eccentricities of "riparian owners." The Committee recommend that the towing-path along the river-side be continuous, and be made a public path from end to end, and maintain that "the river is open from bank to bank wherever the Thames water runs." The latter decision, if sustained, will put an end to the fencing up of backwaters. They propose that the Conservancy should have large powers to deal with all persons guilty of rough and disorderly conduct, and that police supervision should be increased and systematised.

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THE state of the Thames seems likely to furnish matter for lively correspondence for some time to come. We may suggest that those who study such correspondence in the daily papers will do well to consider the relative weight of impartial scientific evidence, as compared with the suggestions of those who are not scientific and who live on this or that site on the banks of the Thames. Scientific men, for instance, disapprove of any more locks on the Thames, for logical reasons which they have given, some of them in our columns. A gentleman who is not scientific, but who has a house at Twickenham, says the scientific men are all wrong, and there should be a weir at Richmond, which will keep the water deep and clear before his lawn. Which is most likely to understand the subject or to give an impartial judgment? For personal reasons we should be very glad to see a lock just below Putney, but it has not occurred to us on that account to recommend this course on public grounds.

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WE record with great regret the sudden death, from apoplexy, on the 2nd of this month, of the eminent French architect, M. Paul Abadie, whose reception of the members of the Conference of French Architects at his own great building, the Church of the Sacré Cœur, was mentioned in our columns very recently. M. Abadie was a member of the Institute of France, and Honorary and Corresponding Member of the Institute of British Architects. He was Inspecteur-Général des Édifices diocésains, and an officer of the Legion of Honour.

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THE name of Mr. Charles Manby, who died on the 31st ult., has been closely associated with the advance made, during the present century, by the engineering profession in England. Born on February 4, 1804, he was apprenticed at an early age to a practical mechanic, and taught to earn his bread by daily toil. He was engaged as a youth on his father's contracts on the East and West India Docks, and was entrusted with the construction of the first pair of marine engines with oscillating cylinders, and with the building of the *Aaron Manby*, the first iron steamer that ever made a sea voyage; steaming from London to Paris in 1821. In 1839 he was appointed secretary to the Institution of Civil Engineers. The number of members at that time is not stated in the report for the year, but in 1837 it was 252, comprising all grades. In 1858, when a timepiece and candelabra, and a cheque for 2,000*l.*, were presented to Mr. Manby in recognition of his services to the Institution, the number stood at 797, and the receipts had risen from 1,410*l.* in 1838, to 2,016*l.* in 1856. The testimonial in question was presented on the retirement of Mr. Manby from the post of

secretary, in which he was succeeded by Mr. James Forrest, who had been connected with the Institution since the year 1842, and who entered on the post of assistant secretary in June, 1856. In November, 1876, a second piece of plate, accompanied by a purse of 4,088*l.*, was presented to Mr. Manby by the President of the Institution, in recognition of the services he had rendered as honorary secretary. Mr. Forrest's name first appears as "secretary" in the Report of the Council for the session 1859-1860, but the name of Mr. Manby has been retained as "honorary secretary" down to the last report.

THE Home Secretary and the Lord Chamberlain have intimated to the Metropolitan Board of Works that in their opinion it would be advisable that the Board should introduce into their Various Powers Bill next Session a clause making it compulsory for places of amusement to have a certificate from the Board as to the security of the buildings for the public, before applications are made for licences. The effect of this clause would be to transfer the responsibility with regard to the safety of the public in places of amusement from the Lord Chamberlain and the magistrates to the Metropolitan Board of Works. Such an alteration in the law may be desirable, but it should certainly be accomplished in some more comprehensive manner than by the introduction of a clause into an Omnibus Bill. The Metropolitan Board will probably have something to say on the subject, and are not likely to accept the responsibility of answering for the construction of these buildings, and to leave the Lord Chamberlain his privileges and emoluments.

THE trustees of the National Gallery appear to have become conscious of the ugliness of the shed they have caused to be erected in front of that building, and have sought to relieve the plainness of the structure by the exhibition of advertisements relating to iron buildings in a manner with which we have become familiar through the iron sheds erected at the Health Exhibition at South Kensington. This is a step in the right direction, and it is to be hoped that the trustees will see what a capital field the front of the National Gallery presents for the display of advertisements, and will utilise it accordingly. The proprietors of some of the soaps and cigarettes which are now widely advertised would no doubt gladly avail themselves of this opportunity of bringing their wares more prominently before the public, if it were offered them.

WE have received a very prettily got-up circular, illustrated with various sketches, from the management of the Female School of Art, at 43, Queen-square, stating the importance of enlarging the premises by new buildings in the rear, which would enable the Committee to provide adequately for branches of study for which there is at present not sufficient room. The school was founded in 1842 at Somerset House, has continued to grow in numbers and success ever since, and "has taken a high place among the institutions designed for enabling women to earn their own livelihood." It is on this latter ground especially that we desire to say a word in its support. As we have before observed, we doubt the advisability, from an artistic point of view, of women setting up any separate standard of their own in art; and the female artists of real genius, in fact, mostly decline to occupy that position, and prefer to be judged along with men. But a school in which the needs of women wishing to develope the means of supporting themselves are specially considered, is a valuable institution, and should not be allowed to flag for want of funds.

A CORRESPONDENT sends us a note as to the proceedings that have recently been taken in regard to the celebrated spire at Grantham, which was struck by lightning a year ago. In putting up the new lightning conductor (which is of Liège manufacture, all of one piece, and carried to a deep well dug for it in the churchyard), the workmen reported the stonework much damaged. Mr. J. Oldrid Scott was consulted in the matter, and after a study of the spire through a powerful telescope, decreed that the upper portion should be taken down and rebuilt. Apparently the ladders up the face of the spire were too much for the nerves of any but workmen, who ought to have more credit than they always get for the matter-of-fact way in which they quietly face considerable danger of this kind in the pursuit of their calling. The upper 16 ft. of the spire has accordingly been taken down, the stones numbered, and built up inside the church. The country-folk who came to the agricultural show, a week or two since, thought the spire had been drawn inside out, like a stocking. The men are now working at the repairs, sitting on boards slung from the cap of the scaffolding which has been erected over the apex. The prayers of the congregation for their safety are asked daily in the church far below them. The crockets of the spire, our correspondent adds, are worked on a separate rib of stone butt-jointed in a chase up the angle of the spire, with no bond into the work: not a scientific way of doing it. There is living in Grantham an old woman who, when a girl of eighteen, climbed to the top of the spire by the crockets, for no better reason than that a young man had promised to marry her if she would. She did an even more dangerous thing than she was aware of, considering the construction of the masonry, and unhappily without the desired result, as the prudent "young man" afterwards declined to marry any woman who was foolish enough to do such a thing,—a decision more creditable to his head than his heart.

OUR esteemed contemporary, *La Semaine de Constructeurs*, to which we have occasionally been indebted for interesting facts in regard to building work across the Channel, fairly puzzled us in its last number of Aug. 2. Under the heading, "Décor intérieur des Habitations," is an article dealing mainly with the delights of that peculiarly English invention, "le bowindow," and an illustration labelled "une intérieure d'un bowindow-foyer, —architecte, M. Robert." It struck us that we had "heard this learning before," the illustration was not new to us; and, sure enough, on investigation, we discovered that the view was from an interior by Mr. Edis, published by us in the early part of the present year, and that "M. Robert" was the form in which the name of Mr. Robert W. Edis presented itself to the French mind. The absolute inability of our neighbours to get an English name right is really phenomenal. In this case half the name appears to have been accepted as equivalent to the whole; but then what *did* the French editor think that the words "W. Edis" stood for? Did he confuse it with the "fecit" or "delt." which often stands after the draughtsman's name? Let it not be supposed, however, that our contemporary over the water borrowed from us without acknowledgment. On the contrary, there was due and complimentary reference to "le journal si répandu, *le Builder*, autrement dit 'le Constructeur.'" The art of "conveying" architectural drawings from other people without permission or acknowledgment, brought to such perfection in some quarters in London, does not seem to have been similarly developed in Paris.

**Improved Industrial Dwelling Company.** From the half-yearly report of the Improved Industrial Dwellings Company, Limited, presented to the meeting just held, it appears that the company now possesses thirty-four estates in various parts of the metropolis, on which 4,314 dwellings have been erected, and are in occupation, and 656 are in course of erection, making a total of 4,970 tenements. When these are completed the number of persons residing in the Company's dwellings will be about 25,000. The expenditure on capital account has reached 866,281*l.* The usual dividend of 5 per cent. was declared for payment, after carrying 500*l.* to the reserve fund for equalisation of dividends, which now amount to 56,000*l.*

## THE BAKERIES AT THE HEALTH EXHIBITION.

FOOD is the most important constituent of health, and bread, in temperate climates at least, is the chief element of food supply. For this reason, the bakeries have rightly had assigned to them important sites in the Health Exhibition.

It seems almost an anachronism to speak of the introduction of bread into these Isles, yet there appears to be little doubt that the baker's craft came to us by way of Greece and Rome from the East. In classic days the Athenian bread was celebrated for its high quality, and, indeed, Athens appears to have been the prototype of the Vienna of the present day, inasmuch as it was the metropolis of bakers.

Wheat is of all cereals the best suited for bread-making, and of this grain there are over 150 named varieties known to the scientific world. To the miller, however, these fine distinctions possess no practical interest; but still the characteristics of different descriptions are of great importance. White and red wheats are the two broad distinctions. The former is a harder and smaller grain than the latter, and is said to afford a higher percentage of nutrient principles; thus, a soft white grain may only contain 8 to 10 per cent. of flesh-forming principles as compared to the 18 to 20 per cent. of albuminoids found in some of the hardest varieties. The balance of material in the softer descriptions is made up by starch granules, which afford the chief force-producing element of bread food. The fibrin which forms the principal part of the albuminoids in wheat is more largely contained in the outer parts of the grain, and these are mostly separated from the flour during the various processes of milling, as will be more fully explained when we come to speak of the distinctions between white and whole-meal bread.

The particular adaptability of wheaten flour for bread-making lies in the property possessed by it of preventing the too ready escape of carbonic acid gas which is evolved in the process of fermentation. This action is owing to the great tenacity of the gluten of wheaten flour, which forms, when moistened, a close viscid mass. The carbonic acid gas is dried out in the process of baking, but before it escapes it forms innumerable small holes which render the bread light and digestible. In times of great scarcity, rye, barley, oats, beans, peas, and even acorns have been mixed with wheaten flour for making into bread; but a good "sponge" can never be obtained excepting from a flour almost wholly made from wheat.

The principal exhibits at the Health Exhibition give a fair idea of the internal economy of high-class bakeries, all the operations of making and baking bread being carried on in practical style, and indeed on a somewhat extensive scale. Each of the four principal establishments is fitted with an oven differing in essential features from those shown on the other stands, so that four distinct principles of baking are illustrated. The first exhibit that is met with on entering the east corridor is that of Mr. J. Marshall, of the Strand. The oven shown on this model establishment is one of great interest not only to bakers, but to the general public also, if only on account of the total abolition of smoke that undoubtedly attends its use. At the Smoke Abatement Exhibition Mr. Booer, the inventor, exhibited the first oven of this class, which took a gold medal. That now shown differs from the original in many respects, and is the result of the experience gained in actual work. The new arrangement has been patented by Messrs. Gilson & Booer, of 180, Union-street, Southwark. The oven is similar in all respects to an ordinary baker's oven, with one important exception. In place of the usual coal fire there are a number of gas jets, which heat the brickwork in the same way that the flame from the coal does. The gas, however, creates no smoke, air being mixed with it previous to ignition, as in the Bunsen burner, and perfect combustion is thus produced. The arrangement of burners is such that the heat is distributed under the crown of the oven; the flame, starting from the front angle on the right, passes towards the rear, and then back to the remaining angle or register corner. The advantages claimed by the inventor for his system are numerous, and most of them will be apparent from the description given. For instance, there can be manifestly no smoke, that most fruitful source of trouble

and anxiety to all bakers working in the ordinary way. It will also be evident that the space usually taken up by the storage of coal will be set free, probably to be occupied by another oven. The absence of the ash-pit is a greater advantage than at first sight might appear. In smaller and ill-regulated establishments, which are far more numerous than could be desired, the ash-heap becomes a receptacle for refuse of all kinds, and frequently of matters of the most offensive description. When these are allowed to accumulate they give forth unpleasant odours, which are absorbed by the ferment or by the "sponge," which is a mixture of the ferment and flour. Although the condition of London bakehouses has greatly improved of late, much remains to be done in this direction; and, indeed, until a better class of journeymen can be trained, no possible amount of inspection will prevent dirty habits from being practised, which have become ingrained by years of usage. Another point of advantage claimed by the advocates of this system, is the uniform temperature at which the oven can be brought at each operation. About 500° Fahr. is the best heat of oven for bread-baking. If higher than this the oven will be "rash," and if lower it will be "slack." With the ordinary coal fire it is necessary to heat the oven a good deal above the temperature required for baking, as the process of "scuffling" or clearing away the soot and dirt cools the brickwork considerably. For this reason, even supposing exactly the required heat to have been obtained at first, it is a matter of guesswork how far the temperature will be lowered by the scuffling. With gas the conditions are always the same, so long as the pressure in the mains and the quality of the gas remains constant; and it having once been ascertained how long it is necessary to keep the flame alight to get the required heat, it is easy to guard against undue ranges of temperature, and of course there is no scuffling. Probably the most promising feature in this invention is that it can be applied to the ordinary baker's oven at a comparatively small cost, and in the great majority of cases without interfering seriously with the ordinary routine of business. A short time ago Messrs. Gilson & Booer converted one of Messrs. Bertram & Roberts' ordinary ovens at the Crystal Palace into a gas oven in the space of twenty hours. The oven shown on Mr. Marshall's stand will hold ten bushels, equal to 320 half-quartern loaves. In London there are about 6,600 ovens such as this, excepting, of course, that they are worked with coal fire in place of gas. If all these were fitted on the principle we have described, it is estimated that they would burn 6,000,000 ft. of gas per day. The great advantage to the community that would arise through the freedom from smoke will be manifest. Although the Smoke Nuisance Act is occasionally put in force against bakers, its provisions are practically inoperative so far as abolishing the evils attendant on the use of coal in the ordinary baker's oven is concerned. Wood is the best fuel that can be used for baking, as it produces little smoke, and the products of combustion given off by it are not of an objectionable nature. In Continental cities wood is mainly used, but it is long since the London bakers gave up the cleaner and more wholesome fuel for coal. To Henry Sibthorpe belongs the credit, such as it is, of having introduced the reeking coal ovens of the London bakers. In 1635 he was granted a patent for "The arte & skill of erecting and makeing of ovens in such sorte as that the said bakers, bakeing cookes, and other persons, may heate the same ovens with sea coales digged out of the earth, and therewith may bake as soone & as fayre & for lesse charge than they nowe doe with wood, and with much more safety." Sibthorpe appears, however, to have had considerable difficulty in pursuading the "bakers and bakeing cookes" to adopt his plan. The more extensive use of sea-coal as fuel appears, however, to have been engaging the attention of the advanced spirits of that age, for the public records show that a large number of patents were granted about this time for different stoves and ovens in which coal was to be burned. Whether the reign of smoke, so far as bakeries are concerned, will be brought to an end after lasting for 250 years by such inventions as those of Mr. Booer and others we are about to describe, remains to be seen. For the present by far the great majority of bakers use the ordinary smoky coal oven. Messrs. Marshall also use a patent gas-heated oven, exhibited in the same building by Messrs. Beynon & Cox, of Torquay. This oven is self-contained, requiring no brickwork setting. It is said to be remarkably economical, and seems especially well adapted for hotels, asylums, and other large establishments.

On Messrs. Marshall's stand is shown a Melvin's patent doughing machine. This is one amongst other classes of apparatus which have been introduced of late years, and is designed for the purpose of superseding the uneconomical and uncleanly manual processes of treating dough; processes which are yet, unfortunately, the general practice in ordinary bakeries. The machine consists of a long wrought-iron trough mounted on dwarf-standards. Within this, and extending for the full length, is a series of mixing blades made of Siemens' rolled steel and mounted on three horizontal steel shafts. These are actuated by suitable spur-gearing at each end. The disposition of the blades is made with a view to cutting, pressing together, and turning over the dough in the most effective manner. The blades are arranged so that they do not act simultaneously, and no unequal strains are, therefore, thrown on the gearing. The machine is emptied by tilting the trough, the movement of the blades discharging the dough.

Adjoining this stand is the bakery of Messrs. W. Hill & Son, of Bishopsgate-street, who are perhaps best known to the public as the purveyors of whole-meal bread. This is a very different article to the brown bread of ordinary bakers, which is simply white bread with a certain quantity of pollard or bran mixed in with it. The meal obtained by milling wheat is divided into different products. The chief of these is flour which is made from the white inner part of the grain, and is the richest in heat-giving principles, as it contains nearly the whole of the starch. Next in the scale comes what are known in the trade as "tailings," which are composed of the inner coating immediately enclosing the starch cells. Outside this are other layers or envelopes which, when ground and separated by sifting, form respectively "middlings," "sharps," "pollard," and "bran." Now, as the flour produced from the inner part of the grain consists chiefly of starch, a carbo-hydrate or heat-giving principle which may be converted into work done, so the products of the outer coatings contain the greater amount of nitrogenous substances that supply the flesh-forming principles required to build up the human body. In addition to this, certain mineral substances, necessary for the formation of the bone structures of our frame, are contained in the three exterior envelopes. Premature decay of teeth is a trouble that appears to be of constantly increasing seriousness, and the theory has been advanced that this is due to the almost universal use of white bread. If we were to depend on chemical analysis alone there is no doubt that whole meal affords a more valuable food product than can be obtained from fine white flour. But the physiologist has to go further than the chemist, and he tells us that a large proportion of the flesh-forming substances in the whole meal passes through the system unassimilated. On this account the use of whole meal has been a good deal objected to by many authorities on these subjects. The reason that a great part of the nutritive principles in whole-meal bread is excreted, is that the rough particles of the outer coatings so stimulate the intestines that the food does not remain sufficiently long for complete absorption of all the nourishing principles to be effected. Although it is undesirable that any large amount of food should be taken into the stomach which would not become assimilated, yet the loss of a part of the nourishing constituents of the grain, in the case in point, may be well submitted to if a gain is made in other directions. Stimulation of the intestines is exactly the action which is so much required by an increasing class in the present day, in which sedentary occupations are constantly multiplied as the use of machinery displaces the need of manual labour. In addition to this a system of artificial locomotion has become so ramified that the natural walking exercise taken by an ordinary citizen is too often insufficient for the purposes of health. On the stand occupied by Messrs. Hill & Son several machines used in baking are exhibited. The most noticeable of these are Pfleiderer's mixing and kneading machines, of which several examples are shown both at work and unattached. This machine consists of a mixing-trough mounted on a suitable framing, in which a pair of blades are caused to rotate by gearing. These blades are made of such a shape that the paths of rotation can bisect each other, although the blades travel at different speeds. A very ingenious arrangement is applied for reversing the motion of the blades. A couple of loose pulleys are placed on the main driving shaft, one having an open and the other a crossed belt, so that they run in opposite directions. By means of a hand wheel and sleeve attachment, a friction-clutch placed between the two pulleys will engage either one or the other, and so cause the blades to turn in either direction as may be required; or the clutch can be kept central, in which case neither pulley is engaged. The trough can be emptied by power if required. A leading screw stands vertically at the back of the machine, and engages in a sleeve attached to the lower part of the trough. In this way the latter can be turned over on the trunnions upon which it is supported, the action of the blades helping to discharge the dough. It is said that with this machine bread dough can be thoroughly mixed, kneaded, and discharged in 40 to 50 seconds. Another clever machine shown on this stand is an improved dough-dividing apparatus, which will produce fifty rolls or buns from one mass by a single operation. The dough is placed on a circular steel table, and a cap or hollowed lid is pressed over it. The table is divided in such a way that it allows of a number of steel partitions to rise up from below, which will divide the space between the table and the lid into fifty exactly equal parts The partitions are sharpened at their upper edges, and act as knives dividing up any substance that may be contained in the machine. Messrs. Hill & Son use Mason's patent hot-air ovens, of which they have two on their stand, one a two-decker oven, and the other a single with travelling bottom, which can be withdrawn bodily, running out on wheels on a framing with rails provided for the purpose. In this way the whole batch can be set or withdrawn at once. On this stand is shown a 3 ft. grist mill by Messrs. Hughes & Sons, of Great Dover-street. It is especially designed for provincial or foreign use in parts where corn may be grown, but transport is difficult. A small crane is attached for lifting the stones, and pulleys are fitted so that the ordinary portable engine may be used as a motor.

Messrs. T. Watt & Sons of 6, Gledhow-terrace, S.W., occupy the next stand, and are chiefly engaged in producing what are known as angel cakes, a dainty compound, of which an enormous quantity must have been sold since the Exhibition opened. Indeed, the business done by those exhibitors who retail their wares, has exceeded the expectations of even the most sanguine, and must in many cases have afforded a handsome return on the outlay. It is said that the sixpenny dinners of the Vegetarian Society are affording a profit of 30*l.* per week, whilst the returns from the shilling portions of strawberries and cream retailed by the dairy companies will form no inconsiderable item when these exhibitors make up their balance-sheets. Messrs. Watt bake their angel-cakes in Perkins's steam oven, which is heated by means of a number of wrought-iron tubes, the ends of which are welded up, a small quantity of water having been placed in each tube. The tubes are slightly inclined from the horizontal, the lower ends being placed in the furnace which lies at the back of the oven. In this way steam is formed in the pipes, by the heat from which the baking is effected. The Perkins' system is well known, but two adaptations of it shown in the Exhibition will, perhaps, be more novel to the majority of visitors. These are a ship's oven and a military field-oven mounted on wheels. The ship's oven is shown in operation.

Messrs. J. Baker & Sons, of 58, City-road, E.C., have a most complete display of baker's appliances in full operation. Their ovens are the only ones shown in the exhibition that work on the ordinary principle of allowing the products of combustion from the furnace to pass into the space where the bread is placed. There are two ovens on this stand, the one of greatest interest being known as the "Bailey & Baker Patent Continuous Oven." The furnace doors are placed under the oven door, and there are four flues leading into the oven at each corner. A hollow space lies between the sole of the oven and the crown of the furnace. A single flue of special construction carries off

the products of combustion, and the whole of the flues are arranged in such a manner that, it is said, the fumes of the furnace never come in contact with the bread, but remain in the roof of the oven until they escape by the outlet flue. Messrs. Baker exhibit "Thomson's Double-action Dough-mixing and Kneading Machine." By means of suitable mechanism the mixers can be made to revolve in the trough at high or low speeds, and either in opposite or the same directions as required. In this way a quick action may be obtained for breaking and stirring the sponges, and for mixing the dough in the earlier stages, whilst the slower and more powerful motion is useful for kneading when the dough becomes stiff. By the differential speed action of the mixers the blades always pass each other at different points of their orbits. By alteration in the speeds and direction of motion of the mixers, the machine can also be easily adapted for working different grades of flour. A strong flour will bear more vigorous usage than a softer variety, which would give a dead dough if too roughly handled. A sifting and mixing machine shown in operation on the upper floor of this establishment is an ingenious apparatus. The effect of emptying a sack of flour into the hopper and then starting the machine is curious, the white mass seeming to melt away much as one might imagine a heap of snow would disappear in a blast furnace. The wire bottom of the sieve is made semi-circular, and on the arc thus formed a scraper or agitator is caused to oscillate rapidly, and so keep the particles of flour in motion. We are told that this machine will pass a sack of flour (280 lb.) in three-quarters of a minute when power-driven. A machine for cleaning currants is ingenious, the fruit being freed from stalks and dirt, without being broken, by series of oscillating arms working in a receptacle with a wire-sieve bottom. A large number of other machines used in bread and cake-making are shown on this stand, a biscuit-baking machine being the most noticeable. It would, however, be impossible to describe this without the aid of illustrations which our want of space alone would prevent us publishing.

In the gallery containing the Bakeries there are several exhibits of various machines and apparatus, that of the Globe Mill Company, Limited, of Chiswell-street, who exhibit Thompson's centrifugal pulveriser being perhaps the most interesting. In this mill the grain is crushed by the centrifugal action of an iron ball pressing against the casing of the machine. The method is said to be very effective.

## CHINESE ARCHITECTURE, AND WHAT IT TEACHES.

So much has been said on the many and so diverse architectural styles and modes of building that have obtained in past times, and in various countries all the world over, that it would seem somewhat difficult to select out of them any one that has not been well looked at and into, and thoroughly analysed; but without pausing to go into details, it may be fairly said that there is at least one of them which yet needs to be further and more carefully studied by the student of architecture as one of the world's primitive outcomes, viz., the architecture of China. It is a subject just now of somewhat more than commonplace interest, from the fact of the great show at South Kensington, containing, as one of its primary attractions, a Chinese Court, or section, full of objects specially suited, in many ways, to illustrate the fine art and the architecture of the strange and far-off land of which so much has been dreamed, and even said, but of which so little, so very little, in accurate detail, is really known. It may be of interest, therefore, to call attention to it, as here in part seen, and, in some aspects of it, for the first time, in so genuine a way, and with so little in it comparatively of foreign influences.

It may be well just to bear in mind the exceptional character of this so distant and so large,—for it is some eighteen times the size of Great Britain,—portion of the world. It holds 360 millions of people, whose homogeneity is complete. It has a "history" of longer duration than any other community, past or present, and had existence long before either antique Greece or imperial Rome had even their world-renowned "beginnings." It has nearly 7,000 miles of boundary line, including land and water, and has two of the longest and most notable rivers in the world. It has also its world-famous Great Wall,—an architectural work with which few building feats will compare. It is well called the "myriad mile" wall. It is no less than some 25 ft. thick at the base and 20 ft. high, and it forms the imposing boundary line of one side of the vast country,—the Pacific ocean forming the other and opposite one. Much more might be said here in detail which would account for the unique character of the art and architecture of China, but space forbids, there being so much of detail to be looked at and into. We would now only call attention to the contents of this Chinese Court, and more especially to the architecture to be seen in it, though in the shape only of models.

We thus point to some of the more exceptional and singular characteristics of China for the purpose of drawing attention to the contents of the Chinese Court or Division at the International Show, as it fortunately contains among so many objects of interest some few that are altogether unique. There are some models, most carefully executed, of those very unique and picturesque architectural constructions the many-storied towers or pagodas, which, in this strange land, takes the place of the Dagoba or relic shrine of the Buddhists in India. There are several of these in glass cases ingeniously modelled; one of ten stories; and a model gives a far better and more picturesque idea of such structures than any drawing, however correct or elaborate, can possibly do. As a work of architectural art it is most surely infinitely to be preferred to such misapplications of architectural forms as the single and isolated column from the front or side of a temple, as seen in Wren's monument, imposing as that may be, or the Nelson Monument in Trafalgar-square, or even to the more appropriate example of the use of such a form as at Westminster. One of them has eleven stories or galleries, and is, we are told, some 200 ft. in height, with others less than this, but fully as quaint and characteristic. In these we see, though perhaps dimly, a little of the indigenous art of China.

We note these curious buildings so typical of the country, and apparently so in harmony with its other buildings and scenery, in the hope that some effort will be made to retain them for one or the other of our national museums, either for the South Kensington Museum or the British Museum. As examples of the picturesque in architecture they can hardly be surpassed, and, as models, are equally noteworthy. We know so little of the architecture of China, familiar as the matter may seem, that it would be a sad oversight to let slip this opportunity of adding to our sources of information about it, the more especially as all here would appear to be "for sale," and both the "antique" and the quite new are really valuable and worth preserving and looking at twice, the simply common-place and worthless being passed by. Many other things here are noteworthy, but we should, perhaps, be travelling too far from our proper subject-matter to describe them, but we may add one other item architectural, which calls for it,—it is that of the Memorial Gateways, as they are termed. These models also are worked out of soap-stone, and are fully as characteristic as the pagodas. They are difficult to describe, and one of them, perhaps the best, is so broken by its having fallen to pieces in its glass case that it is all but impossible to restore it even to the mind's eye. Should this meet the eye of the Commissioner who has authority here, we would hope that this "breakage" may be put right,—but the work of a few minutes.

Much more might be said by going a little into detail, especially into that of its all but unnoticed house architecture, and cottage and temple building; but our main object here is to call especial attention to the advantage and desirability of obtaining for our national museums some selected portions of this almost unique collection of Chinese fine art, and models of its architecture. The whole, or at least the major part of these illustrations of the architectural art of China, might well form a nucleus for a complete outline representation of Chinese architecture,—an art so isolated and complete in itself, and yet, at least in the interior, and away from the coast-line itself, so characteristic and national. It is a thing not a little to be desired, for, as we have already hinted, the the architecture of China is unique, both in kind and in its history, for all the old architectures have had their "decline and fall" long since. They have had to be revived by other races of men, and under quite new conditions, *e.g.*, the Greek in England; but this strange style of architecture yet lives, not as a broken link merely from the chain of art, but as belonging to the past of it, and as yet a part of it. Indeed, in it do we not see the long past of art in the very and actual present? It must needs, therefore, be worth a little attentive study, if only to find out if possible how this can have been. Here, at least, it is.

## WHITEHALL COURT.

"See under Ripley rise a new Whitehall,
While Jones' and Boyle's united labours fall."
POPE.

In our issue of the 19th of July last we announced that it had been decided to pull down, at no distant date, Lord Carrington's town residence at Whitehall. But this is not the only change which is about to pass over so time-honoured a quarter. The death-warrants are signed of a much older though less conspicuous building,—we mean the Almonry Royal at the further end of Middle Scotland-yard; together with the large building, formerly Lord Stuart de Rothesay's, which is occupied by the Royal United Service Institution. To the wide waste which lies adjacent to these several buildings has already been given the name of Whitehall-court, and here, beneath the mammoth height of the Hôtel Métropole, sets of chambers and offices will be constructed. By the levelling and excavation of the ground some interesting relics of the earlier Whitehall are brought to light. There are laid bare, for instance, portions of three massive stone walls running parallel almost due north and south, and even with the river's course. These walls clearly mark the successive reclamations from the foreshore which have been made at this spot. That which lies westwards, being the most remote from the waterside, forms part of a rampart along which a terrace ran from the Small Beer Buttery to the land-side head of the Palace public stairs. The Beer Buttery is still represented by the now deserted Almonry Royal and Queen's Treasury; an existing archway in the ground-floor of the latter gave access on to the terrace, that was made to prevent the inundations from which the Palace inmates constantly suffered. At the northern end of the terrace were the Great Bakehouse and Scotland Dock. At the end opposite was the bridge or stairs, for the ordinary traffic of boat passengers; this should not be confounded with the Privy Stairs a few yards higher up the stream. The causeway leading from the old court (now Whitehall-yard) to the public stairs may still be traced, though much of it has been removed within the few past months. The ground is dug away from its northern wall, also of stone, discovering the marks of the water level on either side, and a large opening is made through it to a garden beyond. The dimensions of this garden east and west should be carefully observed, since they indicate the width (75 ft.) of the ground, which for 200 ft. northwards from the causeway was taken from the river at the building of Fife House. The tradition which connects Great Scotland-yard with a home of the Scottish kings when they came to our Parliaments received a singularly practical revival at the laying out of the new garden; for Lord Fife overlaid the ground with veritable soil carried hither from Scotland. This northern earth, however, disappears with the excavations, though these reveal the base of the second and later river wall, which again has given place to the Embankment wall, some 200 yards further southwards. That second wall, if fully laid bare, would be found to extend to the eastern corner of the new hotel. Fife House and Little Fife House were demolished just twenty years ago upon the lapse of the crown lease. The staircase of the former,—the last home of Lord Melbourne,—was removed to South Kensington; and nothing is left of either *in situ* but the gateways and a heap of stones, mortar, and red brick, with some broken carvings scattered around. The Earl of Fife's house, in fact, stood over the "small beer cellar" of Hollar's print No. IV. The Almonry Royal and the Queen's Treasury, being one building, represent, as we have said, the Small Beer Buttery, which is clearly marked upon Fisher's ground-plan taken in 1680, and known by Vertue's en-

graving. We are not certain at what particular period the royal alms ceased to be distributed at the Palace Gate; but the southern half of this old building has long been known as the Almonry Royal, and was conspicuous for a good Tudor window in stone (which we notice is now taken away) in the ground-floor overlooking the river. The Almonry Office served for a term as the treasury of the Princess Dowager of Wales, and subsequently passed to the purposes of Queen Charlotte's comptroller and secretary. The Queen's Treasury,—the northern half containing the archway and buttery hatch,—was assigned to King George II.'s consort, and then to the queen of his successor on the throne.

Lord Carrington's house, No. 8, Whitehall-yard, occupies the position of the Wardrobe in Fisher's plan. Between the Wardrobe and Inigo Jones's Banqueting Hall stood the Palace Gate. Whitehall-yard corresponds with "The Court" beyond, down whose length still runs the pathway to the public stairs. Rather more than halfway southwards the pathway became a passage. This had to the south the Great Hall,—that is, the hall of Wolsey's time; the chapel and its two vestries, with offices against the river. On the other and northern side of the passage ranged the pantry, kitchen, privy larder, and some cellars. The Great Hall and chapel sites are those of the existing Army Medical Department (No. 6, Whitehall-yard) and its garden, the passage going through an archway beneath that office and skirting the garden. Lord Gage's house (No. 4, Whitehall-yard) and its garden show the positions respectively of the apartments which, in King Charles II.'s reign, were tenanted by the Countess of Falmouth and Lady Arlington. Viscount Gage's residence and the adjoining Board of Trade offices are separated the one from the other by a piece of original stone wall. Immediately south of Inigo Jones's famous structure, into which a less enlightened age fixed an incongruous northern entrance, were the Lord Keeper's rooms. Those have given way to Lady Clifden's stables. Gwydyr House projects into the once Privy Garden, though in the adjoining enclosure we can see the survival of that garden where Pepys, to his no little benefit and delight, saw my Lady Castlemaine's finest smock and linen petticoats, richly laced, hanging in the air. Her kitchen, where on a memorable evening the rising tide interfered with preparations for the King's supper, lay on the further side of "the street," by the Duke of Albemarle's lodgings, over against the Tiltyard Parade in the Park.

## THE OLD LONDON STREET AT THE HEALTH EXHIBITION.

A PLEASING, because not oppressively learned, little book* is published by Messrs. Waterlow & Sons *à propos* of Old London in the International Health Exhibition. It contains a set of eleven views, or "gravinges,"—for the most part excusably embellished,—of the salient features of Mr. Birch's handiwork. Mr. T. St. Edmund Hake contributes the letterpress, or "historical sketch." He devotes a few opening sentences to the origin of London, though we could wish he had written even less. For his readers will naturally infer that the river Thames has always flowed within its now artificial channel beneath the shadow of St. Paul's, and that the Corn Exchange possibly the after site of *Verulamium*, is indubitably identical with the *Augusta* of a later day. Of Butcher-row, Mr. Hake reminds us that "in one of the houses in this row the Gunpowder Plot conspirators met." Winter's confession does not identify the actual house, in one room of which, he says, the conspirators took the oath of secrecy, and then in a room adjoining received the sacrament. Tradition, however, points to the dilapidated structure which, until the 30th of March, 1878, was standing at the south-eastern corner of the junction of Butcher-row and Clement's-lane. The singularly picturesque house, well known by Capon's print of 1799, with J. T. Smith's and W. Spyller's earlier views, at the south-western corner of Chancery-lane (and which was pulled down for the widening of that thoroughfare), is described as the certain home in Fleet-street of Izaak Walton. Walton did remove in 1624 to the northern side of Fleet-street, sharing a house there with one John Mason, hosier, next door to the Harrow inn. It is a question whether this was the house that gave way to Mr. Attenborough's late premises, or the house which, together with its neighbours, was pulled down rather more than three years ago, and, having a modernised front, formed Mr. George Kenning's Masonic depôt. So again in describing the old house on Little Tower-hill,—a veritable relic of King Henry VIII.'s reign,—Mr. Hake speaks of its medallions as being those of the Roman emperors. As a matter of fact, it was then customary to reproduce in plaster on a house any coins that were discovered beneath it. Ald-Gate bore stone carvings copied from coins found in digging its foundations (1606). So we may account for the various figures on ancient house fronts of the cardinal virtues or similar emblematical devices. We write thus in no captious mind, but the rather to show how much care has still to be bestowed in dealing with the antecedents of these old dwellings which are thus suddenly restored to us.

Their realistic air has been enhanced by the introduction of groups of workmen who may be seen engaged upon the employments once peculiar to the different guilds. The conditions under which the street is open to public inspection perhaps render impossible its presentment under one or two aspects which seem to have escaped general notice. It would be highly instructive to see how such a thoroughfare was ordinarily lighted, paved, and drained. On the latter two points we will but make a passing reference to the works of Oulham and Swift, of Hogarth and Smollett. We cannot here stop to show how or when the moon's rays were first supplemented with the lantern's or cresset's feeble aid. Regulations *ad hoc* were frequently promulgated, to be no less commonly disregarded. The earliest legislative enactment appears to be that of 1708, when an Act passed "for the paving, cleaning, and lighting of the streets of London, Westminster, and Southwark." But Heming had already secured letters patent for an exclusive right to light the streets, engaging to maintain a lantern before every tenth door, between the hours of six and midnight on every moonless night, from Michaelmas to Lady-day. Oil-lamps came in, under John Vernatty's patent, with the last decade of the seventeenth century, having been first adopted to serve the Court between London and Kensington Palace. They have survived within our own memory along the Finchley-road beyond Swiss Cottage turnpike. Dean Clayton of Kildare and Watson made some futile experiments with coal-gas, leading the way to the thoroughly practical investigations of Murdock. Murdock built in 1798 the first gas-works of any size at Boulton & Watt's Soho works. Ten years later he received the Royal Society's Rumford Medal in reward of his enterprise. As far, though, as our own city is concerned the initiation of our existing system should be ascribed to the labours, commercially speaking, of Winsor, who began in 1803 with an illumination of the Lyceum Theatre, and of William Knight, who founded the gas-works that, until lately, stood in Whitefriars. By these, on Christmas night, 1814, a considerable part of the town was lighted. Accum's Treatise appeared in the year following. We now read with amusement how strong had been popular prejudice against gas. Even Murdock opposed, probably on private grounds, Winsor's scheme for a National Light and Heat Company; Sir Humphry Davy had declared that it would be as easy to bring down a bit of the moon to light London as to succeed with the novel illuminant.

* The Historical Study of the Olde London Street. Edited by T. St. Edmund Hake. London: Waterlow & Sons (Limited).

**Clocks.**—A large new clock has just been erected in Ombersley Church, near Worcester, by Messrs. John Smith & Sons, Midland Clock Works, Derby. It strikes the hours upon a ton bell, chimes the Cambridge quarters upon four bells, and shows time on four dials, each 6 ft. across. The movement is fitted with all the latest improvements of the makers, and it has one of Sir Edmund Beckett's double three-legged gravity escapements, with a 2-cwt. pendulum. The same firm have just erected a similar clock in Enville Church, Staffordshire, as a memorial to the late Earl of Stamford and Warrington, and also a large village clock at Woodford, Northamptonshire.

## PATENTS.*

THE modern "patent right" is simply the royal "monopoly" of immemorial usage under a new name, and the power to grant it to particular individuals resides as heretofore in the Crown alone. Its exercise has often been connected with gross injustice and hardship, and the irregularities of which it was the occasion culminated under the Stuarts, whose prerogatives in this as in other respects were at last restricted by law. The statutes of Elizabeth and James in this behalf were so wisely framed that they have remained without substantial alteration to the present time, and the Act of 1883, which became operative on the 1st of January this year, leaves the principle almost untouched, and deals mainly with the question of procedure: the only constitutional change consisting in the provision by sec. 27 that "A patent shall have to all intents and purposes the like effect as against her Majesty the Queen, her heirs and successors, as it has against a subject."

By repealing and consolidating some two-and-twenty previous statutes, the "Patents, Designs, and Trade Marks Act, 1883," secures to an inventor, by a very simple and cheap process, the benefits accruing from his invention. Heretofore seven personal visits and four separate payments were required for the protection of a patentee. He may now secure protection at a stroke, at an outlay of 4*l*., and by the simple and ubiquitous aid of the Postmaster-General. All the inventor has to do is to fill up and address to the Comptroller of Patents a form of declaration, to be obtained at any post-office, and affix a 1*l*. stamp. With this he may send a provisional specification and drawings (compulsory under the new Act), and after an interval of nine months furnish a complete specification and drawings, bearing a 3*l*. stamp, or he may send the complete specification and drawings with his original application, and 4*l*. in all. The documents will be open for public inspection for two months, and if unopposed the patent will be sealed, and stand good for fourteen years, provided only the patentee sends at given intervals to the Comptroller further fees, amounting in all to 100*l*. In certain circumstances the patent can be renewed for a second term of fourteen years. As will be seen, these steps may all be taken without the intervention of an agent, or the outlay of any sums in excess of the above fixed fees. As, however, much still depends upon the character of the specification, and perils abound on every side, it may be as well for inventors to seek the advice of those whose special business it is to advise on the subject.

In the case of opposition to a patent, or the revocation of one already granted, such aid cannot be dispensed with.

A novel point in the new Act is the extension of its provision to aliens, who can now take out patent rights in the United Kingdom and the Isle of Man direct without the intervention of an agent holding the right in trust. A clause is provided by which Government departments may use any patent in the service of the Crown on terms to be agreed upon with the patentee, or failing such agreement upon terms to be settled by the Treasury. We shall be surprised if this does not give rise to some contentions. An apparently arbitrary circular by the Postmaster-General forbids the Post-office *employés* to take out patents without his consent. This is surely too general in its terms, and should be limited to inventions bearing upon the public service.

The sections of the Act which deal with the registration of designs and trade-marks exhibit the same desire to simplify procedure and secure equity in the application of the statute. But, after all, the matter is necessarily a complicated one, and the legal commentators on the new Act foreshadow many points upon which a good deal of judicial acumen will doubtless be exercised. Of the two books before us one is by a lawyer and the other by a professional patent agent, and as each looks at the subject from his own side it is essential to a complete understanding of the Act, its facilities and its shortcomings, to consult both works, or others like them. It is evident that the authors have respectively striven hard to classify and elucidate the subject fully by notes and illustrations, and not without success.

* Wallace's Law and Practice of Patents, Designs, and Trade-marks. London: Maxwell & Son.
Patents, Designs, and Trade-marks Act, Rules, &c. By Bristow Hunt. London: Waterlow & Sons.

## WATER SUPPLY.

The following are the main portions of the papers read by Mr. G. J. Symons and by Mr. E. Easton at the recent Conference of the Society of Arts on Water Supply at the Health Exhibition. Mr. Symons's subject, as mentioned in our last, was "The Origin of Water Supply." He said:—

All water supply comes from the clouds, and it is with the products of the clouds as rain (including therein snow and hail) that I have to deal.

Perhaps before describing the general features of rainfall distribution, it may be permissible to explain (for the use of those who have never done it) how the fall of rain is measured. If we imagine a flat dish,—a tea-tray, for instance,—placed upon a lawn during rain, it is obvious that (subject to loss by splashing) that tray would at the end of the shower be covered by a layer of water of a depth approximately equal to that which fell upon all portions of the lawn, and the depth of the water on it (say ½ in.) would be the depth of the rain fallen. Obviously, besides the loss by splashing, the water on this tray would soon evaporate and be lost, besides which the depth could not easily be accurately measured. For these reasons, some form of funnel is always used, so that the rain may be, as it were, trapped, prevented from splashing out, and from evaporation. In the gauge before you (a very inexpensive one) all known sources of error are guarded against, and, as the water collected by a 5 in. funnel is measured in a jar only 1½ in. in diameter, it will at once be seen that its vertical depth is multiplied nearly tenfold, and, therefore, even $\frac{1}{100}$ of an inch is easily measured.

There are other patterns specially adapted for observation on mountain-tops, where they can only be visited once a month; others for observations during heavy thunderstorms, so as to obtain data needful for drainage questions; others in which every shower that falls writes down its history, the instant of its commencement, its intensity during every minute, and the time of its termination; but I must not stand between you and other papers with a discourse on the many interesting points which these gauges bring out.

During the last twenty-five years, I have done what I could towards establishing a complete system of recording the rainfall in this country. In early days the British Association for the Advancement of Science gave considerable help, but some ten years since they dropped it. Government have never given any help at all, and now the whole cost, or 99 per cent. of it, is borne by the observers themselves, a body which has now grown to the very large number of nearly 3,000. I do not know the precise number, but there are every year new stations beginning, old ones stopping, and others interrupted, yet for 1883, I have just had the pleasure of printing perfect records from 2,433 stations, every record having been previously carefully examined and verified.

I refrain from going into the subject in detail, desiring chiefly that you should realise the fact, that large tracts of country have twice and even three times as much rain as others. If we descend to single stations, the differences are of course greater, *e.g.*, in 1883, the rainfall at The Stye, in Cumberland, was 190·28 in., and at Clacton-on-Sea, in Essex, it was only 18·71 in., that is to say, the one was more than ten times the other.

Here I should like to interpose a question as to public policy. There is often a great outcry if the water in one district is taken to another. Surely, while there is no relation whatever between the density of population and the quantity of rainfall, one early duty of a Government is to see that all parts are amply supplied with the first necessary of life. Englishmen have a dread of centralisation, but in many ways they pay a long price for their dread. At present, it is not very often that any town can even state before Parliament its views as to the effect upon it of what its next neighbour may be obtaining powers to do. Having suggested one semi-legal question, I may as well mention at once another. Up to the present time, there being no Hydraulic Office (as I hold that there should be) in this country, all the larger water questions come before Parliament as Private Bills, and provided that they get through Committee, they, as a matter of course, become law,—law for all time to come. No one can foresee what will be the total population of this country a century hence. No one can tell where the bulk of the people will reside, nor what will be the need for water in various parts of the country. Water-rights are already very valuable, and they will, probably, become still more so. Would it be possible to safeguard our successors by insisting that special water-rights, if now asked to be created, shall be subject to revision without compensation after the lapse of 100 years.

However, to return to rainfall, and explain why I stated it to be the origin of water supply. All rain and melted snow must be disposed of, either by evaporation, percolation, or flow into streams and rivers. The first class, evaporation, is, of course, not a supply, and therefore we must not pursue it. Percolation is the source of all springs and of all well-water. Sometimes, as at Lancaster, the springs are so large that even a considerable town can be supplied by merely laying pipes to the sources whence they burst forth; sometimes they run down into the reservoirs of gravitation water-works; sometimes they pass, as in the chalk districts, for miles beneath impervious strata, finally being either pumped up from wells, or even, in rare cases, rising as true artesian wells above the surface of the ground; and sometimes they pass even deeper, as in red sandstone supplies pumped from extreme depths for Liverpool and other towns.

The water which runs off the surface is utilised either by throwing a bank across a stream, and thereby forming a reservoir behind it, as, for instance, in the new supply for Liverpool from the Vyrnwy, where the reservoir will form a lake larger than many of those in Cumberland. Sometimes the lakes themselves are utilised as reservoirs, as, for instance, Loch Katrine and the surrounding lakes, and sometimes, as at York and London, the rivers are drawn from by powerful pumping machinery.

Mr. Easton's paper dealt with the subject of "Water Supply" in its mechanical aspect. He commenced by observing that the three chief points which have to be considered in relation to this subject are:—

1. The source of the water.
2. Its distribution; and
3. The conditions under which it is used.

1. With regard to the source, it is evident that in designing waterworks the engineer has to provide that the water shall be adapted for the purposes for which they are intended to be used, both as regards quality and quantity. The question of quality will depend upon circumstances. It is essential, of course, that in every case the water shall be free from contamination by organic and other impurities; but the necessity of its being chemically free from other constituents will depend, to some extent, upon the purpose for which it will be used; for instance, in a manufacturing district, where the water is required for dyeing and such-like purposes, it must be free from certain mineral ingredients, whereas for the supply of drinking-water and for general purposes, this is a qualification which need not be insisted on.

Sources of water proper for use may be classed under two distinct heads. 1. Those which are afforded by nature in a state absolutely pure and fit for use, such as water drawn from wells and deep-seated springs. 2. Those derived from water-courses or gathering grounds, which are open to the atmosphere, and which must necessarily be exposed to the risk of contamination from external agencies.

In the case of the former, no works for storage or purification are necessary, the stratum of rock or other material from which the water springs, forming a natural reservoir and filter.

In the second case, it is necessary (*a*) that all direct pollutions shall be prevented from coming into the source; and (*b*) that in almost every instance, efficient means of filtration should be provided. The filtration ought, wherever it is found impossible to altogether prevent the chance of contamination, to include the use of some deodorising agent, of which there exist more than one capable of practical application.

As instances may be mentioned the filtration at Wakefield, where, for many years, by the use of Spencer's magnetic carbide of iron, a water very much contaminated was rendered perfectly wholesome; and that at Antwerp, where Professor Bischoff's spongy iron is employed with an equally good result.

2. Essential as it is to ensure that the source of supply is proper for the required purposes, it is equally essential that the mode of distribution shall be such as shall prevent its deterioration before being used.

To effect this, it is absolutely necessary that the reservoirs into which the water is collected for distribution should be covered, and that the mains and pipes should be perfectly air-tight, and laid at a proper depth below the surface, so as to preserve the water in its original state of purity, and, as much as possible, at the same temperature, during its passage from the source to the consumer.

One great cause of the complaints of the quality of the water in most large towns, is the use of cisterns for storing it in the houses, which it is impossible to employ without the risk of some injurious effect upon the water.

It is scarcely credible that the favourite place for fixing the cistern from which the water for drinking and culinary purposes is drawn is immediately over the water-closet or next to the dust-hole, whilst even in the better class of houses, where the cisterns are fixed in the roofs, they are very rarely sufficiently covered, and are open to contamination from soot, dust, inroads of black beetles, and other abominations. The latest researches of scientific men show that there is no more fruitful source of disease than such a condition of things affords.

This consideration naturally leads up to the third division of the subject, viz., the conditions under which water should be used. And first it is essential that a constant supply should be given, without which it is difficult to avoid the deterioration of the water above alluded to.

Not only is it impossible to give an adequate supply by the intermittent system, without having storage cisterns in the houses, but there is also a serious danger of contamination by the possible admission of foul air or gas into the mains when the water is turned off. There have been several instances of a water supply being seriously affected from this cause.

But to give constant service it is absolutely necessary also that the supply should be under proper regulations, which shall ensure the prevention of undue consumption and misuse of the water.

Not only are the difficulties of providing the supply greatly increased where waste is allowed to prevail, but the cost to the community is augmented without the slightest corresponding benefit to health.

Nothing is more fallacious than the idea, prevalent among a large section of consumers of water, that the allowing of taps and water-closets to run to waste, assists in the flushing and cleansing of the sewers, and, therefore, conduces to health. These continuous dribblings of water can have no effect whatever in removing any obstructions or accumulations which may exist in the large drains. The only proper and effectual way of removing fœcal matter is so to regulate the use of water that it shall be proportionate to the work it has to do at the moment. Where this is done, by the use of properly-constructed water-closets, well-proportioned drains, and by keeping out from the system of sewers the rainfall on the streets and houses, the ordinary quantity supplied to a town is quite sufficient to perform this service without having recourse to extraordinary means.

For these reasons it is not desirable that the supply should be unlimited in quantity; on the contrary, every precaution should be taken to make that quantity commensurate with the real wants of the consumers.

It is quite certain that in almost every town a very large proportion of the water delivered through the mains runs needlessly to waste. The waste of water, whether it arises from leaky joints in the mains and service-pipes, or from defective fittings inside the houses, can only be injurious to health from the increased humidity which is thereby imparted to the atmosphere, and which, as is well known, contributes so much to the spread of infectious diseases and the establishment of epidemics.

At this moment, when we are suffering to a greater extent than usual from the contamination of the Thames, owing partly to the presence of a large quantity of sewage, but also to the abstraction of a large proportion of the summer flow of the river, it is manifest that the reduction by thirty-three per cent. of the amount drawn from and discharged into the river would

go far to ameliorate the condition of things now complained of.

It is useless to discuss the method and conditions of supply, if the sources of water are not to be preserved to us, and it is quite certain that with the immense growth of the population of this kingdom, it will not be long before this preservation becomes a pressing necessity.

In the report presented to Parliament by the Duke of Richmond's Select Committee on Conservancy Boards, in 1877, a very workable scheme was recommended by their lordships. The Committee say that :—

"In order to secure uniformity and completeness of action, each catchment-area should, as a general rule, be placed under a single body of Conservators, who should be responsible for maintaining the river, from its source to its outfall, in an efficient state. With regard, however, to tributary streams, the care of these might be entrusted to district committees, acting under the general directions of the conservators; but near the point of junction with the principal stream they should be under the direct management of the conservators of the main channel, who should be a representative body, constituted of residents and owners of property within the whole area of the watershed."

But although the question of improving the water supply, by preventing the pollution of the rivers, was incidentally mentioned by their lordships, it was evident that the main object of the report was the prevention of floods and not the conservancy of water for the supply of populations. Now, it may well be said that the one subject is at least as important as the other, and just as the recurrence of a number of wet seasons at that time brought the question of the floods prominently before the Duke of Richmond's Committee, it may safely be asserted that a corresponding succession of dry seasons will compel the serious attention of the Government to the other part of the subject.

When presiding over the Mechanical Section of the meeting of the British Association, at Dublin, in 1878, on which occasion the opportunity was taken to very fully discuss, from a variety of aspects, this question of rivers conservancy, I made a suggestion which, I believe, is worth repeating at the present time :—

"A new department should be created, one not only endowed with powers analogous to those of the Local Government Board, but charged with the duty of collecting and digesting for use all the facts and knowledge necessary for a due comprehension and satisfactory dealing with every river basin or water-shed area in the United Kingdom,—a department which should be presided over, if not by a Cabinet Minister, at all events by a member of the Government who can be appealed to in Parliament."

It is earnestly to be hoped that no further time will be lost in passing an Act to deal with this subject, and that no considerations of a party or private nature will be allowed to prevent a scheme of so important and imperial a character being made as complete and comprehensive as possible.

## PROPERTY SALES AT THE AUCTION MART.

*Whitechapel.*—Messrs. Weatherall & Green last week continued their large sale of freehold houses and shops in Whitechapel. The sale, which occupied three days, comprised upwards of seventy lots, including more than 100 houses and a number of valuable freehold ground-rents. In last week's *Builder* we gave particulars of the first day's sale, which realised 18,520*l*. The second day's sale consisted of property in Greenfield-street and Yalford-street, fifteen houses in the first-named street being sold for an aggregate sum of 8,360*l*.; and twenty-five houses in Yalford-street realising 5,160*l*. Freehold ground-rents of 53*l*. per annum, with early reversions, were sold for 2,150*l*. The last day's sale consisted of houses in Commercial-road, Coke-street, and Plumber's-row, together with a number of ground-rents. Six houses in Commercial-road realised 7,370*l*.; seventeen houses in Plumber's-row were sold for 5,740*l*.; and one house in Coke-street realised 360*l*. Freehold ground-rents, amounting to 170*l*. per annum, with early reversions, were sold for 2,390*l*. The total proceeds of the three days' sale amounted to 50,550*l*.

*Croydon.*—A freehold estate, known as Waddon House, near Croydon, was submitted for sale in several lots by Messrs. Blake, Haddock, & Carpenter. Waddon House and sixteen acres of freehold land were sold for 12,110*l*.; an adjoining residence and three acres of land realised 3,730*l*.; a plot of building land, containing between five and six acres, was sold for 3,480*l*.; another plot of building land, containing four acres and a half, fetched 1,710*l*.; and a mansion, known as the Priory, with eight plots of building land, was sold for 5,530*l*., being a total of 26,560*l*. In addition, three freehold residences on the estate were sold for 4,405*l*.

*Ground-rents in Cheapside and at Islington.*—At a sale of ground-rents held by Messrs. Debenham, Tewson, & Co., the large sum of 11,600*l*. was obtained for a freehold ground-rent of 300*l*. per annum in Cheapside. The same auctioneers also sold freehold ground-rents in Islington, of 41*l*. per annum, with early reversions, the sum realised being 4,570*l*.

# Illustrations.

## THE OPERA CAFÉ ON THE OPERA-HOUSE PLATZ, FRANKFORT-ON-THE-MAINE.



THIS *café* was built in the years 1881-2 on the new Opernhaus Platz, from the designs of the architect, Herr Franz Jacob Schmitt, of Frankfort-on-the-Maine. It is carried out entirely in hewn stone, and all the structural parts are in Vosges sandstone, veined and beautiful as marble, and of a whitish yellow colour, from the quarries of Deidesheim in the Rhenish Palatinate; the neutral wall surfaces are covered with white limestone from the quarries near Bar-le-Duc, in France. The core of the wall-work consists of brick, but the cellar and foundation-walls are of red quarry-stone, which comes in immense quantities into Frankfort, by water transport, from the very extensive sandstone quarries on the upper Maine.

The two lower floors of the *café*, which are in rusticated masonry, comprehend the business portion of the building. On the first-floor a balcony with a grille of forged ironwork runs along the whole front of the building. Over the four rusticated columns rise on high bases eight Corinthian three-quarter pillars, extending through two floors, and carrying entablatures. The figures on the four sides of the façade timber work represent the four elements :—Earth, Air, Fire, and Water, by two female and two male figures, modelled by the sculptor Eckhardt, in Frankfort-on-the-Maine. The models of the two female caryatides, which enframe the two windows on the third floor, come also from the hand of this gentleman.

In the design of the present building the architect was forced to take into consideration the façade of the opera-house in order to obtain a fitting and harmonious effect against the opera-house itself, which is designed in the Greek Renaissance style, and the dwelling-houses which border the Opernhaus Platz.

The new building at the corner of the Opernhaus Platz, a double house, was also built from the plans and details of the same architect. The three façades of this combined business and dwelling-house, in all 66 mètres long and 19 mètres high to the crest tile, were also built entirely in square sandstone, and equally richly decorated with sculptures from the models of the sculptor Herold, in Frankfort-on-the-Maine.

## STAIRCASE AND DINING-ROOM, No. 8, WHITEHALL.

THESE elegant interiors, the work of Sir William Chambers, are within that square, plain-looking mansion opposite the Horse Guards, from which the Prince and Princess of Wales the other day witnessed the procession of the demonstrators to Hyde Park. The treatment of the dining-room is very simple and appropriate, saving only the rather too florid and naturalistic ceiling decoration, which has more of a drawing-room character, but is too much of the pie-crust order in any case. The staircase shows that extraordinary development of sliced-up architrave which modern criticism has taught us to condemn; but the whole has the merit of dignity and refinement proper to a house interior of the first-class. The illustrations, which are reproduced from photographs by Mr. Bedford Lemere, may be of some value as records of a London mansion which will soon be numbered with the things of the past. Some further particulars as to the site and its associations will be found in another column, under the heading, "Whitehall Court."

## ST. GEORGE'S MISSION HOUSE.

THIS building is intended to serve as a centre for the parochial work of the parish of St. George-in-the-East, — an ecclesiastical workshop where the various branches of church-work in an East-end parish have their centre of organisation. In the basement is a gymnasium for the boys, fitted up with the necessary apparatus, and having a wood block floor. Here are also the kitchen for preparing soup, and for brewing tea for tea-meetings; the heating apparatus for warming the Mission Hall above, and water-closets. On the ground-floor are two entrances, one to the upper floors of the house, the other specially for the Mission Hall at the back. Between these is a room for Infants' Sunday School. Behind is the hall, a large room intended for concerts, mission services, parochial entertainments, and Sunday school. There is an entrance from the churchyard for Sunday use. The gas pendants, specially made by Messrs. Slater, of Holborn, are hung with balance-weights, so that they can be turned up out of the way when a magic lantern is being shown. The floor is of wood blocks, and all the woodwork of deal, stained and varnished. Five of the lunettes have been filled with very excellent paintings, by members of the Kyrle Society, who have also given some charming panels of flowers painted on Willesden paper.

The first floor of the house is a large room for Sunday School, reading-room, &c. On the second floor are three rooms, one of which is used as a class-room, the others, and also the three rooms on the third floor, being living-rooms for caretakers, &c.

The work throughout is plain but substantial, and has been well carried out by Mr. Charles Cox, of St. George's Works, Hackney; the architect being Mr. Keith D. Young, of 17, Southampton-street, Bloomsbury, W.C.

The perspective view of the interior was drawn by Mr. W. H. Atkin Berry.

## WEELEY CHURCH, ESSEX.

THIS little country church, situated on rising ground, surrounded by beautiful trees and a lake of water near, was rebuilt in the year 1880, by Mr. E. C. Robins, F.S.A.; that is to say, the whole is new but the western tower, which remains as it was. Such slight alterations as were originally proposed involved in the raising and re-erection of the roof and parapets, is indicated in the illustration which we present to our readers, but have not yet been realised.

The old church was a dilapidated barn-like structure, accommodating about 200 persons, concerning which the architect reported, "with the exception of the tower, there is really nothing of interest or value remaining, scarcely a moulding left. The church is very dilapidated, and owing to defective foundations has had to be buttressed up to prevent the walls giving way outwards, more particularly at the chancel arch: to enlarge it is out of the question. The fittings are simply hideous, and it is quite impossible to think of it as 'that holy and beautiful house where our fathers praised Thee.'" It how consists of a nave and chancel, with north aisle and open porch, seen in our view. It accommodates 300 persons, and cost less than 3,000*l*.

## COMPLETION OF ST. SAVIOUR'S, LAMBERT ROAD, BRIXTON.

THIS church, which was erected from the designs of Mr. E. C. Robins, F.S.A., and was consecrated in September, 1875, giving accommodation for above a thousand persons, without galleries, is now about to be completed by the execution of the upper part of the tower and spire.

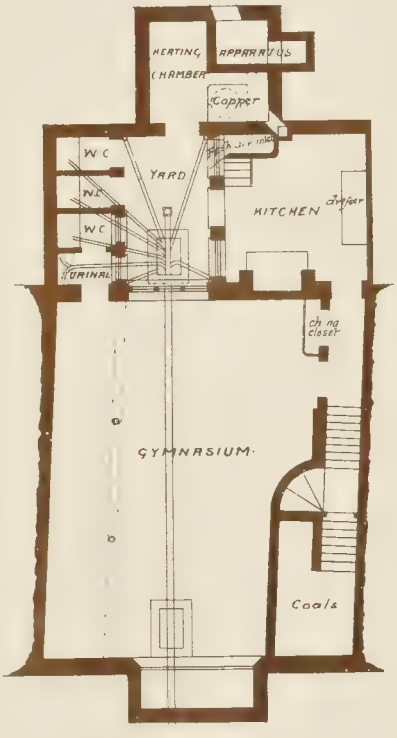
The building is an example of the thirteenth-century French Gothic, and was originally intended to have a lofty spire reaching about 180 ft. in height; economical reasons have necessitated a simpler termination to the lofty tower, and we now give an illustration of the whole church as it will appear when Mr. Bangs has completed his contract.

The total cost, including both the former and the present contracts, will be below 9,000*l*.

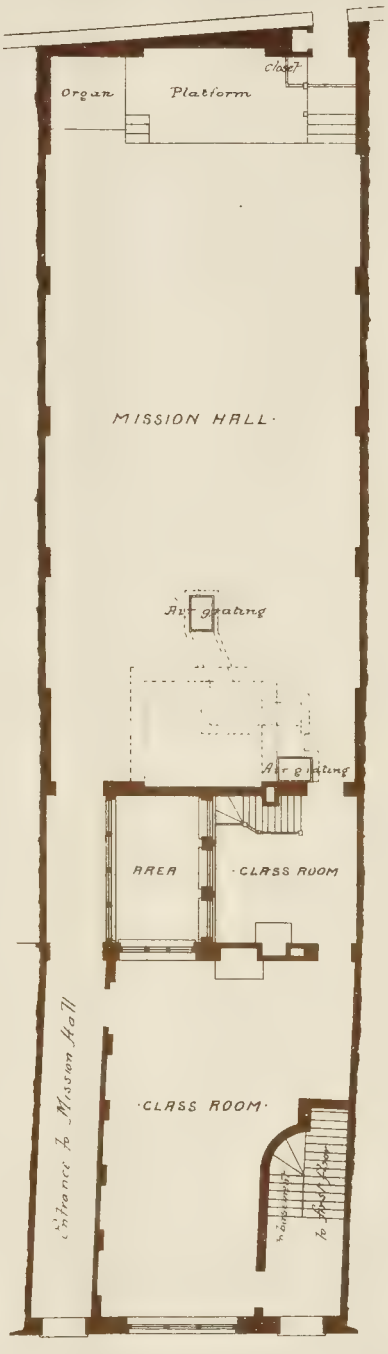
**Surveyorship, Richmond Vestry.**—On the 1st inst. Mr. Walter Brooke, Assoc.-M.Inst. C.E., commenced his duties as Surveyor to the Richmond Vestry, Surrey. Mr. Brooke was three years and a half Assistant Engineer and Surveyor to the Hove Commissioners, Brighton, and previously four years assistant to the Borough Engineer, Brighton. He was elected out of ten selected candidates. There were 138 candidates for the appointment, which is worth 300*l*. per annum, with a horse and dog-cart.


Weeley Church Essex
E.C. Robins F.S.A. Archt
16 John St. Adelphi London






BASEMENT PLAN




GROUND FLOOR PLAN

Scale of Feet 0 5 10 20 30 40 50

MISSION HOUSE, ST. GEORGE'S-IN-THE-EAST: MR. KEITH D YOUNG, ARCHITECT.



THE PLATE SPRAGUE & CO. LONDON


CAFE-ROYAL




INK PHOTO. SPRAGUE & Cº LONDON

THE OPERA CAFÉ, FRANKFORT, HERR FRANZ JACOB SCHMITT, ARCHITECT.

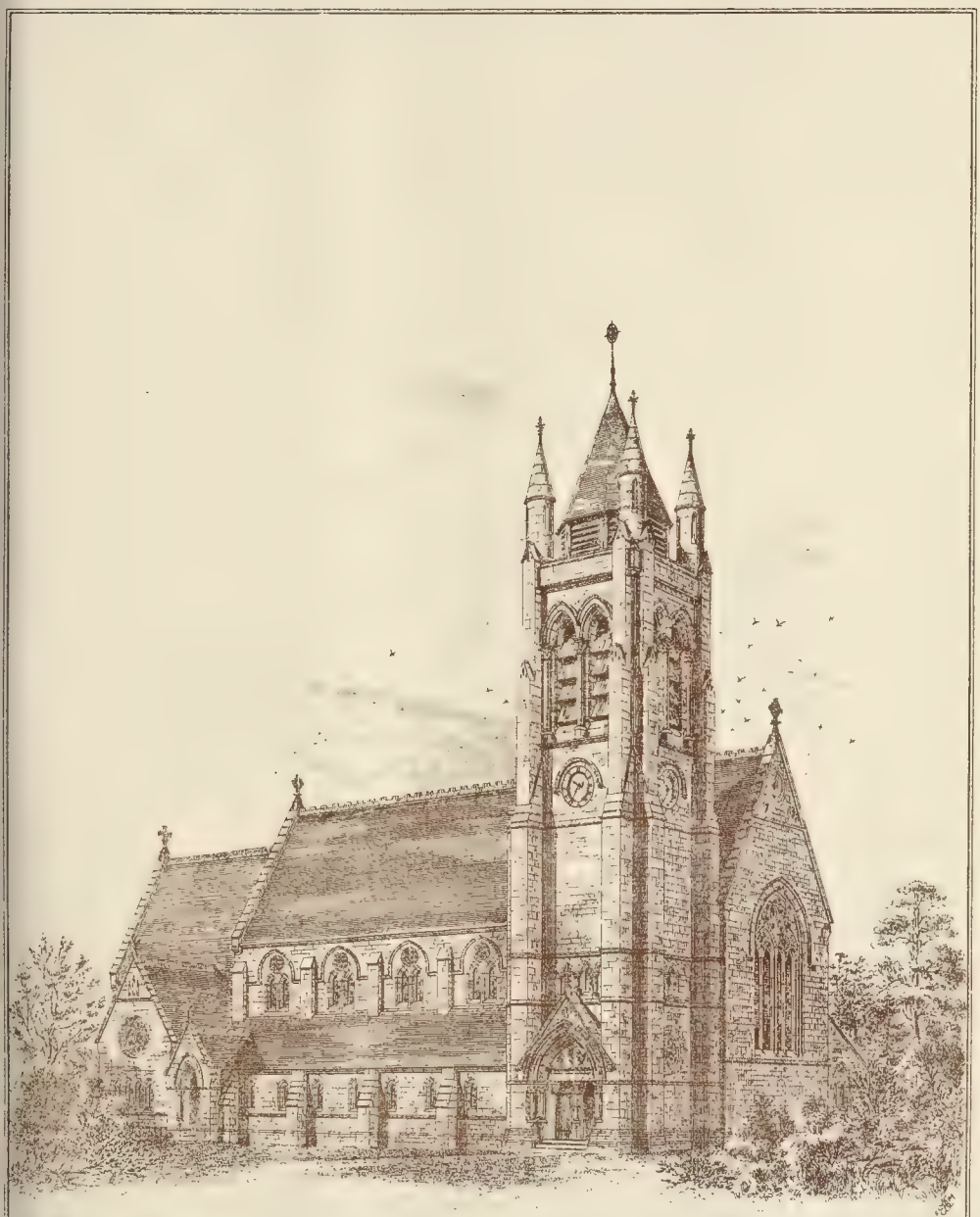


Nº PHOTO SPRAGUE & Cº LONDON

STAIRCASE Nº 5 WHITEHALL




MISSION HOUSE, ST. GEORGE'S-IN-THE-EAST: Interior View.——Mr. Keith D. Young, Architect.



A.D. 1884 :St Saviour's Church-Brixton Rise: E.C. Robins f.S.A. Arch.t 1 John Street Adelphi

Avenue Road Photo Lith.

Thomas Dawson W.

## HEALTH EXHIBITION LECTURES.

### ANGLO-SAXON HOUSES.

On Saturday afternoon a lecture was delivered by Professor Hodgetts, at the International Health Exhibition, on "Anglo-Saxon Dwellings." Dr. Zerffi presided, and there was a good attendance.

The lecturer, in his opening remarks, said he wanted to tell his audience something about Early English houses. Those who were scholars of the true University stamp would turn up their English noses at English things, because they had been trained to admire only Greek and Roman antiquities. Such gentlemen would know all about the atrium, the compluvium, the basilica, and all other buildings, or parts of buildings, peculiar to the Greeks and Romans, but they would be almost indignant if they were asked how those lived who crushed the power of Rome and threw off the yoke of the arch-tyrant,—who called Freedom from the deep and founded her empire on the waves. It was contrary to history to suppose that the martial, poetic, and industrious race which overthrew Rome, and bore in it the germ of the new civilisation which now covers the face of the globe, was a race of rough, untutored savages. The remains of their arts, which have descended to us, their noble language, and still nobler literature, prove them to have been men of thought, skill, refinement, and enterprise. The civilisation which they brought from Scandinavia was very different from that of the classical civilisation of Greece and Rome. The tastes of our ancestors were totally different from those of the classic nations of antiquity, and however excellent Greek and Roman models may have been, they clearly did not suit *them*. In the cold, bleak north, man required warm houses and plenty of fuel, consequently Nature supplied him with enormous pine forests to build a house and brighten a hearth. Nor could better materials have been supplied for either purpose. No structure was so warm as a house of wood, and the glowing embers of a large wood fire were known to be the best adapted to the requirements of a household.* The Anglo-Saxons were away in the summer on board their ships, and the house was, therefore, more calculated to keep the owners warm than to protect them from the heat. The houses which the Early English constructed in Scandinavia were more to their taste and better suited their requirements than any marble palaces beside the Tiber. And when they found such buildings in Britain, of the Romano-British stamp, they looked upon them with contempt, and pulled them down as they cut down the owners. Consequently, our own immediate ancestors built rather in the style of their forefathers than that of the nations they subdued. The Scandinavian was in the very nature of his love and life a warrior. His gods were gods of war, and his thoughts were those of a soldier. Even in peace he was a hunter, and the distinctions in his social existence were derived from warlike habits. One of the first principles of the Anglo-Saxon military education was that the soldier in war, whether on board ship or on the field, should have no protection from any kind of fortified work. The house was the dwelling-place in peace, and had for our remote ancestors no reference to war. Consequently it was described in such a manner as recalled to our minds the old-fashioned farm-house with its out-buildings, rather than the mansion of a later time. In the Older England, whence we came in the fifth century to Britain, there were grand structures in wood, giving our forefathers room to hold festive meetings in the winter, when cold and snow prevented their great assemblies in the open air. Such an apartment was the great hall of Herót, in our own grand national epic of Beowulf, the description of which afforded a ready clue to the architecture of the earliest English in Britain, as the other references to dress, arms, manners, and customs presented a vivid picture of English life in the fifth and sixth centuries. They were introduced in this glorious poem to a palace, which consisted, for the most part, of a large oblong building, used for the meeting-place of the warriors, forming the train of King Hrothgár, to whom the structure belonged. The internal arrangements were simple enough. There was the oblong room or hall, with its high bank on one side supporting the throne of the king, and below this, all round the walls, were placed the benches for the warriors. The walls were hung with tapestry, the work of the Queen and her train of maidens. This was a necessary adornment, inasmuch as the joints between the logs, though carefully caulked and stopped up with tow, could not be hermetically sealed against the wintry blasts that cut their way through every crack and cranny. So the hangings on the walls were of immense use in keeping out the wind. Nor were the benches and settles without their bright and attractive coverings. Some of these coverings were so valuable as to render their mention in wills as bequests an important item. Besides the wall-hangings woven by the fair hands of tender women, there were other ornaments wrought by harder hands and less gentle fingers. The coat of linked mail, the splendid shield with its bronze or golden boss and circling ring or border of the same metal, the helmet ornamented with the wings of the sea eagle, the horns of the orochs, the grim face of the boar or wolf, the sword, the boar-spear for the hunt, the gár for combat, and the lighter spears hurled as javelins at the more distant foe; such a group of splendid weapons marked each warrior's seat, as the escutcheons and coronets in another great house mark the seats of our earls and thanes at the present day. There were but two windows, one at each end, and they were called wind-eyes, their object being ventilation rather than lighting the hall. The roof was of the gable form, rather pointed, and covered either with wooden shingles painted and gilt so as to glitter in the sun like gold, or else they were ordinary tiles highly glazed and of variegated colours. In the centre of the hall was the fireplace or hearth formed of burned clay, and surrounded by a low wall of fire-bricks from which the smoke rose in eddying columns to escape through an aperture in the roof left there for its passage. At each end of the long hall was a door, and during a feast both doors were open, and the poorest passer-by might enter and be certain of noble alms. The floor was of deal planks, but the hearth was a little cubical mound of earth surmounted by fire-bricks, tiles, &c. The external appearance of such a hall, judging from the description of Herót, must have been very imposing. The horizontal trunks were surmounted by the highly-pointed roof, gaily decked with shining shingles or curiously-coloured tiles, bright and glowing in the sun. The effect was that of plates of gold used as tiles burnished and bright. At the gable ends the ornamental boards or planks that finished off the roof were, like the ends of the Swiss cottages and the modern Russian country houses, carved into fantastic forms. Those of the hall in question were carved into the resemblance of the antlers of a mighty stag or hart, and seen from a distance it must have conveyed the impression of a huge stag tossing its antlered brow aloft. When the winter set in and meetings in the open air were impossible, and the Viking expeditions equally so, such a grand hall must have been a bright scene indeed. The roaring fire in the centre, the splendid colours of the gorgeous tapestry shown up by cressets or iron lamps hanging from the rafters; the four massy pines supporting the roof in the centre, in the stems of which some rude likeness of Thor and Odin Frigga and Freya were carved, painted and richly adorned with gold and gems, the brilliant arms glittering from the rich coloured ground of the tapestry, the gay dresses of the seated warriors, red, blue, and white, richly bordered with beautiful gold fringe. The harpers, with their harps and gay mantles, occupied the centres of the hall on each side of the fire, and around the blaze the busy cooks plied their art. Behind the seats of the joyous warriors golden-haired damsels poured liquor from such jugs as may be seen in the British Museum, into such horns as that rescued from the tumulus at Taplow, and also forming part of the national treasure in Bloomsbury. When the lady of the house, followed by her maidens and the other ladies who were present at the feast, withdrew, as is the custom of their descendants at the present day, they sought the bower, or women's apartments, built off from the great hall, and entered by a door at the side of the high seat or daïs. In these rooms the maidens of the household spun flax for the linen of which the fine underclothing was made, or wove the web and worked the threads in the wool for the tapestry hangings of the hall and other rooms. Then there was the "Máthum House," or treasure chamber, where rings and bracelets and money were stored. Next came the "Wæpen-hús," or armoury, with its store of helmets, byrnies (or coats of mail), white shields for the inferior warriors, spears of all kinds, bows and arrows, swords and axes. Again, beyond these places were the outhouses for the ceorls, or free labourers, and the thralls or slaves. Then there was the *cycene*, where certain preparations were made, and some portions of the cooking performed, that done in the hall being confined to the roasting on the spit, and to the boiling of the grand stew or soup in the gigantic cauldron swinging over the royal blaze in mid hall. All these buildings were to the rear of the great hall, and they were none of them higher than the ground-floor. There were also the Bæc-hús, where various kinds of bread were made, the breáw-hús, a most important element in the comfort of an English house if all tales were true; the malt-house, where the malt was stored; the pantry, a building set apart for the preservation of the food of the household. Vegetables were preserved in the so-called hed ærn, and the wine was kept in a cellar dug under the earth and called the win ærn. The bors ærn was the stables where the "fettered whirlwinds" were confined. For such corn as was consumed in the house there was the qweorn or handmill, but besides this there was the mylen or windmill that ground in larger quantities. The cows were confined in the scyppen or cowhouses. Then came the wash-house, where the linen of the household was washed, and, considering the scrupulous cleanliness of the Anglo-Saxons, this must have been no mean portion of the establishment, for they used table-cloths, towels, and napkins, which, besides the linen portion of their clothing, had to be kept white and clean. Those who had travelled in Sweden or Russia must have been struck by the number of bathing-houses for all classes of the people. Hot baths, vapour baths, and cold baths could be had at prices varying from 1d. to 6s. or 7s. of our money. The Russians visited the bath-house generally once a week, and certainly never less than once a fortnight. They said they acquired in such baths sufficient heat to keep them going another fortnight. Thus, when Tacitus speaks of the constant use of the warm bath by the northern nations they were led to understand why the Anglo-Saxons paid so much attention to the bath as to have a separate building provided for it in their great houses. Now all these places were buildings connected with the great hall of an Anglo-Saxon gentleman or person of distinction, and perhaps some would say that they were houses, not a house. His reply was that the original meaning of "house" was home rather than only one building, just as on a grand farm in some out-of-the-way place where "Threadneedle-street" was never heard off, if such a place were within the province of imagination, they would find the house itself not more than one story high, and all the various departments of the household, except the kitchen, carried on in out-buildings, as was the case in Russia. But the true English style of building was confined to one floor, and that was the ground-floor. By this means the fatigue of going up and down stairs was avoided, and the possibility offered of having all the dwelling-rooms of the same temperature, and of passing from one room to another without running the risk of chilling the whole body in the transit. In the Scandinavian houses of an early period there did not appear any trace of the unwholesome staircase, which embittered the lives of so many people in this country. Certainly they had stairs, but they were the steps by which to mount the watch-tower built on a hill near the house, and used by the watchman to scan the whole neighbourhood to see if there were signs of intruders or visitors. The poorer classes, of course, lived in less pretentious dwellings; and, like the huts of the Russian peasants, their houses consisted of only one room, sometimes partitioned off into smaller apartments. But he was not by any means prepared to say that they were anything like so badly off as the poor were in this great metropolis. As long as they did their duty, civil and military, their lords were not unmindful of their wants. They were allowed wood enough for fuel and to spare, while the timber for their huts was supplied by the lord of the manor. In such poorer houses the hall was not wanted, and therefore the space which it would have occupied

* The learned Professor's enthusiasm has certainly carried him a little too far here.—Ed.

## LEAKY SLATE CISTERN.

Sir,—In answer to your correspondent's questions, we have always found slate cisterns get leaky if they often run quite empty, and especially if allowed to get dry, however they may be fixed or built up.

We should much doubt the efficacy of covering the bottom as proposed, but if mastic, mixed with boiled oil, were used, instead of Portland, it might answer.

We should say,—judging, of course, from "Bombazeen's" letter,—that his cistern has not been properly fixed, and we think it would pay him in the long run to have it taken to pieces, and refixed by a competent person. J. & C. Christie.

## IMPERMEABLE CONSTRUCTION.

Sir,—The statement by Mr. E. C. Robins at the Conference of Architects (see *Builder*, July 19) that an application of linseed oil or of gum and wax dissolved in spirit will preserve external stonework in London is so entirely opposed to present opinion, and to the actual experience of the last thirty or forty years, that I apprehend there must be some mistake.

It is, as we know, always dangerous, in scientific matters, to base a general opinion on a single unsupported fact. We are told that stone in Regent-street which was coated with linseed oil fifty years ago is now undecayed. But there are several things to be considered before the oil can be credited with such an excellent, if not wonderful, quality. Even accepting the fact with as much confidence as Mr. Robins does, it must, I think, be taken as the exception that proves the rule; but, if otherwise, it is one of the most valuable discoveries of the century. Nearly the whole of the present annual expenditure of 2,500*l.* for restoring decayed stone at the Houses of Parliament with new insertions, a process finally adopted after the trial and failure of numerous chemical ingredients,—will at once be saved.

And as members of Parliament often trouble the First Commissioner of Works about reducing this vexatious impost, there can scarcely be a doubt that if Mr Robins would, in the public interest, lay his discovery before him, it would be accepted if backed by adequate scientific evidence.

In the meantime, I, for one, must be excused for thinking, as I said before, that there is some mistake. Can it be possible that we have heard nothing before now of a discovery of such national importance, and which, years ago, ended the search of such Nestors in science as Newton, Fuchs, Kuhlmann, Moreau, Szerelmy, and our own nearly successful countryman,—Frederic Ransome? I find that as many as seventeen patents for stone preservation have been taken out in less than twenty years. Various kinds of vegetable, animal, and mineral substances were proposed, amongst them oil, gum, wax, flour, bitumen, blood, and waterglass, were to be used in varying solutions. Many were allowed a test trial by the Government, but they all failed. Not one has secured permanent adoption by the public. Can Mr. Robins succeed with oil, or with wax and gum, when others fail?

In the meantime, buildings constructed with soft, porous, freestones blacken and decay with more or less rapidity. It is as reasonable to expect oil and vinegar to unite as to believe that limestone or sandstone can exist in the presence of an monia, muriatic acid, and a dozen other natural or unnatural enemies floating unseen in the London air. As to better selection of stone, no quarry-owner would permit the best blocks to be picked out by one customer, unless, indeed, he was willing to pay the price of marble. Such a system would soon ruin the good name of the best quarry, and bring the owner or lessee into bankruptcy.

This state of things,—pending some further reliable evidence,—is exceedingly unsatisfactory, if not discreditable, and appears to me to demand from architects, if it be possible, the adoption of such a radical change in the external construction of our more important national buildings of the future, as shall enable them to resist the destructive effects of our abnormal atmosphere.

What this should be is a difficult but very interesting question; but I do not think that terra-cotta, though durable when well burned, would be tolerated for a great national edifice. As you are aware, Mr. Editor, I have my own idea on this subject, and you have allowed me to place its merits or demerits before your readers. It has at least one great advantage, namely, that the evidence in support of it is not only ample but local, and could therefore be easily tested.

I venture to trouble you with this letter, because I do not see that any notice was taken of the statement I refer to in the discussion which followed the reading of Mr. Robins's interesting paper. H. T.

**The Rivers Pollution Act at Reddish.**—The Reddish Local Board having obtained an order from the Local Government Board suspending the Rivers Pollution Act, 1876, have given instructions to Mr. R. Vawser, C.E., Manchester, to prepare a plan for the complete sewerage of the district.

## CHURCH BUILDING NEWS.

*Lincoln.*—The foundation-stone of the tower of St. Swithin's Church, Lincoln, was laid on the 19th ult. by Mr. Alfred Shuttleworth. It is now many years since the church itself was erected, but owing to the fact that the parish is comparatively speaking a poor one, sufficient funds were not forthcoming to warrant the immediate completion of the design. Under these circumstances the chancel and tower were left to be added at a future time. In March, 1879, the Vicar, the Churchwardens, and the parishioners had the satisfaction of seeing the corner-stone of the chancel laid by Mr. N. Clayton, the senior partner of the firm of Clayton & Shuttleworth, through whose generosity that portion of the edifice was principally erected. For the building of the tower the parishioners have to thank Mr. A. Shuttleworth, who will, it is understood, bear the whole cost of the work. The tower and spire, when completed, will form a very important object in the heart of the city, rising, as it will, to a height of 197 ft. above the floor of the church. It will be of three stages, flanked by massive buttresses. In the lower side of the western face there is to be a deeply-recessed doorway, flanked by a blank arch on each side. Over this is to be a three-light window. The second stage is to be arcaded on three sides with loop-lights to the belfry. The upper story will have two windows on each face, well recessed and finished on the outside with crocketed pediments running up into the cornice, the spandrels thus formed being filled with diaper work. Above this the spire will rise to a height of 106 ft. This will have three bands of ornamental diaper work upon it at different heights, and at the corners terminating the buttresses are pinnacles, 32 ft. high, connected with the spire by flying buttresses. On each of the cardinal faces of the spire there will be a lucarne with gabled pediment. Seen from the interior of the church, the lower part of the tower will be enriched with arcade work on the north, west, and south sides, the eastern face being occupied by a noble arch opening into the nave. The material for the interior will be of Ancaster stone; the exterior will be of Lincoln stone with Ancaster dressings, the material from the old church being used in the new building. The plans for the church and spire were prepared by Mr. Jas. Fowler, of Louth, whose architectural efforts adorn so many parishes in the county of Lincoln and elsewhere. The building of the tower is entrusted to Mr. Baines, of Newark, who erected the chancel in 1879. The cost of the present work (5,700*l.*, exclusive of architect's fees) is to be defrayed by Mr. A. Shuttleworth, as before mentioned.

*Blyth-on-Tyne.*—On Tuesday afternoon the foundation stones of the new church of St. Cuthbert, at South Blyth, were laid. The site (given by the lord of the manor, Sir M. W. Ridley, Bart., M.P.) of the new church is west of the old building, and when completed the two buildings will be within one and the same enclosure. There is no record of the old church ever having been consecrated, consequently the vicar intends to devote it to secular purposes. Only part of the new site is at present being built upon, and the church now in course of erection, which will be stone and in the fourteenth century style of architecture, will, when completed, seat about 370 persons, and will cost 3,000*l.* Mr. W. S. Hicks, of Moseley-street, Newcastle, is the architect, and Messrs. E. & J. R. Taylor, of Benfieldside, the contractors for the main portion of the work.

*Littleham.* On the 27th ult. a new reredos was unveiled at the recently-restored church of St. Margaret, at Littleham-cum-Exmouth. It stands upon a polished Devonshire marble super-altar, which has been prepared to receive it. The reredos itself is of dark oak, and has been made from a design of Mr. R. Medley Fulford, of Exeter, the architect under whom the general restoration of the venerable fane was carried out. The reredos is the work of Mr. Harry Hems. The main feature in the reredos in question is the sculptured work. In the centre is a figure of Our Lord as the Redeemer. The reredos consists in the main of seven compartments, three large and four smaller ones. All these contain sculpture. In the centre the gable is surmounted by a tall and handsome foliated cross. The four niches contain statuettes of the four Apostles. On the right hand side of Our Lord is a large panel in which, sculptured in high relief, is a representation of Christ bearing the cross. On the other side is shown in the same way the entombment.

## PROVINCIAL NEWS.

*Manchester.* — On the recommendation of Mr. Henry Shelmerdine, architect, of Liverpool, the tender of Messrs. Robert Neill & Sons, of Manchester, has been accepted by the directors of the Lancashire and Yorkshire Railway Company for the new Exchange Station buildings, hotel, and offices, Tithebarn-street, Liverpool. The amount of the estimate is close upon 100,000*l.* and the work will be proceeded with at once.

*Bolton-le-Moors.*—In the year 1870 the sum of 30,000*l.* was left by the late Mr. Stephen Blair, of Bolton-le-Moors, to build and endow a convalescent hospital near that town, under the condition that if a site were not given or provided within a fixed time the gift would lapse, Mr. Blair not being able legally to leave money for the purchase of land, and the money would go to the family of the testator's brother Mr. Harrison Blair. The trustees are Mr. Harrison Blair, the Rev. Canon Powell, Mr. C. Wolfenden, Mr. Thomas Glaister, Mr. W. Hargreaves, and Mr. J. Hick. Mainly through the exertions of those who would have benefited had the site not been given, a suitable plot of five acres was found, just in time to prevent the legacy becoming void. Mr. Knowles most generously gave the land, a plot pleasantly situated to the north of Bolton, and about half-way between Mr. Greg's house and Bromley-cross station. The land slopes towards the south and west, and the country round about is attractive. Since the year 1870 the money has been well invested, and has greatly increased in amount, so that a larger and more complete hospital, duly endowed, can be erected. The trustees have engaged the services of Messrs. Medland & Henry Taylor as architects. The building, as now designed, is divided into three departments, for men, women, and children, with a central administrative block. The preliminary works of levelling, foundations, and boundary walling have been already let to Messrs. W. Thornton & Sons, and are to be pushed on with as much speed as may be.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—VI.

### ROMANESQUE AND BYZANTINE.

IN the last article the birth of Christ was referred to, but nothing further was mentioned on the subject. But it was reserved for Christianity to give the distinctive colour to the next thread introduced into the web,—introduced, too, a long way back and alongside of the Roman thread before it openly affects the colour of the web; but, having once got a firm hold on the pattern, it has continued to suffuse the whole with its various shades.

For the first three centuries the Christians in Rome were so persecuted that they had to carry on the practice of their religion in catacombs, the subterranean vaults from which it is said the Romans had dug out pozzolana for their mortar; and, considering the quantity of mortar that had been required for the buildings described in the last article, it will be readily seen that these catacombs are very extensive. On their walls may be found members of those symbols expressive of the Christian faith, which are still used in our churches, such as the ☧, &c. (X and P are the first and second Greek letters in the name of Christ (ΧΡΙΣΤΟΣ), and must not be confused with the Roman letters, as was done in a modern stained-glass window representing a Roman standard with the letters XPQR!

In the fourth century the Roman Emperor Constantine established Christianity as the state religion; and we get what Fergusson calls Christianised Roman,—or Romanesque architecture; moreover, he transferred the empire from Rome to Byzantium,—thence called Constantinople after him, which led to what we may call Easternised Roman, or Byzantine architecture. For this reason, these two styles are coupled as the subject of this article.

It now becomes more necessary to "keep one's weather eye open" in order to detect the

various shades that are attributable to Western, *i.e.*, Roman, and Eastern, *i.e.*, Byzantine, influences respectively. At Byzantium, Constantine touched what has been called "the edge of the world: the knot which links together East and West; the centre in which all extremes combine" (Smith & Slater, p. 210). Here he came under the influence of Oriental art (see Freeman's "History of Architecture" on this subject), the elements of which are utterly different from those which he brought with him from Rome. For a time it appears that he gave and left there an impression of Roman work derived from the Pagan temples amongst which he had lived; but within two centuries of his migration to the East, "the East" (or, as Fergusson suggests, on page 945 of his Handbook, the Sassanian style) had migrated into the conception and design of the Christian churches erected by these Roman emperors, of whom Justinian has left us the largest example, namely, the Church of Santa Sophia (or Holy Wisdom). This huge building is illustrated in all the handbooks. Fergusson, who prefers to place his chapter on Byzantine at the very end of his Handbook, p. 943, illustrates this church by a plan at two levels, and a longitudinal section drawn to his usual scale of 100 ft. and 50 ft. to the inch respectively. Smith & Slater's "Classic Architecture" gives a section on p. 212, and Rosengarten gives, in addition, on p. 180, a bird's-eye view illustrating the dome system.

It is in the construction of their domes that the Byzantines differ from the ancient Romans, who simply placed a circular dome on a circular wall, with the one exception pointed out by Fergusson, p. 345, of the Temple of Minerva Medica, where the dome rests on a decagon, or ten-sided, substructure; the change between the two forms being effected by means of *pendentives*. The Byzantines eclipsed this completely by raising a *circular* dome on a *square*, or four-sided, substructure; each side of the square being occupied by an arch.

This subject should be studied from Scott's Academy Lectures, in the excellent and clearly-illustrated chapters on domes and vaults. The student can, however, easily realise the shape of the dome of St. Sophia by peeling a hemisphere of an orange, and cutting four contiguous semicircles out of it. These will represent the four arches, the portion above their crowns will represent the dome, and the remaining triangular portions will represent the four pendentives. It should then be noticed that there is no substructure vertically under any part of the dome, so that Procopius, who witnessed the erection of the St. Sophia, described it "as if suspended by a chain from heaven."

Such a dome is very flat in section, and, both for constructive and æsthetic reasons, the domes were afterwards made steeper, and also raised on drums pierced with windows. Their situation on plan is at the centre of four *equal* arms, constituting the nave, choir, and transept, as distinguished from the *unequal* arms in the Western churches, where the nave is longer than the choir and transept.

There are in the Institute library two copies of Salzenburg's magnificent work, containing drawings of St. Sophia, one of which is in the loan collection, and will well repay the somewhat Herculean labour of carrying it home to study. There are also the following:—Couchand's "Églises Byzantines en Grèce" (one vol. quarto); Lenoir's "Architecture Monastique" (two vols. quarto); Texier & Pullan's "Byzantine Architecture," 1864 (one vol. quarto); F. de Vermeilh's "Architecture Byzantine en France," 1854 (one vol. quarto); De Vogüé's "Syrie Centrale," 1865 (two. vols. quarto); and vol. iii. of the loan collection of the Institute "Transactions," containing a paper by G. J. Wigley, on "Archæological Studies in Jerusalem," 1856; J. L. Petit's "Remarks on Byzantine Churches"; and C. C. Nelson's notes, in 1865, on Salzenburg's work above mentioned; "Early Christian Monuments of Constantinople, Fifth to Twelfth Century," published in 1854 (one vol. folio). There is also Wyatt & Waring's Guide to the Romanesque and Byzantine Court at the Crystal Palace.

The student will soon become familiar with the characteristics of Byzantine buildings, their mosaic decorations and the sharp foliage carving and subsequent surface treatment, which was gradually evolved from Roman work, as pointed out in a most interesting series of examples by Fergusson (see p. 952 of his Handbook).

Commerce carried Byzantine art westward, producing here and there such exceptional buildings as the Church of St. Mark, at Venice, and St. Vitale, at Ravenna (though Fergusson includes this church in his chapter on Romanesque), and further westward still, we find the result of a Venetian colony in France, as evidenced by the Church of St. Front, at Perigeux, almost a copy, in plan, of St. Mark's, at Venice. But the Byzantine influence is shown in many parts of Europe, more in details than in entire buildings, and perhaps more in textile fabrics,—which formed the staple of Eastern commerce,—than in architecture.

It has seemed best to glance at this Eastern branch of Christian architecture first of all, and thus leave the way clear for following the Western or Roman influence, being prepared with knowledge which will enable us to recognise the colour of the Eastern thread which, from time to time, puts in an appearance in many subsequent parts of the web. Sir Gilbert Scott notices what he calls the Greek or Byzantine character of Corinthianesque capitals, illustrated by the Choragic monument of Lysicrates (distinguished from the Roman capitals in the temple of Mars Ultor); by scroll-work at St. Denis, near Paris; by a cornice at St. Denis; by a capital at St. Mark's, at Venice; at St. John's, Constantinople; at St. Front, Perigeux; by the column of Marcion, Constantinople; by carving from St. Germain des Prés, Paris; by the north-west portal of Lincoln Cathedral; and by the enriched shafts of the west portal of Chartres Cathedral ("Academy Lectures," vol. i., p. 80).

When Constantine left Rome, the Christians had crept out of their catacombs, and had, in some cases, announced the fact by building a church over the entrance to their former hiding-place, or over the spot where they had buried a saint or martyr.

Rosengarten, on p. 169 of his Handbook, points to this custom as the origin of the subterranean chapels or crypts so often constructed under the principal altar of subsequent churches.

What form were these emerging Christians to adopt for their above-ground churches? Fergusson, on p. 481 of his Handbook, points out "the remarkable fact connected with the early history of the Christian religion, that neither its founder nor any of his more immediate successors left any specific directions either as to the liturgical forms of worship to be observed by his followers, nor laid down any rules to be observed in the government of the newly established church." This is a point upon which there may be difference of opinion, to judge from the many proofs of a precomposed liturgy given by Wheatley "on the Common Prayer."

Be that as it may, it is generally admitted that the Christians began on the principle of the hermit crab, who establishes himself in some one else's ready-made shell, of course on the understanding that some one else had no further use for it. Thus, the Halls of Justice, or *Basilicas* mentioned in the article on Roman architecture, were found to be very well suited to the requirements of a Christian church. See Fergusson, p. 482. The bishop naturally took the place in the apse previously occupied by the prætor or quæstor, the presbyters those of the assessors. The altar in front of the apse was ready in position and only needed change of purpose, and with a few alterations brought about by the introduction of a choir, provided with two pulpits or *ambones*, and of screens or *cancelli* (from which the word "chancel" is derived), and of a transept which converted the plan into the shape of a *cross*, and sometimes a chancel arch, and generally a *narthex* and *atrium*, or forecourt, we get a series of basilican churches that Fergusson, on p. 485, enumerates as dating from the fourth to the fourteenth century. One of the most beautiful, that of St. Clemente (of which photographs can be easily purchased), exhibits the original choir and ambones and also an arrangement of piers and columns which form a pleasant relief to the usual innumerable arrays of columns (which were a glut in the market when there were so many Pagan buildings to "de-colonnise") that one finds in most basilicas.

These buildings, then, are emphatically Romanesque, or Christianised Roman, and the term may be fairly carried on to describe all those buildings, not only in Rome or Italy, but in many other parts of Europe, in which the chief inspiration of the architecture was Roman, be the forms of the buildings what they might,—and of course they would vary with all the different requirements that had to be fulfilled. A good general notion of the style may be obtained from Gally Knight's somewhat pictorial "Ecclesiastical Architecture in Italy from the time of Constantine to the Fifteenth Century," 1844, two vols., folio; or from Isabelle's "Edifices Circulaires"; or, going further westward to France, from Révoil's "Architecture Romane du Midi de la France," 1873, three vols., folio.

In the next article we shall meet with another element which suffused European architecture long before the Roman element died out, and as fresh threads multiply, the web becomes more and more broken in colour, and we have to look all the more keenly for the predominating tint here and there in order to assign the proper title to the architecture. One peculiarity, however, of the English translation of Rosengarten's "Handbook" should be guarded against, namely, the application of the term Romanesque to all the Christian architecture of Europe down to the Renaissance. In Italy, indeed, Romanesque architecture never died out, but survived in Florence and Pisa throughout the Middle Ages, eager to bloom afresh when the turn of Classic art should come round again. Other countries, however, so entirely threw off all vestige of Roman tradition, construction, ornament, and feeling, that the term Romanesque ceases to be applicable to their architecture.

It may be as well to mention also to beginners that the French word "Romaine," applied to architecture, signifies Roman, and "Romane" signifies Romanesque, while "Romanesque" signifies Romantic.

Smith & Slater carry their illustrations of Romanesque architecture into France and England, giving examples which are also known under the local terms of Saxon and Norman; and Fergusson, on p. 522, remarks upon the very gradual nature of the change, in France, from Romanesque to Gothic, and reserves for his chapter upon "French" architecture, p. 593, the description and illustration of several most decidedly Romanesque buildings, such as the porch of Notre Dame des Doms at Avignon, and the angle of the apse at Alet. His woodcuts are chiefly taken from the following works:—Laborde's "Monumens de la France," Chapuy's "Moyen Age Monumentale," Taylor & Nodier's "Voyages dans l'Ancienne France," Renouvier's "Monumens de Bas Languedoc," and other works.

The features which distinguish the mixed Romanesque style from the purer Romanesque work built in Italy will be pointed out in the next article, which will treat of a thread that put in an appearance from quite a different direction.

## Books.

*Practical Guide to Photography.* London: Marion & Co.

THIS is an amateur's practical guide, giving instruction in a concise form, and will prove very useful to the beginner. There are chapters on the dark-room, development, exposure, defects, optics, portraiture, printing, retouching, &c., as well as on the ferro-prussiate process, now being so much used by architects and engineers. The work is clearly written, but Messrs. Marion do not forget to mention their own goods. We totally disagree with their recommendation of certain instantaneous shutters fixed on the hood of the lens: this is not the proper place for a shutter; it should be either in a similar position to the diaphragm, or in front of the plate, as in Edwards's plan. We should have liked to see the chemical part of the subject treated of. The book contains over 200 pages, and we consider it one of the best handbooks for the novice which has yet appeared. It deals with many subjects which the beginner ought to have an elementary knowledge of, and which otherwise could only be got from more elaborate treatises on the particular subject. Attention is called to the value of photography to the engineer, builder, and architect, and it is stated that photographic reproductions of buildings must always be infinitely more faithful and useful than the most elaborate and laboriously-prepared sketches or drawings. This, we consider, has not yet come to pass; for a good sketch does not distort,—the lens does, and renders the near object larger, and dwarfs the distant; besides which, one sketch educates the mind and eye much more than a dozen photo-

graphs taken. The camera can, however, be made a very useful and pleasant adjunct to the sketch-book.

*The Fisheries of the Adriatic and the Fish thereof.* By G. L. Faber, H.M. Consul, Fiume. London: Bernard Quaritch. Wyman & Sons, Printers.

This is a sumptuous book, bearing the imprimatur of no less an authority than Mr. Albert Günther, which is better evidence of its value than any we could offer.

But we can bear testimony to the exhaustive character of the work, and the beauty of its numerous illustrations, and few could fail to be interested in the many diagrams in plan and elevation of the various picturesque fishing-craft used in the Adriatic, their nets and multitudinous appliances; while the *Cimarol*, or device for the mast-head, acting as a weather-cock, and figured at p. 105, is more wildly and quaintly beautiful than anything which the pencil of Mr. Norman Shaw has produced, and we have always considered vanes and weather-cocks as amongst his strong points. Besides answering its purpose, the *Cimarol* is full of religious symbolism and versatile fancy. The book is an eminently practical one, and not the least interesting parts of it are the chapters on the curing and cooking of the fish described, and the statistics of their capture. Once more we ask, *when* are we to have this wealth of the sea brought to our tables *fresh*, and at a reasonable price? The author predicates that the supply of fish will hereafter be as regular and as abundant in inland towns as the supply of meat. Perhaps. But will it ever be within the means of the poor man? The Fisheries Exhibition was to have done a great deal for us. What *has* it done to increase and cheapen our fish supply?

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*July* 25.—10,564, E. W. Brown, London, Spring Door-locks.—10,580, F. Hocking, Liverpool, Heating the Rooms of Buildings, &c.—10,587, J. E. Tilling, London, Suspending and Working Window-curtains.—10,605, G. D. Peters, London, Spring-rollers for Window-blinds.

*July* 26. -10,621, R. J. Worrall, Liverpool, Brick Walls for all purposes, &c. -10,622, C. G. Tebbutt, Bluntisham, Bricks for Paving Stables and Stable-yards.—10,642, J. C. Cowell, Higher Tranmere, Double-valve Flushing-box and Water-waste Preventer.

*July* 28.—10,662, C. Groombridge, London, Apparatus for Raising and Closing Window-sashes, Shutters, &c.—10,664, T. Purdie, Glasgow, Water-closets.—10,667, W. Clark, Reading, Method of Glazing. 10,678, S. Johnson and R. Freeman, London, Flooring, &c.

*July* 29.—10,687, J. Shanks, Barrhead, Water-closets and Urinals.—10,703, W. B. Shorland, Manchester, Latches.—10,707, J. Wolstenholme, Manchester, Pipe-trench for building purposes.—10,712, E. J. Day, London, Travellers for supporting Window-curtains, &c.—10,717, W. J. Holmes, London, Instantly Syphoning with great velocity for Flushing Closets, &c.—10,731, R. Weaver, London, Water-waste Preventers.—10,742, S. B. Goslin and J. J. Brown, London, Water-closet Apparatus.

*July* 30.—10,751, R. Ash, Hanl worth, Automatic Spring Hinge.—10,754, E. W. Buller, Birmingham, Lock Spindles, and attaching them to Knobs and Handles.—10,759, J. C. Baker, Liverpool, Apparatus for Ventilating.

*July* 31.—10,801, H. T. Owens, Birmingham, Securing Knobs to Spindles for Door Locks and Latches.—10,821, J. Honeyman and W. P. Buchan, Glasgow, Water and Dry Closets.

### SPECIFICATIONS ACCEPTED.†

*July* 29.—8,245, J. A. Turner, Manchester, Wall Papers.

*August* 1.—5,845, E. S. Romilly, London, Chimney-pots.—7,767, T. Frost, Adelaide, Exhaust Ventilators.—9,647, H. H. Lake, London, Ventilating Cowl. Com. by H. L. Day, Minneapolis, U.S.A.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending August 2, 1884.*

5,527, J. H. Reynolds, Troy, U.S.A., Ventilators and Chimney Cowls. Com. by A. J. Robinson, Boston, U.S.A. (Nov. 26, '83, price 6d.)

A dome-shaped plate is placed above the chimney, and another similar but inverted plate is placed below, and a pipe from the chimney rises through the centre of the latter. A hood is fitted round these plates, leaving an annular space round their peripheries and the hood.

5,772, D. R. Clymer, Reading, U.S.A., Construction of Ceilings and Floors of Buildings for facilitating exit therefrom in case of Fire. (Dec. 18, '83, 6d.)

A hole is made in the flooring of each room, and a corresponding hole in the ceiling below, both being fitted with hinged doors, and coiled up between the two is a ladder by which access is granted to the room below.

5,905, E. Edwards, London, Detonating Alarm for Doors, Windows, &c. Com. by H. Gibout, Paris. (Dec. 28, '83, 2d.)

A hammer is pivoted on the door-post, and is held back by a catch on the door. When the door is opened the catch is released, and the hammer falls on the detonating cap of a cartridge placed in a recess in the door-post. (*Pro. Pro.*)

5,931, W. R. Lake, London, Portable Ladder Apparatus to serve as a Fire Escape. Com. by E. Canziani, Milan. (Dec. 29, '83, 2d.)

A series of ladders are arranged and fitted on a portable carriage, and the ladder is erected by joining the several parts together. (*Pro. Pro.*)

* Compiled by Hart & Co., Patent Agents, 166, Fleet-street.

† Open to public inspection for two months from the dates named.

## Miscellanea.

**Arbitrations.**—A Bill has been introduced into the House of Lords by Lord Bramwell for consolidating the general law as to arbitration. It does not deal with special measures of arbitration, such as the Act of George IV. regarding disputes between masters and workmen, or with the special provisions for arbitration contained in many Acts of Parliament, as, for instance, in the Artisans' and Labourers' Dwellings Act or the Land Clauses Consolidation Act. The Bill proposes no change in the law; the utmost that it does is, when there are conflicting decisions, to state the law in accordance with what appears to be the correct view. It is intended, however, by those at whose instance the Bill has been prepared to propose certain changes in Committee. Among these are an abridgment of the power of revoking submissions to arbitration; the simplification of procedure in some respects; the laying down a common form of submission in accordance with the general understanding of men of business, which is to be implied in all references unless the contrary is expressed; the assimilation of the English and Scottish law of arbitration; the enabling an arbitrator to procure the attendance of witnesses out of the High Court's jurisdiction; the alteration of the law as to the liability of executors and administrators who refer; and the simplification of the law as to costs.—*Standard.*

**The Extensions at the Waterloo Railway Station.** The South-Western Railway Company are vigorously carrying out the enlargement of their Waterloo Station, the works in connexion with which have been continuously going forward during the last four or five years. For some time past they have been the owners of a large block of property on the east side of York-road, and extending to the west boundary of the station. Upon this property stand several houses and shops, and other business premises, all of which are at present in course of demolition in order to clear the site for the erection of an extensive block of new offices having their frontage to York-road, the buildings being a continuation of those recently erected on the south side of the York-road approach to the station. They will have a frontage to York-road of upwards of 200 ft. in length. In addition to these buildings the roof of the enlarged station westward for giving increased accommodation for the Windsor traffic is at present in course of construction. The Iron Roof Construction Company are supplying the iron.

**New R. C. Church and Presbytery, Bootle.** On the 20th ult. the foundation-stone of a new church for the Very Rev. Dean Kelly was blessed by Dr. O'Reilly, R.C. bishop of Liverpool. The presbytery has accommodation for four priests, and the church, which is of large proportions, is designed in the style of the Early Decorated period, and built of local red sandstone, the wall-facings being hammer-dressed. It has a spacious nave, aisles, and chancels, with carefully-arranged confessionals, and is 63 ft. wide internally and 152 ft. long. Messrs. Hadfield & Son, of Sheffield, are the architects, and Mr. W. Haworth is acting under them as clerk of the works. Messrs. G. Woods & Son, of Stanley-road, Bootle, are the contractors, their foreman being Mr. Bishop.

**Electrical Propulsion of Tramcars.** We understand that the Ryde (Isle of Wight) Pier company are about to make experiments on the propulsion of their tramcars by electrical energy.—*Electrician.*

**Thames Communications.**—At the last meeting of the Court of Common Council, Mr. F. Green, chairman of the Bridge-house Estates Committee, reported on the reference of the 20th of December last, recommending that a low-level bridge with mechanical openings be erected at Irongate-stairs, at the end of the street known as Little Tower-hill, by the Corporation, out of money to be raised on the credit of the Bridge-house Estates, and that it be referred back to the Committee to obtain and submit a design or designs for such a bridge, together with an estimate of the expense, and for authority to make such inquiries, seek such practical information, and obtain such professional and other assistance as the Committee may think necessary to enable them to form a sound judgment upon the subject, in view of an application being made to Parliament during the present year. Mr. Deputy Fry moved, as an amendment, the omission of the words "with mechanical openings." Mr. Peebles seconded the amendment. After a long debate, the report of the committee was carried by eighty-three votes as against fifty-eight recorded for Mr. Deputy Fry's amendment. Mr. Peebles moved an addition to the report, instructing the committee to publicly advertise for designs and offer premiums, and that three umpires be appointed,—the President of the Institution of Civil Engineers, the President of the Royal Institute of British Architects, and an engineer to be selected by the committee,—to award the premiums, and to advise the committee which design was most suitable for adoption. This amendment was defeated by 81 votes to 40, and, no further amendment being proposed, the report was put and carried. We are informed that in the division which took place upon Mr. Peebles's amendment five of the six architects who are members of the Court were present and took part, viz., Deputy Hammack, Deputy Saunders, and Deputy Taylor, who voted with Mr. Peebles, and Mr. H. H. Bridgman against.

**The Statistical Works of Dr. Farr.**—It has long been the source of much regret amongst students of vital statistics, as well as among those practically interested in this branch of sanitary science, that the valuable statistical work of the late Dr. Farr is, from the form and manner of its publication, not generally available. The Sanitary Institute of Great Britain propose, in these circumstances, to publish a selection from Dr. Farr's official reports, papers, and addresses, and have confided the selection and editing of this memorial of his labours to the capable hands of Mr. Noel A. Humphreys, of the Registrar-General's Office. It is proposed that the volume should consist of not less than 450 pages 8vo., and that it be published at the price of 30s., or, to subscribers, one guinea, provided that the number of subscribers warrants the Institute in incurring the expense of publication. Intending subscribers are requested therefore, to send in their names without delay to the Secretary of the Institute, in order that the Council may be able to determine whether they will obtain sufficient support to justify them in publishing the book.

**Machinery at the Shrewsbury Agricultural Show.**—Referring to the recent show of the Royal Agricultural Society, held at Shrewsbury, Messrs. W. H. Bailey & Co., of the Albion Works, Salford, were exhibitors of a novelty in the shape of a modification of their well-known hot-air engine, of the vertical type, in which an ordinary gas-jet is employed for the purpose of generating the heat necessary for driving the engine, instead of using gas-coke or other fuel. This engine is described as a pumping-engine, and is intended to be employed for the purpose of pumping domestic water supplies. The advantage of this form of pump is that after it is once put into motion it can be left for hours, no stoking being required, whilst the amount of gas consumed varies from 15 ft. to 30 ft. per hour, according to its duty. Messrs. Bailey & Co. also exhibited their ordinary patterns of hot-air engines.

**The Island of Herm.**—We are informed that this property has been sold by private contract by Messrs. Debenham, Tewson, Farmer, & Bridgewater, for about 7,500*l*. The purchaser is a member of a firm of Scotch fish-curers, and it is understood that, in addition to the agricultural and other resources of the island, it is intended to make it a depot for the fish-curing business.

**New Buildings in Wych-street and Holywell-street.**—The demolition of several of the ancient houses in Wych-street and Holywell-street has been quickly followed by the erection of new buildings of modern character. The ground-floor of the Wych-street frontage contains five shops and the Holywell-street frontage six shops. The portions of the buildings are faced with polished Aberdeen granite piers resting on Portland stone bases. Above them are cornices in Bath stone, the upper portions of the frontages being in that material and yellow brick. They contain two floors, with an additional dormer floor set back some distance to the rear of the main cornice. The first and second floors have each ranges of six three-light mullion windows, the central part of the windows having arched heads. Between the windows the frontages are ornamented with fluted and panelled pilasters, carried up to the main cornice. The dormers have alternate arched and pediment heads. The upper floors are intended to be let as offices, the entrance being in Holywell-street. Messrs. Francis & Sons, of Old Broad-street, are the architects, and Mr. Richard Condor, of Ball's Pond, the contractor. Mr. C. Chandler is foreman of the works.

**The Re-Building of Garden-court.**—The rebuilding of the chambers on the west side of Garden-court, in the Temple, which was recently taken down, and which included the apartments at one time occupied by Goldsmith, will very shortly be commenced. The necessary excavations preparatory to getting in the foundations, are now in progress, and the superstructure is expected to be proceeded with in about a month from the present time. The buildings will be erected from the designs of Mr. St. Aubyn, architect to the Honourable Society of the Middle Temple, Messrs. Patman & Fotheringham being the contractors.

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Public Baths | Corporation of Stockport | £50, £30, £20 | OCTOBER 1st | ii. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Pipe-laying | Corporation of Burton-upon-Trent | James Mansergh | August 11th | ii. |
| Broken Granite | Willesden Local Board | O. Claude Robson | August 12th | xv. |
| Coastguard Buildings, near Weymouth | Admiralty | *Official* | do. | ii. |
| Road Metal | Cor. of Rochester | | do. | ii. |
| Iron Galleries, Infirmary | Guardns of St. Leonard, Shoreditch | J. Wallace Peggs | August 13th | ii. |
| Sanitary Hospital | Bournemouth Comisnrs | G. R. Andrews | August 16th | ii. |
| Sewerage | Dorking Local Board | Smith & Austin | August 18th | ii. |
| Venetian Blinds | Grdns of Croydn Union | | do. | ii. |
| Making-up Roads | Hornsey Local Board | T. de Courcy Meade, C.E. | do. | xv. |
| Additional Schoolrooms, &c. | Grays Thurrock Sch Bd | E. Clerk Allam | do. | xv. |
| Broken Granite | Brentford Local Board | — Lacey | August 19th | xv. |
| New Brewery, Vauxhall | Barrett's Screw-Stopper Bottling Co., Lim. | H. Stopes & Co. | August 20th | xv. |
| Painting Workhouse | Guardns of St. Leonard, Shoreditch | Lee & Smith | do. | ii. |
| Relief, &c., Offices, Longton | Stoke-on-Trent Guard. | F. E. Scrivener | do. | ii. |
| Painting, Nerley Hospital | War Department | *Retail* | August 21st | ii. |
| Iron Staircases | Guardians of St. Mary, Islington | Wm. Smith | do. | ii |
| Sea Wall, East Cowes | Admiralty | *Official* | August 22nd | ii. |
| Farm Buildings, &c. | Corporation of Walsall | do. | August 23rd | ii. |
| Enlargement of Gas Works, Darenth Asylum | Met. Asylums Board | A. & C. Harston | August 25th | xv. |
| Fire-Escape Bridges | Guardns of St. George's Union | H Saxon Snell | do. | ii. |
| Press-House, &c., for treatment of Sewage | Wimbledon Local Bd | *Official* | August 26th | xv. |
| Repairs, &c., Public Buildings | Commissioners of Wks | do | August 28th | ii. |
| New Road and Sewer, Wood Green | Not stated | Sextus Dyball | Not stated | xv. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Curator, Art Museum | Cor. of Manchester | August 11th | £[illegible] | xvi. |
| Surveyor | Wigmore Highway Bd. | August 14th | £[illegible] | xvi. |
| Clerk of Works | Grdns of Bromsgrve Un. | August 15th | Not stated | xvi. |

## TENDERS.

For rebuilding the Ship and Turtle Tavern, Leadenhall-street, for Messrs. C. & A. Painter. Mr. Geo. Sparks, 8, Great St. Helen's, architect Quantities by Mr. Henry J. Treadwell, 5, Agar-street, Strand :—

| | |
|---|---|
| T. Little | £21,280 0 0 |
| J. J. Sargeant | 21,200 0 0 |
| T. Boyce | 20,850 0 0 |
| Ashby Bros. | 20,366 0 0 |
| Scrivener & Co. | 20,365 0 0 |
| Colls & Son | 20,270 0 0 |
| E. Conder | 20,159 0 0 |
| Perry & Co. | 19,886 0 0 |
| Ashby & Horner | 19,885 0 0 |
| Rider & Son | 19,868 0 0 |
| W. Brass | 19,373 0 0 |
| J. Morter | 19,198 0. 0 |
| J. T. Chappell | 18,162 0 0 |

For the erection of new Town-hall, Gosport, for the Town-hall Committee acting on behalf of the Local Board, Guardians, Overseers, and the Thorngate Trustees. Messrs. Davis & Emanuel, architects, 2, Finsbury-circus, City. Quantities supplied by Mr. H. P. Foster, 5, John-street, Adelphi :—

| | |
|---|---|
| W. Hill & Co., Gosport | £9,564 0 0 |
| Foster & Dicksee, Rugby | 9,555 0 0 |
| G. Burbidge, Southsea | 9,363 0 0 |
| J. Barton, Ryde | 9,070 0 0 |
| W. R. & C. Light, Portsmouth | 8,959 8 6 |
| W. Lowe, Gosport | 8,788 4 10 |
| J. Crook, Southampton | 8,327 12 0 |
| D. W. Lewis, Southsea (accepted) | 7,996 11 4 |

For cottage residence at Teddington, for Mr. G. H. Harrison. Mr. George A. Dunnage, architect, 5, John-street, Adelphi :—

| | |
|---|---|
| J. & P. Hermon, 21, King-street, St. James's (accepted) | £1,727 0 0 |

For rebuilding and alteration of premises, Little Park-street, for the Guardians of the Coventry Union. Mr. T. W. Whitley, architect, Bank-chambers, Coventry :—

| | |
|---|---|
| T. Mayo & Son, Coventry | £640 0 0 |
| J. Worwood, Coventry | 627 0 0 |
| G. Brittain, Coventry | 613 0 0 |
| Lester & Wincote, Coventry | 608 12 0 |
| J. Makepeace, Coventry | 574 0 0 |
| C. Garlick, Coventry (accepted) | 540 0 0 |

For completion of premises, Rective-buildings, Ducksfoot-lane, for Mr. E. H. Thompson. Mr. J. W. Brooker, architect, 13, Railway Approach, London Bridge :—

| | |
|---|---|
| J. Beale (accepted) | £980 0 0 |

For rebuilding premises, Finsbury, for Finsbury Estates Company (Limited). Mr. J. W. Brooker, architect :—

| | |
|---|---|
| Hall, Beddall, & Co. | £15,939 0 0 |
| W. Brass | 15,750 0 0 |
| Perry & Co. | 15,659 0 0 |
| Morter | 15,223 0 0 |
| Lawrence | 15,141 0 0 |
| Scrivener & Co. | 14,973 0 0 |
| Wm. Downs (accepted) | 14,967 0 0 |

For erecting the internal fittings to the Green Man and Still public-house, Upper Whitecross-street, for Mr. E. Cain. Mr. J. W. Brooker, architect :—

| | |
|---|---|
| Hewlett | £439 0 0 |
| A. Thomas | 269 0 0 |
| W. & F. Croaker | 267 0 0 |
| J. Beale (accepted) | 260 0 0 |

For alterations and additions to the Limes, Warwick-road, New Barnet, for Mr. G. Page. Mr. J. W. Brooker, architect :—

| | |
|---|---|
| W. James | £325 0 0 |
| T. Butcher | 302 0 0 |
| G. J. Kick (accepted) | 256 0 0 |

For the restoration of Highfield House, Catford Bridge-Kent, partially destroyed by fire, for Mr. Alderman White, head. Mr. Josiah Houle, F.R.I.B.A., architect, 71, Guildford-street, W.C. :—

| | |
|---|---|
| Jerrard | £3,164 0 0 |
| Macey & Son | 3,039 0 0 |
| Kearley | 2,658 0 0 |
| Spencer & Co. | 2,645 0 0 |

For four houses and shop at Grassmoor, near Chesterfield (exclusive of bricks, which will be supplied by the proprietors), for the executors of the late Mr. C. Oxley. Mr. S. T. Rudge, architect, Hucknall, near Mansfield. Quantities supplied by Messrs. Rudge & Sharpe :—

| | |
|---|---|
| Farnsworth & Son, Crumford | £610 0 0 |
| Thos. Maulin, Chesterfield | 608 13 0 |
| Wheeldon Bros., Belper (too late) | 580 0 0 |
| C. Marsden, Brampton | 558 17 0 |
| D. Brown, Haslan | 549 0 0 |
| E. Heath, Hasland | 540 16 4 |
| D. Jowett, Grassmoor | 517 17 0 |
| R. Dennis, Kirkby Folly | 514 0 0 |
| C. Hays, Clay Cross | 511 10 0 |
| H. Shaw, Sutton-in-Ashfield | 505 9 9 |
| E. Tinkler, Clay Cross | 498 0 0 |
| Roe & Son, Alfreton | 496 10 6 |
| Wilson & Wain, Pilsley | 469 15 0 |
| Revill & Holmes, Grassmoor* | 433 2 0 |

* Accepted.

For new house, for Mr. W. H. Manser, Newmarket. Mr. John Flatman, architect, Newmarket :—

| | |
|---|---|
| Edwards | £1,645 0 0 |
| Simpson & Sons | 1,489 0 0 |
| Hook & Tebbitt | 1,393 0 0 |
| Saint & Sons | 1,360 0 0 |
| Kerridge & Shaw | 1,247 0 0 |
| Denson (accepted) | 1,200 0 0 |

For painting, &c., Settles-street Schools, for the School Board for London :—

| | |
|---|---|
| E. J. Coombe, St. George's | £257 0 0 |

For painting, &c., Farncombe-street Schools, Bermondsey :—

| | |
|---|---|
| E. J. Coombe | £259 0 0 |

For stabling, &c., at The Vale, Sydenham, for Mr. T. B. Muggeridge. Mr. Geo. Loe, architect :—

| | |
|---|---|
| Eustace | £1,006 0 0 |
| Jarrett | 990 0 0 |
| Holloway | 980 0 0 |
| Oliver | 935 0 0 |
| Marriage (accepted) | 878 0 0 |

For additions to Brighton-road Schools, for the Croydon School Board. Mr. Robt. Ridge (Surveyor to the Board), architect :—

| | |
|---|---|
| Marriage, revised estimate (accepted) | £3,540 0 0 |

For painting, &c., at the Workhouse Schools, Hornsey-road, for the Guardians of the Poor of St. Mary, Islington. Mr. William Smith, architect, 1, Gresham-buildings :—

| | |
|---|---|
| Grosvenor | £650 0 0 |
| King | 182 0 0 |
| Rice Bros. | 547 0 0 |
| Austin | 630 0 0 |
| Peckford | 478 10 0 |
| Wood | 442 0 0 |
| Olds Bros. | 395 0 0 |
| Lake & Son | 374 0 0 |
| Burgess | 367 0 0 |
| Kelly & Son | 350 0 0 |
| Travis & Son | 344 0 0 |
| Hewett | 319 0 0 |
| Stevens Bros. | 313 0 0 |
| Woods | 310 0 0 |
| Tellbrook | 305 0 0 |
| Harper | 312 0 0 |
| Richards | 300 0 0 |
| Sharpe | 300 0 0 |
| Thompson | 287 2 0 |
| Crowne Bros. | 285 10 0 |
| Hobbs & Son | 272 10 0 |
| Collins | 248 0 0 |

For alterations and additions to 43, Green-street, Parklane, for Mr. D. W. C. Hood, M.D. Mr. George A. Dunnage, architect. Quantities by Mr. C. L. Cadney, 57, Moorgate-street :—

| | |
|---|---|
| Binder & Co. | £1,099 10 6 |
| W. & E. Curtis | 963 18 0 |
| J. & P. Hermon* | 926 0 0 |

* Accepted subject to certain reductions.

For alterations and additions to shop, 206, Upper street, Islington, for Mr. L. Siegenberg. Mr. Geo. M'Donell, architect, 2, Arundel-square :—

| | |
|---|---|
| Chant | £730 0 0 |
| Goodman (accepted) | 700 0 0 |

For laying down a 6-in. fire main and fitting up hydrants at the Workhouse Schools, Hornsey road for the Guardians of the Poor of St. Mary, Islington. Mr. William Smith, architect, 1, Gresham-buildings :—

| | |
|---|---|
| Jeakes | £242 5 0 |
| Merryweather | 230 0 0 |
| Stidder | 215 0 0 |
| Shand, Mason, & Co. | 195 0 0 |
| Simpson | 139 18 0 |

For the erection of new school buildings, with master's house, in the Enborne road, for the Governors of St. Bartholomew's Grammar School, Newbury. Mr. J. P. Power, architect, Basinghall-street, London. Quantities by Messrs. Batstone Bros. :—

| | A. |
|---|---|
| B. E. Nightingale, London | £8,178 0 0 ... — |
| T. L. Green, London | 7,795 0 0 ... 650 |
| E. James, Newbury | 7,337 10 0 ... — |
| Harris & Wardrop, London | 7,274 0 0 ... 50 |
| Silver, Sons, & Filewood, Maidenhead | 7,215 0 0 ... 52 |
| S. Elliott, Newbury | 7,170 0 0 ... 63 |
| J. Crook, Southampton | 7,147 0 0 ... 17 |
| Stephens & Bastow, London | 6,999 0 0 ... — |
| W. H. Simmonds, Reading | 6,983 0 0 ... 45 |
| H. J. Sanders, Southampton | 6,883 0 0 ... 50 |
| C. Claridge, Banbury | 6,756 0 0 ... 30 |
| Bull, Sons, & Co. (Limited), Southampton* | 6,581 0 0 ... — |

A. Allow if stone te quarry-worked.

* Accepted conditionally.

For the erection of new buildings, consisting of cart-shed, stores, walls, &c., at the parish yard, Wandsworth-road, Clapham :—

| | | | |
|---|---|---|---|
| Stewart | £840 | 0 | 0 |
| Curnick & Sons | 795 | 0 | 0 |
| Dickeson | 788 | 0 | 0 |
| Garratt & Son | 770 | 4 | 0 |
| Leylands Bros. | 740 | 5 | 0 |
| Turtle & Appleton | 715 | 0 | 0 |
| Vickery | 696 | 10 | 0 |
| Priestley | 685 | 0 | 0 |
| Jewell | 660 | 0 | 0 |
| Cooke & Co | 635 | 0 | 0 |
| Hunt | 635 | 0 | 0 |
| Aldridge & Jenvy | 630 | 0 | 0 |
| Feltham Bros. | 625 | 0 | 0 |
| J. Holloway | 595 | 0 | 0 |
| Howard | 594 | 6 | 0 |

[Surveyor's estimate, £631]

For forming a new road between Cold Harbour and Bridge-road, Poplar, to be called Managers' street, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied :—

| | | | |
|---|---|---|---|
| Adams, Hackney | £495 | 0 | 0 |
| Victoria Stone Company | 471 | 0 | 0 |
| Rutty, Bromley | 440 | 0 | 0 |
| Mowlem & Co. | 434 | 0 | 0 |
| Nowell & Robson | 425 | 0 | 6 |
| Beadel Bros., Erith (accepted) | 356 | 0 | 0 |

For enlargement of lecture-hall, Market-street, Clay Cross :—

| | | | |
|---|---|---|---|
| C. W. Hays | £166 | 15 | 6 |
| E. Tickler (accepted) | 151 | 0 | 0 |

For the erection of a block of three small cottages at Crouchfield, Hemel Hempstead, for Mr. Thos. Doust, jun. Mr. W. A. Fisher, architect and surveyor, Hemel Hempstead :—

| | | | |
|---|---|---|---|
| Lear, Piccott's End | £840 | 0 | 0 |
| Flint, Hemel Hempstead | 574 | 19 | 6 |
| Horn, Hemel Hempstead | 525 | 10 | 0 |
| Mork, Two Waters (accepted) | 486 | 0 | 0 |

For new premises at Lavender-hill, Clapham, for Messrs. Arding & Hobbs. Messrs. Tolley & Son, architects :—

| | | | |
|---|---|---|---|
| Marriage (accepted) | £9,000 | 0 | 0 |

For additions to Belle Vue, Sydenham hill, for Mr. W. A. Little. Messrs. Tolley & Son, architects

| | | | |
|---|---|---|---|
| Marriage | £780 | 0 | 0 |
| Falkner | 675 | 0 | 0 |
| Kemp | 670 | 0 | 0 |
| Roberts (accepted) | 646 | 0 | 0 |

For engineers' work at the new dining-hall, for the Guardians of Hackney Union. Messrs. Lee & Smith, architects. Quantities by Mr. Walter Barnett :—

| | | | |
|---|---|---|---|
| Newton, Chambers, & Co. | £12,092 | 0 | 0! |
| Thos. Horn & Son | 9,908 | 0 | 0 |
| C. Jeakes & Co. | 9,150 | 0 | 0 |
| Wm. Benham | 8,750 | 0 | 0 |
| J. Richmond | 7,880 | 0 | 0 |
| J. & F. May | 6,768 | 0 | 0 |
| Fraser & Fraser (accepted) | 6,580 | 0 | 0! |

For foundations and basement on the Winchester Estate, Old Broad-street. Mr. F. T. Pilkington, architect. Quantities by Mr. W. Barnett :—

| | | | |
|---|---|---|---|
| T. Boyce | £5,030 | 0 | 0 |
| G. Shaw | 5,006 | 0 | 0 |
| J. Grover | 5,850 | 0 | 0 |
| W. Shurmur | 5,830 | 0 | 0 |
| Reading | 5,821 | 0 | 0 |
| Higgs & Hill | 5,690 | 0 | 0 |
| J. Mowlem | 5,639 | 0 | 0 |
| J. Morter | 5,444 | 0 | 0 |
| Stimpson | 5,240 | 0 | 0 |
| W. Brass | 4,973 | 0 | 0 |

For heating workshops, Manchester, with their "small tube" regenerated hot-water apparatus :—

| | | | |
|---|---|---|---|
| John King (Limited), Liverpool* | £983 | 0 | 0 |

* Accepted.

For extension of premises at 128, Goswell-road, for Messrs. Carter, Paterson, & Co., under the superintendence of Mr. William Eve, 10, Union-court :—

| | | | |
|---|---|---|---|
| Lawrence | £4,590 | 0 | 0 |
| Downs | 4,533 | 0 | 0 |
| Bangs | 4,494 | 0 | 0 |
| Morter | 4,465 | 0 | 0 |
| Harris & Wardrop | 4,440 | 0 | 0 |
| Higgs | 4,290 | 0 | 0 |
| D. D. & A. Brown (accepted) | 4,199 | 0 | 0 |
| Perry & Co. (error, tender withdrawn) | 4,135 | 0 | 0 |

For the construction of the requisite works in laying and completing about three miles and a half of Birmingham Corporation Tramways, in Parade, Sand Pits, Summer-hill, Spring-hill, and Dudley road, to the Borough boundary

J. Biggs, 3, Villa-road, Handsworth (accepted), at schedule of prices.

For alterations and additions to St. Paul's Church, Knowbury, Salop. Mr. Edward Turner, architect, Bowling-green-street, Leicester. Quantities supplied :—

| | | | |
|---|---|---|---|
| Thrall & Payne, Leicester | £1,756 | 0 | 0 |
| J. Grosvenor, Ludlow | 1,690 | 0 | 0 |

For alterations and additions to premises, Nursery-road, Reading, for Mrs. Venner. Mr. Joseph Greenaway, architect, 19, Duke-street, Reading :—

| | | | |
|---|---|---|---|
| Simmonds | £164 | 0 | 0 |
| Poffley | 161 | 0 | 0 |
| Goodchild | 149 | 6 | 0 |
| Hawkins | 135 | 0 | 0 |

For alterations, &c., to the George and Dragon public-house, Hackney-road, for Messrs. Francis & Co. Messrs. Bird & Walters, architects :—

| | | | |
|---|---|---|---|
| Mower | £225 | 0 | 0 |
| Shurmur | 222 | 0 | 0 |
| Jackson & Todd | 220 | 0 | 0 |
| J. Anley | 215 | 0 | 0 |

*Alterations and additions at 13, Orsington-grove.*—Messrs. Scharien & Williams's tender in this list should have been stated as amounting to 1,723*l.*, not 1,783*l.* We inserted the list as sent.

*New Methodist Free Church, Peckham.*—The lowest tender for this work was that of Messrs. J. Allen & Sons, not T. Allen, as printed last week. Correspondents should be more exact in giving particulars, and more distinct in their handwriting.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

T. L. B.—H. H.—E. P.—R. A. B.—G. H. B.

All communications regarding literary or artistic matters should be addressed to THE EDITOR: all communications relating to advertisements and the publishing business should be addressed to THE PUBLISHER and not to the Editor.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters requiring answers should have stamps inclosing them for that purpose, otherwise they are NOT DESIRED.

## PUBLISHER'S NOTICES.

THE INDEX and TITLE PAGE for Volume XLVI. (January to June, 1884) were given as a Supplement with the Number for July 12.

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

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COLLINGE'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS,
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DISCOUNT TO BUILDERS. LONDON, S.E.

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LIVERPOOL: *6 and 8, HATTON GARDEN.*
GLASGOW: *335, ARGYLE STREET.*

# The Builder.

Vol. XLVII. No. 2167. Saturday, August 16, 1884.


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### *The Main Drainage of the Metropolis.*

IT appears from the historical sketch prefixed to the report of the Royal Commission on Metropolitan Sewage Discharge, that the subject of the drainage of surface-water had attracted the attention of the British Legislature at an early period. As far back as the reign of Henry III., and subsequently, in the reigns of Henry VI., Henry VII., and Henry VIII., laws were made regulating the conditions under which works for this purpose were to be executed. These Acts were, however, of a local character, and the first general Act was the Bill of Sewers which was passed in 1531, in the 23rd year of the reign of Henry VIII. This Act was continued, amended, and explained from time to time.

At the present moment, when public attention is being afresh directed to this momentous question, it may be useful to summarise briefly the main points in the modern history of London drainage.

In the year 1732 the river Fleet, which had been a navigable stream, and which conveyed the surface drainage of a considerable area of London to the Thames, was covered in and converted into a main sewer below Holborn. About the same time the Ranelagh sewer and King's Scholars' pond, which were formerly open ditches, were also closed in.

At the commencement of the present century it was penal to discharge sewage or other offensive matter into the sewers which were intended for surface drainage only. The sewage of the metropolis was collected into cesspools, which were emptied from time to time, and their contents conveyed into the country for application to the land.

About the year 1810 water-closets were introduced, which originally discharged into cesspools, but eventually overflow drains from the cesspools were formed, delivering into the sewers, whence the sewage was discharged into the Thames. In the course of time this practice polluted the river to such a degree that it became evident that some remedy was imperatively required, and many schemes were suggested for the purpose. As early as the year 1834 Mr. John Martin, the painter of "Belshazzar's Vision," the "Plains of Heaven," and other extraordinary pictures, proposed a scheme for intercepting the sewage in combination with a grand scheme for the embankment of the Thames. This scheme was rejected at the time as being of too costly a character, but was eventually carried out, only about twenty years after it was first proposed, by the Metropolitan Board of Works.

Some ten years later, namely in 1845, Mr. Thomas Wicksteed renewed Martin's proposal, but suggested carrying the sewage to Barking Creek, on the north side of the river, and to Greenwich Marshes on the south side of the river, with the additional provision of deodorising the sewage before its discharge by means of chemicals.

In 1846 a company was established by Act of Parliament for the purpose of collecting the sewage from some of the principal metropolitan sewers and utilising it by applying the sewage to agricultural land. The attempt was, however, unsuccessful, and the project was soon afterwards abandoned.

The drainage of the metropolis was at that time under the charge of eight separate authorities, or, as they were then called, Commissioners of Sewers, each exercising independent jurisdiction within its own district. These bodies were abolished in 1848, and a royal warrant issued appointing a fresh Commission, consisting of twelve members for London outside the walls, and five *ex-officio* members for the City proper. This body was superseded by a further Commission appointed in 1849. The new Commission determined that the sewage should be kept out of the river altogether, and instructed their consulting engineer to prepare a scheme by which the sewers were to be made to deliver into large tanks, whence the sewage could be pumped and conveyed to the land outside the metropolis. A rival plan was proposed for intercepting the sewage and discharging it into the river beyond the metropolitan boundary.

A public competition was advertised for the best plan of dealing with the sewage, and 116 designs were sent in. The Commission were unable to decide on the designs submitted, and eventually the Commissioners resigned, and were succeeded by a third Commission, who reported on the 8th of March, 1850, that none of the designs sent in could be recommended for execution. The Commissioners eventually instructed Mr. Frank Forster, who had been an assistant of Robert Stephenson, to prepare a scheme for the main drainage of the metropolis, taking advantage of the various plans which had been suggested for that purpose. Mr. Forster accordingly prepared designs for the main drainage of the south side, with the assistance of two other officers of the Commission, one of whom, Mr. John Grant, is now Assistant Engineer of the Metropolitan Board, and the other, Mr. Cresy, was for some time in the receipt of a retiring allowance from the same body. By this scheme it was proposed to form one main intercepting sewer, with a pumping station on the banks of the Ravensbourne river, and a second station in Woolwich Marshes. The sewage was proposed to be discharged into the Thames at the upper end of Woolwich Reach.

Mr. Forster prepared a further report on the drainage of the northern part of London, in the preparation of which he was assisted by Mr. William Haywood, the engineer to the City Commissioners of Sewers. This report was dated the 30th of January, 1851, and proposed to intercept the sewage by two main conduits converging on the east bank of the River Lea, where a pumping-station was to be erected. Thence the sewage was to be conveyed to Galleon's Reach, and discharged at high tide. The estimated cost of this scheme was a million and a half, exclusive of the cost of the acquisition of the land and compensation.

The third Commission having no funds at command to carry out the schemes proposed, was in its turn superseded, and a fourth Commission was appointed in 1852, which renewed the consideration of Mr. Forster's plans. Mr. Forster's health gave way; he resigned his position, and soon afterwards died. This Commission was succeeded by a fifth, appointed in the latter part of the year 1852, which had for some time under consideration a plan promoted by a private company, which was rejected by the House of Commons in 1853. Immediately after the failure of this project, the engineer to the Commission, Mr. (now Sir Joseph) Bazalgette, was instructed to prepare, in conjunction with Mr. Haywood, a scheme for the drainage of the north side of the Thames, taking for a basis the scheme proposed by Mr. Forster. This was done, and their plans were submitted and approved by the Commissioners in the early part of 1854. A serious difference of opinion took place between the Home Secretary and the Commissioners, the Home Secretary advocating the separation of the surface-water from the sewage, in consequence of which the Commissioners resigned. In 1854 a fifth Commission was appointed, partly nominated by the Government and partly by election. They invited fresh plans, but little progress was made with the question. The condition of the river, in consequence of the abolition of cesspools, and the substitution of water carriage, became worse and worse, and

the Government, recognising the impotency of mere Commissions to cope with the evil, resolved to create a new representative body, to whom the task of purifying the river should be confided. A Bill was accordingly introduced into Parliament constituting the Metropolitan Board of Works, which received the Royal assent on the 16th of August, 1855, and came into operation on the 1st of January, 1856. The chief duty of the Board, as defined by the Act, is the construction of "such sewers and works as they may think necessary for preventing all or any part of the sewage within the metropolis from flowing or passing into the river Thames in or near the Metropolis." By the 136th Section any plan for the disposal of the sewage is to be approved by the Government Board of Works. In accordance with this proviso a plan, prepared by the Engineer to the Metropolitan Board, was submitted to Sir Benjamin Hall, the First Commissioner of Works, as early as the 3rd of June, 1856, or very nearly within six months of the date when the Act of Parliament came into operation. This plan was objected to by the First Commissioner of Works, and a second plan, showing the outfalls removed two or three miles lower down the river, was afterwards submitted for approval.

This plan was also vetoed, on the ground that the position of the proposed outfalls would allow the sewage to return into the metropolitan area. The two plans submitted by the Board were considered by the First Commissioner to be wholly at variance with the spirit and intent of the Act and the intention of the Legislature. In the meantime the First Commissioner consulted Captain Burstal as to the nearest point at which the sewage might be discharged into the river without the possibility of its flowing back into the metropolis. Captain Burstal advised that the nearest point at which the outfall should be formed was the upper part of Erith Reach, nearly opposite Rainham Creek, on the south side, and at Rainham Creek on the north side. The Board adopted this recommendation, and forwarded a third scheme embodying the alteration in the position of the outfalls suggested. The First Commissioner resolved about this time to appoint an independent Board of professional advisers to report upon the whole question of metropolitan drainage, including the means for utilising the sewage, a strong feeling having been expressed by some members of the Board that sewage might be made a source of profit.

The referees so appointed, consisting of Captain Douglas Galton, Mr. James Simpson, and Mr. T. E. Blackwell, having collected information from a variety of sources, and examined a number of schemes which were submitted to them, presented, in July, 1857, a report, in which they expressed a strong opinion that the plan proposed by the Board was insufficient, insomuch as it did not provide for the removal of a sufficient quantity of sewage from the metropolitan district, including the prospective increase in the population of such district, and that the provision for the removal of storm-water during rain was not carried to the extent necessary to prevent the pollution of the river. Subsequent events have justified the apprehensions entertained by the referees, it having been recently found necessary to supplement the system of sewerage originally laid down by the Board at an estimated cost of about a million and a half.

As regards the disposal of the sewage the referees reported that they considered that the best mode of dealing with it would be to discharge it in such a manner that it will be rapidly and certainly mixed with large volumes of water and be finally carried to the sea. The points selected for the outfalls were one on the north side of the river very near Mucking Lighthouse in Sea Reach, and the other on the south side at Higham Creek near the Lower Hope. The referees proposed that the sewage should be carried to these points by a main channel on each side of the river, delivering at low water; that on the north side would have been about twenty miles long, and that on the south side about sixteen miles and a half long, measuring from the boundary of the metropolis. It was not at first proposed to cover these channels except where they passed through populous neighbourhoods, or where they were formed in tunnels underground.

The Metropolitan Board objected to the scheme suggested by the referees, the main grounds of objection being the locality of the outfalls and the length of the long outfall sewers leading thereto. A conference took place between the various parties interested at the office of the First Commissioner, in the course of which a question was asked, as to whether the Government would defray the cost of carrying the outfalls to Sea Reach; but to this there was no favourable reply. The vestries about this time, true to the eternal spirit of Vestrydom, urged the Board not to assent to any scheme for carrying the sewage beyond a point that would satisfy the requirements of the statute, and on the 16th of November the Board passed a resolution affirming the principle that it would be unjust to the ratepayers to extend the outfall to Sea Reach, and that to do so would be a contravention of the intention of the Legislature.

In November, 1857, the Metropolitan Board referred the various reports that had been submitted to their engineer, with whom were associated Mr. Hawksley and Mr. Bidder, with instructions to report as to the best means of carrying out the main drainage of the metropolis, with an estimate of carrying the sewage to Erith Reach and Sea Reach respectively. On the 6th of August, 1858, Mr. Bazalgette and his coadjutors made their report, which was of a very exhaustive character, and virtually settled the system which was ultimately carried out. The consideration of this report was delayed for some time, and in the meanwhile a change of Government took place, and Sir B. Hall was succeeded by Lord John Manners as First Commissioner of Works. Sir Benjamin Hall being in opposition, was able to take a more liberal view of the duties of the Government with regard to the drainage of London, and expressed an opinion that the time had come when the Government should take the matter into their own hands, the work being of too great a magnitude to be undertaken by the local authority. Stimulated by a prospect of Government interference, the Metropolitan Board passed a resolution approving of the main features of their Engineer's report, and appointed a deputation from their body to explain the scheme to the new First Commissioner, and to point out to him the difficulties with which the Board had to contend, from the fact that their designs were required to be approved by the Government. The representations of the Board were effectual, and a Bill was introduced to relieve the Board from the necessity of obtaining the sanction of the Government to their scheme for the drainage of the metropolis, which became law on the 2nd of August, 1858. The Board were further empowered to borrow money to the extent of three millions, and the time for executing the works was extended to the end of 1863. It appears from the debates upon the Bill that it was felt that the scheme proposed by the Board for the disposal of the sewage was not final, and that it might be necessary eventually to carry the sewage to the sea; but it was clearly seen that the construction of intercepting sewers was a necessary preliminary to the carrying out of any system of main drainage, and that the decision as to the distance of the outfalls from the metropolis might be postponed for a time.

Immediately after the passing of the Act the Metropolitan Board took the matter earnestly in hand; the drawings were speedily completed, and contracts entered into for the construction of the works, which by the year 1863 were sufficiently completed to allow of temporary arrangements being made for the discharge of a portion of the northern sewage at Barking. The northern and southern outfalls were completed in 1864. In 1865 the great drainage system was declared open by the Prince of Wales on the 4th of April in that year. The north low-level sewer was not completed until the year 1875, this portion of the work having been delayed by the construction of the Thames Embankment, of which it formed part.

In 1881 it was found necessary to enlarge the drainage system by the addition of relief sewers in the low-lying districts, the estimated cost of the works being one million and a half. It was also resolved to increase the capacity of the reservoirs at Barking and Crossness outfalls, to about 50 per cent. beyond their original size, at an estimate of about 160,000*l*. These works are at present in progress.

The estimate of the cost of the works, as recommended in Sir Joseph Bazalgette's report of 1858, was 2,300,000*l*., and the further cost of carrying the sewage to Erith was estimated at 350,000*l*., making a total of two millions and three quarters, while the cost of extending the outfall to Sea Reach was estimated at 2,950,000*l*., making a total of five millions and a quarter. The total amount expended by the Board on main drainage and main sewers, up to the end of 1883, was 5,939,056*l*., or very nearly six millions of money.

Such is the story of "penny-wise, pound-foolish," for which we are now suffering payment, literally, through the nose, besides being threatened with "what worse remains behind."

## THE WAR OFFICE AND ADMIRALTY COMPETITION DESIGNS.*

RESUMING our remarks on the selected designs, we observe that Messrs. Maxwell & Tuke take no notice of the Horse Guards building. They divide up the whole front, emphasising the centre with projecting blocks which mark the lines of building beyond, and which form lofty square towers crowned with octagon towers and roofs. Similar towers, smaller and of less height, form the end features of the front. The carriage-entrance not being in the centre of the building, but between the north and one of the central towers, they have endeavoured to mask it with a colonnade, but we doubt whether it was worth while doing so. The St. James's Park elevation is similarly treated to that in Whitehall, the corner towers, however, being of greater magnitude (53 ft. square). The arrangement of pediment and corner towers which decorate the centre block is weakly designed. In their treatment of the stories they rusticate both ground-floor and first floor, the latter with greater richness; in the towers and projected blocks a Corinthian order runs through two stories (second and third), and between them through one story only. This arrangement is not happy, as it gives too much importance to the second floor.

Messrs. Spalding & Auld's design would appear to have been chosen for plan only; their elevations are suggestive of a Crystal Palace bazaar, and their perspectives too terrible both in design and drawing to be described.

Mr. Porter's design also owes its chief merit to the lighting of the plan, and to the idea of setting back the centre portion of the building. He makes no attempt at grouping his stories, and reproduces features already well known at Burlington House.

Messrs. Aston Webb & Ingress Bell and Messrs. Glover & Salter both depart from the styles hitherto adopted in the Government buildings in Whitehall; the former reproducing a simple but effective version of the François Premier style, or early French Renaissance, and the latter, what is now known as Burges Gothic.

Messrs. Webb & Bell, recognising the impossibility of showing any important and lofty building well in the narrow part of Whitehall, have set back their front some 62 ft., bringing out the two ends as wings, a favourite old English method of treating principal elevations. The recessed front is relieved by a projecting block 125 ft. wide, the centre portion of which rises higher than the rest, forming a sort of tower. There is a similar feature in the centre of the St. James's Park front, as well as at each of

* See p. 181, *ante*.

the ends, and the other two fronts are variations of the same. In the angle of the south and west elevations fronting the Horse Guards Parade is a lofty well-designed tower, rising about 200 ft., with an open loggia at the top and crowned by a pyramidal roof. There is a second tower at the north-east angle of the Spring-gardens front. No regard is paid to the low buildings of the Horse Guards, which sink into absolute insignificance by the side of Messrs. Webb & Bell's lofty mass. In their relative treatment of the several stories the lower story is rusticated with alternating quoins to the window dressings. The two next floors, or rather the second floor and mezzanine, are grouped together; that is to say, the window mouldings run one into another on the projecting blocks; between them they are enclosed in an arcade, which forms one of the prettiest features of the building. On the Whitehall side scarcely any projection is given to this arcade; on the St. James's Park, Spring-gardens, and Parade side (south front) it projects 6 ft., or rather the wall above and behind is recessed 6 ft., and on the west side facing the parade it forms a balcony 20 ft. deep, whence the evolutions in the Parade can be witnessed by the head officials and their friends. The rooms on the first floor, which rise the full 28 ft., have mullioned and transomed windows, with small pediments over them. A band of ornament, in which the anchor, rose, and crown are conspicuous features, runs round the whole building above this double floor, marks its importance, and ties the building together. On the second-floor story the windows have architrave mouldings round and between the blocks, and above the arcade a further enrichment of flat pilasters, the same treatment being adopted for the third floor, which is crowned by cornice and balustrade. Lofty roofs terminate the building, with dormer windows of simple design, which are destined, even at 100 ft. from the ground, to light offices and other rooms for which Messrs. Webb & Bell have not been able to find room elsewhere. The general effect of their building is not palatial, however; it is most skilfully and artistically grouped; but, after all, it is more suggestive of magnificent residential flats than of a public monument. They send in a very fine drawing of the interior of one of the glazed courts before spoken of. Its effect would have been infinitely better if they had omitted the two upper stories, and the second and third floor corridors would have been better lighted.

Messrs. Glover & Salter have not done their Whitehall front justice by taking their point of view from an impossible position. As shown, it looks like a design for two separate buildings with variations of treatment. The right-hand block has the centre portion carried up to some sort of tower; the left-hand building, corner towers of different heights and a centre gable with corner turrets. If this gable had been omitted and the other towers had changed places, it seems to us the two buildings would have better balanced. The St. James's Park front is very much better, and is very palatial in its appearance. The ground-floor should have been left plain without window mouldings, and treated in the same way as the windows in the towers, and the general effect of the building would have gained, as the whole front is too equally enriched. Had the competition taken place in 1866, this design might have been the selected one, *mais nous avons changé tout cela*.

Before entering into a detailed account of the arrangements of the successful and other plans, it would be as well to note that prior to the first competition a very complete schedule of all the requirements was issued by the Board of Works Department. The programme defined the relative position to be occupied by the War Office and Admiralty on the site,—the requirements as regards carriage entrances to the principal courtyards (the plural of the latter word showing that the promoters of the competition were quite unable to foresee that there would be in most of the selected designs only one principal courtyard), intercommunication between the two departments on each floor, a complete list of every room required, and of the position it should occupy relative to other rooms on the same and other floors, and a tabular statement of all the rooms, showing their area, number of clerks occupying each, and the approximate superficial area to be occupied by each department.

Notwithstanding the amount of information thus given, it was still necessary to read between the lines, and numberless questions were constantly being sent to the Board of Works, which they steadily refused to answer. In this we consider they were mistaken. The principal disadvantage of a competition is that the competitors are, as a rule, expressly forbidden to obtain any information from precisely those authorities (viz., the promoters) who are the only ones capable of giving it. It was rumoured that the Board of Works had prepared plans themselves, by which all others would be judged. We may safely say now that their plans were quite different in principle from those actually selected. Be that as it may, it would have been quite feasible for the Board of Works to have intimated to the competitors that any questions submitted to them before a certain epoch would receive their favourable consideration, and that those questions which were worth answering, together with the answers, would be published a week afterwards. The object of both promoters and competitors being to produce the best design, this undertaking would probably have saved an immense amount of wasted labour on the part of the unsuccessful competitors, and might have resulted in the production of a more useful series of plans than those which are now the property of the Government. As it was, those who had friends at court consulted them, and the competitor who got hold of the best man possibly had an advantage over his less successful rivals.

The problem, therefore, settled itself down into a gigantic puzzle, and those who were fortunate enough to have been able to shake the rooms down into their right places and to unite the same with a skilful arrangement in the lighting and ventilation of the corridors and grouping of departments were selected for the second competition.

The instructions issued for the second competition laid stress only on the importance of duly considering the sanitary problems in connexion with the building; the proper ventilation of closets; the advisability of having a carriage entrance into Spring-gardens (which most had given); and facilities for intercommunication with the Horse Guards.

The relative position of the principal rooms in the two departments having been more or less defined, the selection of the successful plan seems to have depended chiefly on the principle of lighting the corridor, skilful grouping of the offices of one department together, and providing that privacy in its arrangement and separation from other sub-departments which in some cases were desirable.

The plans of Messrs. Leeming & Leeming are admirably arranged in these particulars. The south-west block of their building, viz., that overlooking the Parade and St. James's Park, is devoted on first floor to the higher officials of the War Office Departments A and E, with a private staircase for their separate use. In like manner the north-west wing of the building is kept apart for the higher officials of the Admiralty, A, also with their special private stairs; and the block east of it for the Controller and the E department.

Messrs. Leeming place their principal entrance to the War Office under the loggia by the side of the carriage-entrance, not a very dignified entrance; in the arrangement of this and of the vestibule they show a want of knowledge of Classic planning. They provide an entrance in the middle of their long court, and they have private entrances from St. James's Park for the staff suite. The Secretary of State's room is placed in the angle of the south and west fronts, the Commander-in-Chief being on the Parade front, separated by an ante-room (through which, by the way, they must both pass to enter their rooms). The other rooms of the Secretary of State's department continue along the west front. The Commander-in-Chief's department (E) continues along the south front facing the parade, and half of it overlooks the centre court. The principal rooms of the Accountant-General's department (D), on the first floor, is on the west front, overlooking the parade, and department B overlooks Whitehall. The defects of the arrangement seem to us to lie in the separation of the Financial Secretary from his department D, and the Surveyor of Ordnance from his department B. The placing of the War Office Library on the valuable space of the ground-floor when it might have been placed on the third seems also to us to be a great mistake. The principal entrance to the Admiralty is in Whitehall, on the other side of the loggia to that of the War Office, and with a similar vestibule, in which there seems to be a waste of space. There is also an entrance from the centre of the court, and private entrances for staff suite from Spring-gardens; besides these are four other entrances under the carriage-way (exit into Spring-gardens, which we presume are intended only for the clerks of the department, and are necessitated by the cutting through of the building with a carriage-way. In this respect the plan is inferior to that of Messrs. Verity & Hunt, who, taking their carriage exit the shortest distance into the *cul-de-sac*, cut off only the Whitehall block, in which they place the department F, as on that floor it needs no intercommunication with the rest of the building. The Hydrographer and Director of Works in this department (Admiralty) are too far apart. There do not seem to be any special staircases, either, for messengers, which should have been in connexion with their lobbies. Looking at the sanitary and closet arrangements, they appear to us to be defective so far as the number of closets is concerned, there being apparently only six to each floor in each department, exclusive of one or two private ones; this is just about half the number which would be required, and has been provided for, in the other designs. The closets are defectively lighted, and are placed in the internal angle of two walls at right angles to one another,—the worst possible position. We have already referred to the narrowness of the central court, and to the bad proportion given to some of the rooms; in thus specially directing attention to what appear to us to be defects in the plan, we are actuated not by the desire of finding fault, but of suggesting alterations and reconsideration whilst there is yet time. If the depth of the rooms facing the Parade and court were decreased to 20 ft., and less projection given to some of the blocks, 10 ft. or 12 ft. could be gained to add to the width of the central court, but this would not widen the court sufficiently to get rid of the objection on sanitary grounds to a court so narrow in proportion to its height, in which the evil which attaches to even the largest quadrangles, of the formation of strata of stagnant air in the angles,* would extend itself nearly to the whole area of the court.

Messrs. Verity & Hunt provide their principal entrance to the War Office from Whitehall, making it the central feature of their principal elevation; they have another entrance from the centre of their court, and three private entrances from the Parade and St. James's Park. The Secretary of State and Commander-in-Chief are given rooms of equal importance in size and position (which shows greater wisdom than that laid down in the instructions); each also has his private staircase and own ante-room independent of the one common to and between both their rooms; each also has his closet, in which and in other respects Messrs. Verity & Hunt have arranged their plan better than Messrs. Leeming & Leeming. The Commander-in-Chief's room coming so low down on the south side, his

* The present editor of this journal, in an article a few months since in the *Portfolio Review* ("How our Public Works are carried out"), pointed out in strong terms beforehand, in reference to this building, the sanitary objections to closed quadrangles for what are practically residential buildings, and suggested that, if such a form of building must be adopted, it should be with partially open angle staircase or communication towers, which would both admit circulation of air, and form a source of special architectural effect; and the late editor of the *Builder*, Mr. G. Godwin, who has preached so much (often to sadly deaf ears) on the subject of sanitation, made a similar protest in a letter in the *Times* of Thursday last.

department E occupies the first floor rooms along the west front facing the Parade and across into the Whitehall front. The Secretary of State's department A runs round the remainder of the south and one-third of the west front. Department B occupies the first and second floor overlooking the court; and D, which it was suggested in the conditions might be placed in one block, is taken to the second floor over the Parade and St. James's Park. The principal entrance to the Admiralty is in the centre of the court, east side; and there is a second one opposite the War Office entrance, exclusive of the private entrance for the staff suite.

The First Lord is placed in the centre of the St. James's Park elevation, which accounts for the bow-window we have objected to externally. The other Naval Lords have their rooms also facing the park, and the remainder of the department over Spring-gardens. Messrs. Verity & Hunt retain the privacy of the official corridors, by making the inner or central court corridor the only public one, and it is impossible to pass from it into the other without crossing a messenger's lobby. They have also messengers' stairs round the lift in all their lobbies. The defects in their plan, compared with Messrs. Leeming & Leeming's, are that their staircases are not so well lighted (generally speaking, top light only), and that in their corridor courts, although they are 5 ft. wider, they are not so long as Messrs. Leeming & Leeming's, who, above the first floor, open them out to 110 ft. in length. The closets, sixteen on each floor to the War Office, and fourteen to the Admiralty, are well placed and ventilated, being placed across some of the corridor courts. We note that private closets have been supplied to the principal rooms in the Admiralty, not where they were required, but where they could be conveniently placed. Thus the Civil Lord is provided with one to himself, whilst the first, second, and third Naval Lords have none.

Messrs. Aston Webb & Ingress Bell attach so much importance to the ventilation of all their closets that they make both the Commander-in-Chief and Secretary of State walk down two corridors to reach theirs, an arrangement to which they would possibly demur; there are at first sight too few closets, but as, from the wasteful arrangement of plan, Messrs. Webb & Bell only place on the east floor two-thirds of the accommodation given by other competitors, probably in adding the extra floors they provide the same as in the other designs. Messrs. Webb & Bell provide one principal entrance from Whitehall for the War Office, and one from Spring-gardens for the Admiralty: to the latter there is also an entrance from under the carriage exit into Spring-gardens or a special one if this is omitted. Besides these and private entrances there is one common to both War Office and Admiralty in the centre of the court. There is a great waste of space in their designs; the entrances are too large; the centre one in the court, with council-room over, seems to have been introduced for artistic effect, and they provide refreshment-rooms on each floor, which were not asked for; some of the arrangements also are defective, as, for instance, when in three cases they separate the principal offices in the Commander-in-Chief's department from their confidential clerks'. They take credit to themselves for having provided much more accommodation than was asked for, but it has been done by increasing the number of floors and the height to which the clerks would have to ascend, and therefore at the expense of their convenience.

Messrs. Stark & Lindsay provide principal entrances for both departments from Whitehall, two provided with porches in their main court, and two minor ones, the staircase in each case being in close proximity. There are apparently no private staircases for the Commander-in-Chief and Secretary of State, and the arrangement of the closets in ante-rooms is clumsy. Sufficient space for the Secretary of State's department has not been left to give more than four rooms facing St. James's Park, the others being obliged to content themselves with the court prospect, which is a mistake. The Financial Secretary and Surveyor-General of Ordnance are also separated from department A, contrary to the instructions.

Messrs. Hall & Powell place the principal entrances to the two departments within the principal court, and provide covered porches, which, however, are too long, considering that there will never be many people to set down at the same time, as ministerial receptions will never be held in these buildings. Their Secretary of State for War and Commander-in-Chief's rooms are arranged in the same way, and in the same position as Messrs. Verity & Hunt's; the private staircases, however, are not contiguous to their rooms, but have to be reached across a corridor. The arrangements in the Admiralty department are similar to those in Messrs. Leeming & Leeming's plan; the isolation of the two departments A and E is better provided for in the two-wing blocks of the latter. Some of the staircases are not well lighted, and the corridor courts are too small, being about 20 ft. by 25 ft., as against 30 ft. by 40 ft., in Messrs. Verity & Hunt's, and 25 ft. by 110 ft., in Messrs. Leeming & Leeming's design, above the first floor. The waiting and interview rooms are placed in the same position as these latter, viz., deriving their light from the small corridor courts; they are not likely, therefore, to be seized upon as offices by clerks discontented with upper floors.

Messrs. Spalding & Auld, in their double corridor blocks on the St. James's Park side, give undue importance to the stairs leading to the basement, and by covering their corridor courts over the ground-floor deprive the basement of light and ventilation. It is only on the first floor and above that they provide the double corridor, lighted through the courts; the width of the corridor on the ground-floor and basement being added to the rooms, making them 28 ft. to 33 ft. deep.

Messrs. Maxwell & Tuke's plan does not gain on careful examination. Courts covered over with glass are highly objectionable and unhealthy. They become intensely hot in summer, and the rooms looking out on them are deprived of both light and air. The departments are not grouped so well as in some of the other plans, and there is not the same supervision over admission to corridors, private or otherwise; some of the rooms in the Admiralty could be entered by any one coming from Whitehall through the central court without passing any messenger's lobby.

Messrs. Glover & Salter do not comply with the instructions as regards the proximity of the Secretary of State for War and the Commander-in-Chief's rooms. Instead of one ante-room there are four or five offices between. Not content with running a carriage-entrance through the small north court, where it is not required, they provide one into St. James's Park, where it was expressly forbidden. We presume that it was the style of their elevations which resulted in their design being chosen among the nine, for surely no one could for a moment accept the principle of lighting and ventilating two corridors and five or six floors of closets by a well-hole 10 ft. by 8 ft., that being the size of the corridor courts which they provide.

Mr. Porter's court, opening into Whitehall, and his extravagant allowance for entrance saloons elsewhere, provides for about two thirds only of the accommodation required on the first floor, and, like Messrs. Webb & Bell, he has to make up for it by adding a mezzanine floor for repositories (which in most cases are not lighted at all) and an extra basement. The isolation of the south block in Whitehall from the remainder of the War Office Department would be a great inconvenience, especially for the Financial Secretary, who is quite cut off from the department he has to deal with. No light is provided to the side corridors in his plan. The staircases are insufficiently lighted by top lights only, and he makes no attempt to provide private entrances or staircases for the staff suite or private retiring-rooms for the heads of departments.

This terminates our general description of the designs: having carefully examined them all, we are of opinion that, on the whole, the best plan has been chosen, and as regards the general effect of the St. James's Park view we think Messrs. Leeming & Leeming's design groups fairly well, and has a pleasing sky-line. As it is now proposed to carry out this design, we venture to offer a few suggestions, and first to express the hope that a model will be prepared to a sufficiently large scale to enable one to judge of grouping and of detail. To think that the quarter-inch detail is actually going to be built as a portion of one of our public buildings is really uncomfortable to contemplate. We have already suggested that the ground-floor story should be rusticated between the piers; that the latter and the Corinthian order above should have their projections diminished, and that, if possible, the coupled windows on the second floor and the triplets on the first floor should be exchanged for single square-headed windows; if it be considered that more than one window is absolutely required, it will then be better to give up the Corinthian order going through the two floors, adopt an order for each (as in Messrs. Stark & Lindsay's design), and have triplet windows, as shown in their front elevation, on the left hand side. The coupled windows, with the keystone and "the sweet little cherub that sits up aloft," which decorates the second floor, never will accord with the great Corinthian order. We have suggested certain modifications in the west front facing the Parade, viz.: the lowering of that portion of the elevation adjoining to and in line with the Horse Guards; to complete what we said about it before, it will be necessary to bring the lofty tower from Whitehall, and place it in the angle, as Messrs. Webb & Bell have done, between the two fronts facing the Parade, instead of the insignificant lantern there now. The tower will then form a centre of interest, group with the projecting blocks on the south and west elevations, and allow of a low block of buildings adjoining the Horse Guards. To place such a tower anywhere in Whitehall would obviously be absurd, and the design for the tower being good it seems to be a pity to lose it; in addition to this we consider that if the upper square portion of the corner towers of St. James's Park front (as much as rises above the roof) were diminished in height 10 ft. to 15 ft., the remainder of the building would gain in scale. The Whitehall front, as designed in the first competition, and modified in the second, is so hopeless that it will have to be remodelled. In doing this, one of two courses must be adopted; the carriage-entrance must either be placed in a centre between two projecting blocks, or it must be contrived in the middle of one projecting block. The first course would result in a treatment similar to that adopted by Messrs. Stark & Lindsay and by Messrs. Hall & Powell. The second will be a modification of their altered design as sent in. The central block, with entrance archway, should be retained, and one of the small projecting blocks now on the left-hand side of the front placed at the extreme corner on the right: this would leave space for six bays or five Corinthian columns between (six would have been better); repeating the same features on the other side of the central block would occupy about 270 ft. of the whole length; the remainder should be kept down one story and curved round as in Messrs. Stark & Lindsay's design, or lowered as in Messrs. Hall & Powell's design, so as to merge into the level of the Horse Guards. This would carry out the suggestions (before alluded to) of Mr. Shaw-Lefevre, and would prevent the Horse Guards, which is really a well-proportioned building, and refined in style, being spoilt. It should be understood that the chief fault in Messrs. Leeming & Leeming's present design is not that they carry their carriage-way through a projecting block, but that, having done so, they design another block to pair with it in which there could be no archway; worse than that, by adding two pediments carried on coupled columns on each side of the central gate they emphasise its irregularity and call attention to it. There is an inequality in the number of the columns between the blocks which is perplexing; the difference between three and four columns is not sufficient and is too much, besides which, strange to say, the inter-

columniations of the great columns is not the same throughout the elevation. In the Great Court, without there being any absolute need for it, they have placed their entrances out of the centre, an arrangement most objectionable to any one with a true Classic feeling for design: there was no necessity for it, the vestibule and waiting-room might have changed places in the War Office, and the Admiralty subscription library might have been shifted to the other side of the waiting-room on the Admiralty side, and then the entrances could have been brought to the centre. It is precisely these little vagaries which make us afraid of what may happen in the execution of the work, when draughtsmanship will not count for much. The effect of the interior of this principal court would be much improved if an order to each story were adopted instead of the single order running through two floors, which tends to dwarf the court, and is not required there for palatial appearance. The same remark applies here to the single round-headed windows of the second floor, to which we have alluded when speaking of the quarter-inch detail; they are, and always will be, out of scale with the large order. We must say, in conclusion, that we consider it most unfortunate the judges did not advise the selection of one or two designs on the grounds of merit in architectural composition. We have already seen two whose architecture was quite equal, if not superior, to the best of those sent in, and there are others who competed who could not have conceived anything so defective in scale and purity of design as the elevations of the successful competitors, though possibly the draughtsmanship might have been inferior.

## THE NEW SCULPTURE COURT AT SOUTH KENSINGTON.

THE remarkable collection of casts in the new gallery at South Kensington, which is entered from the left of the architectural court, enables the visitor to see before him at a glance the progress of Greek sculpture, from the rude efforts and naïve expression of its childhood, to the magnificent development under Pheidias of an art perfectly balanced, intellectually and physically, and representing the abstract ideal of humanity in the persons of heroes and anthropomorphic divinities. Thence he may note the intrusion of the individual and realistic feeling in sculpture, under the influence of which the productions of the art become more decisively the work of special artists employing each his own peculiar method, and the subjects and their treatment become less ideal and abstract, and partake of the character of *genre* or even of portrait representation. He may trace the further progress of the realistic and prosaic feeling in some of the works of the Roman period, in which the representation of personal expression is more marked than it ever was in the more abstract art of the Greeks, as in the sad and pathetic figure of Agrippina the younger (243 in the catalogue of the collection). The collection does not follow out the subject to the actual decadence of sculpture in the later Roman period, though the subject is touched upon sufficiently in the conclusion of the preface to the catalogue, in which Mr. Perry glances at the curious historic facts as to the influence of Christianity on art of this class. The utter degradation of plastic art, he observes, is shown in the magnificent porphyry sarcophagus of Constantia, the daughter of Constantine, which is now in the Vatican:—

"The subject, and the subject alone, reminds us of Greek art, for it is derived from the worship of Bacchus; but the representations are used to represent Christian ideas. In this case the imbecility of the artist, and the meanness and poverty of the work, are thrown into striking relief by the costliness of the material, the elaborate care and infinite labour expended on the execution, and the rank and celebrity of the personage whose remains it enshrined. We see that the unhappy sculptor was not only devoid of all inventive and creative power, but incapable even of *imitating*, like his predecessors of the time of Hadrian, with skill and good judgment. Greek sculpture, the child of Greek religion, the nursling of freedom, the companion of poetry, architecture, and painting, which had survived the fall of Greece and Macedon, was buried beneath the ruins of the Roman Empire. The new and purer faith which succeeded to Greek and Roman Polytheism led to no revival of plastic art. The Christian inherited from the Jew the commandment of the Decalogue. 'Thou shalt not make to thyself any graven image.' The one God whom they worshipped in common was 'a spirit whom no eye hath seen or can see,' and the promised Messiah was 'a man of sorrows and acquainted with grief, who when we behold Him has no beauty that we should desire Him.' And so Art sank to rise again like the pale ghost of its former self at the so-called Renaissance, with the revival of humanism, and the revolt of a luxurious and semi-heathen society against the abstract spirituality and the ascetic morality of one section of the Christian Church."

This consideration brings into high relief the ever-vexed question of the relation between morality (in the widest sense) and art. Sculpture, dealing with form rather than with expression,—for we are nearly all agreed that intensity of expression is hardly within the scope of sculpture, or, at least, is a hazardous experiment,—not unnaturally flourished most in times and among people with whom bodily form and the perfecting of the physical state of the body were matters of high interest; and it might even seem as if the most favourable atmosphere for sculpture was that in which, morally as well as physically, the natural man prevails over the spiritual man, and that times of licence and disregard for any restraining laws were favourable to the luxuriance of the art. This is the conclusion to which Mr. Perry's sentence, quoted above, would lead, and the conclusion which was substantially adopted by Winckelmann and echoed in the writings of such critics as Mr. Pater, whose early essay on Winckelmann and his views was about as pure a piece of paganism as ever was indited. But there are comparisons to be made in the Gallery at Kensington which may give us pause before adopting this conclusion. If we compare the "Apoxyomenos" (173), the statue of a young man scraping himself with a strigil, with the nude heroes of the Parthenon, we cannot but see that the former, splendid as it is in execution and in its representation of the most perfectly shaped male form, represents a purely animal beauty; whereas in the Theseus and Ilyssus, if the figures were in the same state of preservation, we should see equal perfection of form accompanied by that intellectual dignity and expression which gives the last and highest interest to sculpture, and which can hardly co-exist with a low state of moral feeling. The "Apoxyomenos" is a realistic translation of natural form and action pure and simple. As Mr. Perry says,—"The style of this great work is perfectly free from all conventionality, and shows that the artist copied nature alone; the hair, especially, is here thrown about in the most easy and natural manner. The very nature of his occupation implies a constant change of posture, and we see from the position of his feet that the attitude is accidental and momentary, and one of a series of graceful movements. The face, which is simple and agreeable, shows the gentle satisfaction arising from successful labour. The Apoxyomenos is a grand example of the *genre* style in its highest form."

This is perfectly true, and the work is all that is said; but it almost remains a question, was the result worth the consummate skill employed in producing it? and does not such a work, in intellectual value, rank below not only the Parthenon nude figures, but below such a draped figure as that grand portrait statue of Sophocles in the Lateran (224 at Kensington). The latter is an expression of the highest human dignity and intellectual character; the Apoxyomenos is only a splendid specimen of the animal called "homo."

The collection commences with a cast of a portion of the bronze Balawat gates, followed by that of the famous lions and their column from Mykenæ (as we are now asked to write it). Mr. Perry denies the very early date of this monument, and says pointedly that "we have only to compare this work with the undoubted Assyrian sculptures to detect in it the Greek desire to be true to nature." The details, as now brought before us in the cast, tend to bear out this remark, which must, however, be taken also to separate from the Greek art the grotesque metopes from Selinus, which may be taken as showing how practically distant then were places really so near each other as Sicily and Greece, when these rustic specimens of art could be produced on an important temple in Sicily at a period when Greek art had at least entered upon the discovery of something very different from these childlike attempts. Stiff as the Branchidæ figures are, they are works of serious art as compared with the alto-reliefs of Selinus. One of the interesting fragments among the earlier works in the collection is a small bas-relief of a succession of dancers from Branchidæ, of the end of the sixth century B.C., "important as one of the earliest examples of the stratified arrangement of figures, so that one figure is partially covered by another," as in the Parthenon frieze.

One of the strange facts which recent researches have brought out into new light, and which is largely illustrated in the Gallery of Casts, is the existence of a "præ-Raffaellite" movement in Greece and Rome under the Empire,—a fact of great importance in its bearing upon the real significance of the modern movements of the same tendency. We see, hence, that affectation of archaism is no new thing; that it is apparently a natural tendency in certain stages of highly cultivated society. One of the most notable examples is the "Athene Promachos" (58), in which, while the figure itself is stiff and archaic, the border of the garment is worked with small figures in bas-relief in a perfectly free style. The "Archaistic Pallas" from Herculaneum (59) is still more remarkable, and represents a feeling and treatment exactly analogous to that which has pervaded some of our modern stained glass designers. There is nothing new under the sun. We should suppose that the ancient præ-Raffaellite movement originated in Rome, and that the Greek artists of the day recognised the demand, and laid themselves out to supply it.

The immense progress and change which took place in the art of sculpture in Greece within two or three centuries, as brought into such prominent light by the juxtaposition of so many works in this gallery, form a remarkable testimony of the extraordinary artistic vitality of the period. Within that short period the whole range, from the stiff, artificial figures of the seventh century B.C., to the splendid work of the fifth, and the exquisitely finished naturalism and *grace* of the fourth, was run through. That there will ever be such a time for sculpture again can hardly be hoped, for never again in the history of the world is there likely to be a nation combining such intellectual force and energy and civilisation with so much freedom in regard to the display of the body and so much of open-air life. Modern civilisation has shut itself up in clothes, and in clothes for the most part of a peculiarly unsculpturesque type; and, say what we will, the masses of the people are out of harmony with such work as Greek sculpture, and can only be got to like or understand it by a kind of surgical operation. The tendency of such collections as that at South Kensington, of course, may be in time to familiarise and harmonise the mind of the people more with the antique ideal, and render it a less distant and *outré* thing to them. Whatever we may think as to the future possibilities of sculpture, however, it is a satisfaction to think that we have so many of the productions of the great age of the art left to us as an eternal possession, now reproduced and multiplied in so many ways that we need never fear their loss, and may consider at leisure in what way we can turn to account the lessons to be derived from them.

One lesson other than artistic may be suggested, perhaps, by the proximity of the Health Exhibition to the South Kensington Museum, that of the beauty of the physically healthy body when not cramped and spoiled by conventional habits and conventional garments. Look at that same Apoxyomenos, for instance, which is the model of manly physical health; look at the Niobe or the Sophocles in their

grandly-folding robes, giving dignity without cramping the figure in any way; and then go over to "The Healtheries" and look at some of the cases into which the human figure has been forced, as exhibited both in the "historic dresses," and in some of those unhistoric ones that are moving about in the show, and see "what a deformed thief this fashion is." The collection of antique casts has, in fact, far closer relation to the Health Exhibition than half the objects within its walls.

## NOTES.

AFTER a smart discussion, the House of Commons in Supply on Thursday, the 7th, induced the First Commissioner of Works to postpone the demand for the requisite funds to carry out the proposed alterations to Westminster Hall, and to ask for an *ad interim* vote of 3,000*l.* for repairing the buttresses, which was agreed to, and which is, of course, an immediately necessary operation, considering the state of the work. Perhaps even those most interested in carrying out the work will subsequently see that it was just as well not to spend so much money in a Mediæval restoration without consideration, especially as that restoration will not carry out the practical objects put forth; a point to which we saw no reference made in the discussion. The *open* cloister will not do much to conserve the Norman wall, and its dimensions will be so cramped as to render it inconvenient as a carriage porch. These practical points seem to be left out of consideration in a scheme which is purely an affair of sentiment.

IT appears that the competition for the Dublin Science and Art Museum has resembled most other architectural competitions in its economical aspect. The cost of the designs has been found to be considerably above the architect's estimate. The Chancellor of the Exchequer, in reply to a "question," at the latter end of last week, said that "the Consultative Committee recommended a design by Messrs. Deane; but when the cost of this came to be worked out it was found to amount to 140,000*l.* (the competition having been invited for a building to cost 110,000*l.*). It then became necessary to ascertain whether any other design came within the prescribed limits as to cost. The Consultative Committee recommended a second and a third as admissible; but the cost of these has been estimated, and we have learned that each of them would be slightly in excess of 140,000*l.* We are thus reduced to the position of abandoning the designs altogether, or of consenting to accept Messrs. Deane's design, with a possibility of effecting some economies in its details, and although we cannot but deplore the excess above the limit in which the competitors indulged, it has been determined to accept Messrs. Deane's design." On the whole, Messrs. Deane may be said to be exceptionally fortunate competitors; but on the other hand, it must be said that to find the three leading architects in a large competition all exceeding the stipulated limit of cost by about 30,000*l.* is not a circumstance calculated to raise our ideas as to the value and efficacy of the competition system as a means of securing public interest in architectural matters. Probably all these gentlemen were betrayed into exceeding the limits of cost in the anxiety of each to produce the most attractive design; and if Messrs. Deane had been asked straight off to design a building to cost 110,000*l.*, they could have done so. In this instance, therefore, the competition system has brought forward no new talent, as Messrs. Deane had already made their reputation, and the amusement of instituting the competition has cost 30,000*l.*

THE London and South-Western Railway Company have received a pretty sharp rebuke in the terms of Colonel Rich's report upon the causes of the late fatal accident between Downton and Breamore, and one which certainly does not come too soon. Colonel Rich has no doubt that the accident was caused by the train having been run at too great speed over a weak road. The train having two engines and eight short vehicles with short wheel bases, was not calculated to run steadily at great speed over a line of such gradients and curves. He adds:—

"The London and South-Western Railway Company have had three cases of passenger-trains leaving the rails since September last. The first, which occurred near Portsmouth, was caused by the great oscillation of the last coach of the train. The oscillation made the springs of the coach turn over, and then it left the rails. This coach was of bad construction. The second, which occurred at Brockhurst, in January, was caused, like the present disaster, by a train, made up of inferior rolling stock, being run at express speed along an old and very light permanent way. The numerous complaints which have been made of the violent shaking which passengers experience when travelling on parts of the London and South-Western Railway leave no room to doubt that a great deal of reform in the management and improvement in the working of this railway is required. I believe the complaints are caused in a great measure by bad driving, using inferior stock, and by the coaches in the trains not being properly coupled up. I would strongly urge the Company to make a thorough examination of their system and stock, to classify their drivers, to classify their stock, to classify their several lines and parts of their system, and to classify their trains. It cannot be expected that the whole of a company's stock and railway shall be of the best description, but the public has a right to expect that old and inferior stock shall not be run over old, weak, and inferior parts of the railway at such a speed as to make it unpleasant and dangerous to all that use it."

The Board of Trade point out to the company the serious and grave responsibility they will incur if they do not take immediate steps to improve both road and rolling-stock. The peculiar idiosyncrasies of carriage action on the railway in question are familiar to all who travel on it in fast trains, though few passengers probably trouble their heads to think of the reasons for them. Now that these have been pointed out by Colonel Rich and emphasised by the Board of Trade, there will probably supervene a prudent desire on the part of the public to avoid the railway in question as much as possible, until it shall have certified itself reformed.

THE announcement has been made from Cairo that if an expedition for the relief of General Gordon, for the preparations for which Parliament was lately asked to sanction a supplementary vote to the extent of 300,000*l.*, is finally determined on, the operations will be undertaken on the Nile itself *viâ* Dongola, and that the scheme of the Berber-Suakim Railway may be considered as abandoned. The railway plant which has been already landed at Suakim will be sent on to India, where it will, probably, be utilised on the frontier, and be of infinitely more importance than it could have been in the Soudan. Our readers will remember that we recently pointed out that the Nile was the real Highway of Egypt, and that it would be well for those concerned in the welfare of that country to set about removing or overcoming the existing impediments to its effective navigation. The Mudir of Dongola offers to place 1,000 men to haul steamers over the Second Cataract. If it is possible to effect this by human power, how much more easily and effectively could it be accomplished by the application of a little engineering knowledge? When penning our remarks on the Suakim-Berber Railway we little expected to see the suggestions then made so soon carried out.

THE advocates of additional locks and weirs on the Thames below Richmond have been fittingly replied to by Mr. Redman in a letter to the *Times*, in which he points out "the necessity of watching with the greatest attention any attempt to obstruct circulation in the channel of our great commercial river lower down stream." The weirs would not be any obstruction to the flow of the *flood* waters, and the intermediate ponds created by them would, when once filled, require only the quantity taken off by evaporation to maintain them; but it is the obstruction to the free flow of *tidal* water which would prove so mischievous. What, then, is to be thought of a proposal which was recently seriously suggested at the Balloon Society as one that must ultimately be adopted, to the effect that the whole river to Gravesend would have to be locked up, and that no satisfactory arrangement could ever be arrived at either for purposes of navigation or for the disposal of the sewage question until the river was thus manipulated! Every infringement on or curtailment in the dimensions of a tidal river produces a corresponding deteriorating effect on its *embouchure*; and the public, as we have before hinted, would do wisely to listen to such practical authorities as Mr. Redman rather than to the wild suggestions of people who make it their particular boast that they are "not scientific."

WE learn from the *American Architect* that the publication in our columns (March 15 of this year) of the names of architects who have engaged not to enter into any competitions unless the award is made with the aid of a professional adviser, has stimulated our American contemporary to offer to its readers the consideration of a somewhat similar proposition, bearing the signature of the Secretary of the American Institute of Architects, and inviting architects to pledge themselves not to compete unless the conditions of the competition are such as to insure to the competing architects the following conditions:—

"1. To issue a programme prepared with the help of an architect, such architect or his partners to be debarred from competing.

2. To have at least one architect as member of the jury of award, such architect to have the casting vote in event of a tie.

3. To assure to the architect securing the award of the jury the execution of his design (if the building is built) at the regular compensation of five per cent. on the entire cost of the work.

4. To make no use whatsoever of rejected designs, but to return all such to their authors without loss of time.

5. To pay to the successful architect, in case it is found necessary to abandon the project, the commission regularly charged for so much of the usual professional work as has actually been performed by him, such charge being the usual percentage computed on the estimated cost of the design which it is now found inadvisable to carry into execution."

The term "public building" is understood to include all national, State, county, and municipal edifices, but does not refer to buildings erected through the enterprise of private individuals. We are glad to find that the prominence given to the list in the *Builder* has been the means of suggesting an invitation to the members of the profession in America to adopt the same course, and we hope the appeal will be largely responded to.

AT the Educational Conference last week Dr. Jex Blake read a paper on School Museums of Science and Art, dwelling with emphasis on the value of a School Art Museum, an institution which, he believed, Rugby alone at present possessed. The idea was received, he said, with much laughter at first, and they were told they could neither get funds to build and equip such a museum, nor boys to enter it when built. They did, however, raise the funds, 9,000*l.*, needed to build the art museum and Temple reading-room, with curator's house, opened in 1879; they had been given objects to help to start it worth about 4,000*l.*; and they had, by a charge of 10*s.* 6*d.* a year on every master and on every boy who had voluntarily used the museum, bought during the last five years about 1,000*l.* worth of carefully-selected objects. Dr. Jex Blake went on to speak of the value of such a museum as subsidiary to school teaching:—

"It supplied the drawing-master with excellent examples, in both form and colour. It supplied the classical and historical teacher with the original of many a simile in the old poets; with the photograph of many a classical site, temple, or ruin; with the portrait, on coin or medallion, if not in life-size bust, of many an emperor, king, reigning favourite, general, or statesman; with the emblems of scores of cities in Italy, Greece, Asia Minor, and the Isles of the Ægean; with the whole scenes from the civic or religious life of Greece, as in the reproduction of the Panathenaic Procession from the Elgin marbles; and to the student of the Middle Ages or the Renaissance was of more obvious value still. Indirectly, an art museum was a great instrument

or refining and elevating taste, and since they had had an art museum, a totally different and vastly better style of decoration had been adopted by the boys in their private rooms, called studies, at Rugby."

We hope both that the Art Museum at Rugby may continue to flourish and increase, and that other great schools will follow the example of Rugby. If an art museum, and periodical lectures in it, were part of the curriculum of our great schools, we should, perhaps, not hear such a proportion of nonsense spoken in our Legislative Assembly whenever such subjects come on the *tapis*.

THE case of the Direct Spanish Telegraph Company *v.* Shepherd, which is published in the current numbers of the legal reports, decides an important point in connexion with the renting of buildings. The plaintiffs and the defendant were lessees and lessor, and there was a covenant in their lease that "the lessor will during the said term pay all rates and taxes payable in respect of the demised premises, except for gas consumed by the lessees." On the one hand the lessees said that this meant that the landlord would pay the water-rates; on the other the lessor said that water-rates did not fall within the covenant, since they were not properly rates at all, but only charges for goods supplied. It is unnecessary to discuss the argument at length, it is sufficient to say that the Court decided that the agreement in question included water-rates. The decision will, of course, govern all similar cases, and must be borne in mind in drawing up agreements.

A CASE for compensation, on account of the death of two children by the fall of the chimney at Bradford two years ago, which came before Mr. Justice Manisty at Leeds on Wednesday last, came to no result, through the inability of the jury to agree. They agreed in considering the chimney a dangerous structure when it was built, and "a very dangerous structure on and after the 20th of December, 1882," but could not agree as to fixing responsibility on any one. As judgment may be moved for in the Divisional Court, we refrain from any comment on the case; on the general question of the accident and the verdict of the coroner's jury we expressed ourselves strongly at the time.

THE reply of Captain Gillett, R.N., in command of the training ship *Warspite*, to the statement that "the measures for the deodorisation of the London sewage had proved successful," should be studied by every one who takes an interest in the purity of the river, or in the safety of London. It should be compared with the conversation on the same subject in the House of Commons on the 8th current. The use of permanganate of potash at 130*l.* per ton for merely rendering the exhalations less offensive, has not, as may be readily understood, been carried on to any considerable extent. It would be interesting to know whether the experimental use of this costly oxygenator by any chance coincided with the visit of the deputation of the Metropolitan Board to Barking. But even the use of the comparatively cheap disinfectant, perchloride of lime, costing only 9*l.* per ton, at the rate of thirty tons per day, will form an item in the cost of concentration that London will not like to pay. Two hundred and seventy pounds a day comes to 97,550*l.* a year,—for palliation alone! No wonder that the Local Government Board "are not prepared to express an opinion as to the effect of the means adopted by the Metropolitan Board of Works." We venture to suggest that unless some one be prepared to express an opinion shortly and decisively, the public will be apt to form, and to express, a very decided opinion of its own.

IN reference to the recent accident on the steep portion of the Highgate Tramway, we have received an explanatory circular, which is not very clear in its language. The main paragraph is as follows:—

"The driver on the descending car, having confidence in the sufficiency of his wheel-brakes alone, neglected to make the slipper-brake connexion with the car attached. In descending the hill the cable runs out of the gripper, and the car descends by gravitation to a point about 30 ft. below, when the cable is again taken up by the gripper, and the car then proceeds at the same rate of speed as that of the travelling cable. In this instance the absence of the powerful slipper-brake allowed the car to run past the usual point, and, gaining momentum in its progress, came into collision with the car at the bottom of the hill, thereby injuring one inside passenger and one outside passenger. When the driver found that the car was skidding only with the wheel-brakes he at once called upon the conductor, who was beside him collecting fares, to return to the car and apply the slipper-brake, but in jumping off to do this the conductor fell heavily upon some loose stones and was left behind. This was really the most unfortunate part of the occurrence, because the driver, not knowing the conductor had fallen, continued to stand by the wheel-brakes instead of returning to the car and applying the slipper-brake as he otherwise would have done."

It seems unquestionable that there was either ignorance or considerable carelessness on the part of the driver; but there seems no need for any repetition of such an accident with proper caution, and probably the incident will lead to greater care in future.

TOO much publicity cannot be given to the sad accident to which a surgeon of the Lewes Infirmary calls attention in the *Times*. Serious injuries were received by an unfortunate railway labourer on the London and Lewes line from a bottle thrown from a passing train, which struck the poor man in the face and caused fearful injuries. If the people who travel in fast trains are so stupid that they cannot realise that a bottle thrown out of a carriage window strikes any one who may be in the way with the full speed at which the train may be going, the act ought, in the protection of life and limb, to be made a criminal one, and the thoughtless perpetrators rendered subject to fine or imprisonment, as the only lesson they seem able to appreciate.

WE have received the prospectus of the proposed Exhibition of Inventions which is to be the attraction of Exhibition-road next year, in the place of "the Healtheries." The two main divisions, inventions and "music," seem rather oddly assorted. The first division is to include "apparatus, appliances, processes, and products, invented or brought into use since 1862" (what a medley it will be!), and the second division will include "examples of musical instruments of a date not earlier than the commencement of the present century," and machinery or appliances connected with their manufacture or use, and historic collections of musical instruments or of engravings or paintings representing musical subjects. It appears to us that this is an absolute plethora of objects of interest, which will be too large for any one to study. It would have been better to be content next year with "Inventions" (surely a large enough field), and leave music to follow in 1886.

## THE SANITARY AND INSANITARY HOUSES AT THE HEALTH EXHIBITION.

THE educational value of that popular place of resort familiarly known as "The Healtheries" has been greatly augmented by the opening of the Sanitary and Insanitary Houses, which have been erected under the supervision of a special committee consisting of Mr. H. H. Collins, F.R.I.B.A., Professor Corfield, Mr. Rogers Field, M.Inst.C.E., Captain Douglas Galton, and Mr. Ernest Turner, F.R.I.B.A., than whom no better representatives of the architectural, engineering, and medical professions could have been selected for the purpose. They have carried out their work on the whole in a very satisfactory manner, especially when it is borne in mind that they had very limited funds and space at their disposal. We speak altogether without reference to the façades of the houses, which are merely intended to represent those of typical commonplace dwellings of their size. A "Guide" to the two houses is in preparation, and we have been favoured with advance proof-slips of the same. In the preface the objects aimed at in the construction of the two houses are briefly stated, though it is hardly correct to speak of the houses as two "*full-sized* models of houses." All the details shown are, it is true, of full-size, but several of the "rooms" in which they are shown are much smaller than would be the case in houses of the external appearance of those here represented, and in some cases they are mere strips or corridors, so that it would perhaps be more exact to speak of the collective exhibit as "two full-sized *sections* of houses," while an explanatory note or sentence should be added with the view of making it clear to non-technical visitors that the awkward shapes and limited cubical capacity of the rooms, even in the Sanitary House, are not in any way to be taken as models for imitation, except in regard to the means adopted for making them habitable,—for beyond doubt such rooms exist in vast numbers in actual buildings. Many and flagrant as are the defects illustrated in the Insanitary House, there are one or two notorious sanitary shortcomings which are not illustrated by it. For instance, we noticed no "bedroom" built without a fireplace,—a means of ventilation the presence of which should always be insisted upon in the absence of other special appliances, for however comfortable and pleasant it may be in torrid weather like that now prevailing for people to sleep with their bedroom windows open, it is hardly possible to follow this course in the severe winter months, at any rate not with windows of ordinary construction. Tens of thousands of houses are to be found in London with at least one "bedroom" bereft of fireplace and all other means of ventilation except the window and such providential assistance as is afforded by chinks and cracks in scamped joiners' work. In hotels and boarding-houses not specially built for their purposes it is a very common thing to find what was originally one large room divided by partitions into three or four smaller rooms. The existing fireplace cannot be divided or distributed among the smaller rooms, so it remains (when it is not foolishly blocked up by a screen) for the benefit of one room out of the three or four. It never enters the mind of the "spirited proprietor" to provide any means of ventilation (other than that afforded by the windows) for the two or three rooms thus left without fireplaces. By dividing up a large house in this way it is easy to provide sleeping-rooms for a much greater number of people than it would otherwise accommodate. But when the number of people sleeping on a given number of floors in such establishments is largely increased, additional accommodation in the shape of water-closets is rendered necessary, and these have too often been placed in any dark and ill-ventilated corner that could be found for them, sometimes with their doors actually cheek-by-jowl with bedroom doors. And, in many instances, what closets they are! Either they will be of the now generally condemned (generally condemned, that is, by all sanitarians) pan-closet type, with their filthy iron "containers," or they will be old, badly-made, or worn-out valve-closets, which refuse to hold water in the basin, even when there is a proper flush available, which is not always the case. Now that people are "on the wing," and are crowding into seaside hotels and lodging-houses, we cannot urge them too strongly to look into some of these questions for themselves,—to mind where they sleep: if within measurable distance of a water-closet, to see what sort of condition it is in, and to inquire how far they may be prejudicially affected by it.

To return to the Sanitary and Insanitary houses at the Health Exhibition. The committee whose names we have already given claim,—and we think with justice,—not to have exaggerated defects in the Insanitary House. Although there are thousands of houses which do not contain *all* the sanitary defects here illustrated (simply because all houses are not provided with baths, housemaids' sinks, &c.,—not, of course, that such things are insanitary in themselves, but they are generally improperly fitted and connected with drains, and so bring sewer gas into the houses), we believe it to be impossible to find any house, however costly and luxuriously appointed (unless built or overhauled of late years under the direction of architects who have given attention to sanitation), in which there will not be found several of the most glaring defects which are now to be seen exposed at Kensington. Many of the shortcomings here "shown up" are almost universally to be found in our houses, and it is

to be hoped the public will really be induced to study what is now set before them, and to compare what they see at the Exhibition with what they have in their own homes. They may take it for granted that the things condemned are condemned for good reasons, and that the appliances and methods recommended for adoption fully meet the requirements of the best principles of sanitation, without calling for needless expenditure. The committee "wish it to be understood most distinctly that while they have of necessity selected for the purpose of illustration fittings made by particular manufacturers, they do not wish to give the idea that the fittings adopted are superior to those of similar types produced by other makers." In many cases, as they point out, there are several appliances equally efficient to those which are used, although limited space would not permit examples of all varieties of good appliances to be shown. This is very fairly put, and, in view of some correspondence on the point which we published a few months ago, we are bound to say that the committee's performance is in accordance with their words. Names of manufacturers whose appliances are used are not needlessly paraded, although they are recorded in the Guide. The Committee, indeed, have, as far as possible, chosen illustrative apparatus and appliances which do not bear their manufacturers' names. Possibly the labels describing the insanitary fittings are here and there somewhat too brief and too technical in their wording to be easily comprehended by the average visitor into whose hands the "Guide" may not fall. This shortcoming, as we conceive it to be, might be usefully met, we think, by displaying, adjoining the label, a clearly-drawn section, properly figured and lettered, showing the points which are commended or condemned; and it would be additionally instructive if, alongside the section of the good or bad appliance, a section of its *opposite* were shown. Thus, in the Insanitary House, the drawing showing the dangerous appliance should be accompanied by a drawing showing the safe and healthy appliance; while in the Sanitary House the diagram of the sanitary fitting should be accompanied by one showing "How *not* to do it." The drawings or diagrams which we suggest should be similar to those given by Mr. Pridgin Teale in a work published by him a few years ago on "Dangers to Health." We are led to make these observations in consequence of remarks which we heard fall from some of the visitors the other day. Referring to certain of the fittings in the Insanitary House, we heard more than one person say, in effect, "*How* can that be unhealthy? We have exactly the same kind of thing in *our* house, and that is not unhealthy!" Beyond doubt large numbers of people enjoy (or appear to enjoy) immunity from diseases likely to be engendered by the improper and defective sanitary fittings of their houses; but, on the other hand, perhaps equally large numbers suffer from apparently minor disorders and illnesses or physical disabilities which come upon them they know not how, but which sanitarians shrewdly suspect to be due to the absence of properly-devised, properly-constructed, and properly-fixed, sanitary fittings. It should not be forgotten, in these days of elaborate systems of sewerage, that the ignorance or cupidity of a builder or plumber (or their workmen) may result in sewer gas being effectually "laid-on" to a house without the supply being suspected or discovered for a long time.

For these reasons we are glad that visitors to the Health Exhibition may now easily (if they will spare an hour or two from pleasure for observation and thought) master the nature of the sanitary defects to be looked for (only too surely to be found) in their houses, and at the same time make themselves conversant with the sanitary principles necessary to be observed in the production and maintenance of a healthy house. "Something wrong with the drains" is a common explanation of illness in a house, but, as the Committee point out, the healthiness of a house depends on numerous conditions besides those of drainage and water supply, as, —to cite another instance within the control of the architect and builder,—in the matter of provision for ventilation and the removal of products of gas combustion. The Sanitary House illustrates some good and simple devices for ventilation, one of the most notable of which is very easily adaptable to every sash window, viz., the provision of a deep bead on the sill, so as to allow of ventilation at the meeting-rails by slightly raising the lower sash. The means of draughtless ventilation thus to be obtained for a trifling sum paid to a carpenter for making the alteration is not by any means new; this particular method of obtaining ventilation has been before the public and the building trade for many years, but has not been adopted to any considerable extent. The same remark applies to other contrivances and their applications to be seen in the Insanitary House. We trust that this apathy as to things essential to a healthy dwelling may be greatly shaken by the lessons afforded by the Sanitary and Insanitary Houses at the Exhibition; but if this feature of the Exhibition is to be made the most of, the appliances requiring water for illustration should be more efficiently supplied with it than they were at the time of our visit.

The various defects and their remedies which are illustrated by the two houses form a long catalogue, there being upwards of one hundred items. Many of these are, of course, "doubles" or repetitions (in different situations) of identical points. But, even allowing for this, the number of details in which it is necessary to observe the recognised principles of sanitation is considerable in a house of any size, for they include water-supply fittings, baths, water-closets, lavatories, sinks, drains, and soil-pipes, and their proper and allowable connexion with each other, to say nothing of foundations, damp-courses, sanitary materials for construction, &c. We do not propose on the present occasion to enumerate all these details, but we shall return to the subject, merely premising that all the defects which are "shown up" in the Insanitary House have been condemned by us and by sanitarians generally for many years past, and that the means shown in the Sanitary House for obviating them have had our unremitting advocacy and encouragement.

## THE LATE M. PAUL ABADIE.

Our readers can recall the visit made on the 11th of June last by 300 French architects, assembled in congress, to the works in progress at the Church of the Sacred Heart at Paris. The master of the work, M. Paul Abadie, did the honours of his beautiful edifice; and in congratulating him his *confrères* inscribed themselves to be invited by himself to the ceremony of inauguration. Since then, M. Abadie had assisted on the various juries of the competitions of the Académie des Beaux-Arts; and on Saturday, the 2nd of August, he met his colleagues of the Institut for the award of the Grand Prix d'Architecture. It was but a few hours after, on his return to Chatou, where he possessed a charming summer residence, that he fell struck by an apoplectic fit.

Notwithstanding the holidays and the almost general dispersion of the colleagues and friends of this eminent architect, numerous was the audience which, without official state, rendered to him the last honours on the following 5th of August, and listened at the cemetery to the speeches pronounced by M. Eug. Guillaume, of the Académie des Beaux-Arts; by M. Alfred Normand, of the Société Centrale des Architectes; by M. Henry Révoil, diocesan architect; and by Le P. Montazeau of the *cercle* of working masons and stonecutters; and all were thinking that the mortal remains of the master should repose, not in the village cemetery, but in the crypt of his own monument, in a vault at the Church of the Sacred Heart, beside the spot reserved for the prelate who initiated the work.

English architects in their French travels should not omit to visit the provinces of Angoumois, Perigord, and Bordelais, where are to be found a number of interesting edifices, restored or built by M. Abadie (to whom Paris has not long owed his last work, the Church of the Sacred Heart), but we think that there is profit for all in reviewing briefly the beautiful works executed between 1844 and 1874 by M. Abadie in the centre and west of France, at Périgueux, at Angoulême, and at Bordeaux, and with these alone we can occupy ourselves here.

Grandson of a plasterer of Bordeaux, and son of Paul Abadie, architect of the Department of La Charente, M. Abadie, born at Paris in 1812, studied painting and architecture in the curriculum of the École des Beaux Arts, and was presented by his Professor, M. Achille Leclerc, for the competition of the Grand Prix d'Architecture in 1839. He passed immediately after into the service of the Bâtiments civils, which he quitted in 1847 to take up the position of Inspecteur at the restoration works of Notre Dame, Paris, under the order of M. Lassus and M. Viollet-le-Duc. But in 1849 M. Abadie, attached in 1844 as architect to the Commission of Monuments Historiques, was nominated auditor to the Cultes and diocesan architect to the dioceses of Angoulême, Périgueux, and to a portion of that of Bordeaux, and to him we owe in this beautiful region of the Romano-Byzantine architecture of France, the construction or the restoration of more than thirty cathedrals, churches, chapels, or towers, and some civil edifices of genuine interest, all works upon which we have taken in former times, in the company of M. Abadie, numerous notes, which we abbreviate below, so as to mention the most important.

*Cathedral of Périgueux* (Dordogne).—Beyond the works of general consolidation, notably the renewal of the substructure of the pillars of the cupola of the crossing and of that of the south bay, M. Abadie had to reconstruct almost completely the cupolas with small bells of this cathedral and its apsidal chapel.

*Cathedral of Angoulême* (Charente). The restoration of the principal façade of this church, which appears to-day as it was originally, the small steeples, and a crowning pediment placed on an arcade, as well as the reconstruction of the north steeple, are beautiful works of architecture and archæology.

*Church of St. Michel d'Entraignes* (Charente). This church, to-day completely restored, date 1127, presents this curious particularity of being a French edifice which, by its octagonal plan, enriched by a circular apse on each side, recalls the better Church of San Vitale at Ravenna.

*Tower of St. Michael at Bordeaux* (Gironde). Remarkable work of total reconstruction with enlargement at the base. The spire alone, which is 75 mètres in height, raises itself to a total height of 112 mètres.

*Churches of St. Ausone and St. Martial at Angoulême.*—These two modern buildings, one First Pointed in style (*ogival primaire*), and the other in the Transitional Romanesque style, present a porch with clock-tower, and a nave and aisles behind, a transept with a square choir for the first, and a choir with a circular apse for the second.

*Church of Notre Dame at Bergerac* (Dordogne). A work of much importance, in the First Pointed style, presenting a porch with steeple of 80 mètres, nave with aisles, transept and choir, with radiating chapels, the entire edifice having a length of 96 mètres.

*Church of St. Ferdinand at Bordeaux.*—A work equally important and of the same style, but with square choir and two steeples.

*Church of St. George at Périgueux and Church of St. Bernard at Mussidan* (Dordogne).—Two buildings in the Pointed style, presenting porch and single nave, transept, choir with apse, and steeple.

*Hôtel de Ville, Angoulême.*—Perhaps the most remarkable edifice of all this branch of the work of M. Abadie, who essayed with boldness and success, in France, in the middle of the nineteenth century, the construction of an Hôtel de Ville, recalling the communal mansions, and the palaces of the consuls or *eschevins* of the Middle Ages. The principal façade of this Hôtel de Ville, with its architecture of transition from the Romanesque to the Pointed style, with its buttresses, its pointed arches, and its twin windows, with its belfry more than sixty mètres in height, is invested with a beautiful dignity; but that opposite on the Rue de Plaisance, showing on its first story the great bays which indicate the Salle des Fêtes, and more remarkably still, the façades, as well as those to the court, the vestibules, and staircases, indicate sincere research and a profound feeling for the architecture of the Middle Ages, imitated in its principles and broad lines, but wisely M. Abadie has repudiated whimsicalities and capricious exaggerations. It is a brilliant brief in stone on behalf of an architectural epoch which our own has too often extolled or decried; but which few artists have, as M. Abadie did, studied with conscientiousness, and in dealing with which few have been inspired with so much success.

A French Architect,
Hon. and Corresponding Member, R.I.B.A.

*August* 9, 1884.

## THE ARCHITECTURAL ASSOCIATION'S EXCURSION.

Bury St. Edmunds, the head-quarters of this year's excursion of the Architectural Association, has a history extending back far beyond any period of English architecture which has ever interested the students who make these annual trips, even under the excellent influence of the late Mr. Sharpe. It was far away in the really dark ages of the earlier centuries of our era that the place first assumed a form as the home and dwelling of one Beodric, and became, in course of time, the seat of a monastery and church founded in honour of the Virgin. Beodrics Weorthe, as it was then called, might never have emerged from obscurity had it not been for the cruel slaughter by the Danes of Edmund, a local chieftain much beloved by his people. Such was the veneration in which this leader had been held, that after his death he was canonised, his body was brought to Beodrics Weorthe, and shed such a lustre of sanctity over the place that presently the small monastery grew into a large and powerful abbey,—one of the largest and proudest that England has ever seen, and the town which grew round it was called the Burgh or Bury of St. Edmund. The monastery was freed from episcopal authority; the abbot was mitred, and exercised a jurisdiction such as had few parallels in the kingdom,—that of the Bishop of Durham being the only one quite comparable. The abbey itself was worthy of its lord. Its precincts embraced a vast area, and enclosed a great extent of building. The abbey church was one of the largest in the land; and, as handmaidens to it, there were, in close proximity, three others, two of which remain to the present day, eloquent witnesses of the former splendour of the foundation. Quaint old Fuller bears his testimony in his wonted manner. There was formerly, he says, "so magnificent an abbey church in Bury, that the sun shined not on a fairer, with three lesser churches waiting thereon in the same churchyard. Of these, but two are extant at this day, and those right stately structures:—

> "And if the servants we so much commend,
> What was the mistress whom they did attend?"

This enormous abbey church was built by the first abbot after the Conquest, and gradually extended itself until, in the course of time, and, soon after the erection of the two churches which still remain, came that great blow to ecclesiastical architecture, the dissolution, and behold! the fabric crumbled to pieces, grass silently covered the floors, flowers bloomed over the roofless walls, trees vied in bulk with the columns of the arches; and now, over the house where Abbot Hugo buried himself out of sight and memory of his troubles, spreads a fair expanse of gardens, wherein the youth of St. Edmund's Bury delights to wander. Few as are the remnants of the monastic buildings, there still remain the two great gateways, some 150 yards apart: one raised in later years, the other the very gateway beneath which Monk Samson hurried after his companions with his frock skirts looped over his elbow, when they were bound on that important mission which ended in Samson's becoming the Lord Abbot.

But these are things at present only cursorily examined by the excursionists. Their work hitherto has lain farther afield.

Mildenhall was the first place visited. To reach it the road passes near several villages of historical interest. At Fornham St. Geneviève, for instance, a considerable battle was fought, late in the twelfth century, and a few years before monk Samson became abbot. The then Earl of Leicester, for some reason (and very little reason seems to have sufficed a baron in those days), rose against his king without success. He fled abroad, and presently returned with an army of Flemings, with whose help he hoped to take St. Edmund's Bury; but before he reached the town he was met by the Lord Chief Justice of the day, who had studied war to as good effect as law, and was smitten hip and thigh, and summarily committed,—Countess, Flemings, and all,—to the sluggish waters of the Lark. Relics of the battle have been found from time to time,—swords, skulls, and a ring, presumably the property of the Countess. But nothing of all this turmoil shows itself to the nineteenth century, and the Flemings sleep beneath the fields as quietly as in a graveyard, except that a bone now and then turns up to prove that they are not wholly a myth. All the country between Bury and Mildenhall has remains of ancient civilisation,—of a kind. In the name Icklingham, another village passed *en route*, the memory of the Iceni, the first recorded inhabitants, is said to linger. Here also went a Roman road, the Icknield Way, and just off it are the remains of a Roman villa. But when the guide-book says the pavement of the chancel of Icklingham All Saints is Roman, it misses the mark by a good many centuries. From Icklingham the road passes across open "plains" and near tumuli, and so at last to Mildenhall.

The church and the Manor House were down on the programme, but the former is by far the most interesting, and speaks of a prosperity somewhat diminished from the times when Mildenhall was the centre of a large timber trade, and was much resorted to for the purchase of fish. But that was before the draining of the fens, which has left the town rather stranded. Fuller says that the parochial churches of Suffolk are "no one of transcendent eminency"; but herein he does the county somewhat of an injustice; for Mildenhall, Lavenham, and Melford really reach his standard, not to mention others which are not included in the Association's programme. The chief glory of Mildenhall is its timber roofs, elaborately carved, with bold brackets, and great angels with outspread wings steadfastly gazing on the floor. These angels are quite the most striking part of the design, though the purist some few years back might have objected that they were too important for mere accessories. Outside, the principal interest lies in the north aisle and porch, a piece of beautiful design, late in date, but with greater chances of being well designed in consequence.

The Hall offers little attraction to the architect, much of its original seventeenth-century character having disappeared. There are fragments of panelling inside, and in a room hung with tapestry is a portrait of Catherine of Braganza, said to have been sent to Charles II. "for approbation of the person." If so, the sample seems to have given satisfaction, for she became queen. This portrait bears out Evelyn's criticisms which implied that greater beauty was to be found in the king's own realm; though we see nothing here of "her teeth wronging her mouth by sticking a little too far out."

From Mildenhall the way led back through the Icklinghams, where the unrestored Church of All Saints was visited. Unrestored indeed it is, for it has never been used for some four or five years, and is left to shift for itself; just enough being done to keep the weather out. The church is interesting, if only because it has never come under the restorer's hand, but it is interesting in a fragmentary way, and not as a complete design. There are a good many scraps of Decorated work, which is the prevailing style, though the presence of a Norman window shows that these head-quarters of the Iceni had not been neglected during the ten centuries which elapsed between them and the builders of the bulk of the church. A detour from the straight road back led to West Stow, where are the remains of a brick manor-house, recalling on a small scale East Barsham in Norfolk. The detail has been much defaced; but enough is left to prove that at one time the house must have been very rich in appearance. Even now its shapely brick turrets crowned with figures, its crows' foot gables, and its delightful colour, raise high hopes, which, however, are destined to be somewhat damped on a closer inspection. The builder was a certain Sir John Crofts, who lived about 1540, and who had been attached to the household of Mary, Dowager Queen of France and Duchess of Suffolk. A pleasant reminiscence of his attachment is furnished by Sir John having put his mistress's arms over his main gateway. The royal lady thus commemorated was mother to that Duchess of Suffolk whose effigy lies on an interesting Early Renaissance tomb in Westminster Abbey, and who, in her turn was mother of the hapless Lady Jane Grey. On the wall of one of the rooms inside the gatehouse is a rough wall-painting, setting forth four aspects of life. One represents a youth hawking, and bears the legend, "Thus do I all the day." The next shows a young man whispering to a maiden; beneath, the inscription, "Thus do I while I may." At them gazes a middle-aged man, who says, "Thus did I while I might"; while the series is completed by a greybeard, who exclaims, "Good Lord, will this world last ever?"

From West Stow the drive is not long to Hengrave Hall, one of the typical Tudor mansions of England. Its gateway, with the two flanking towers and detached stone pillars, and the elaborate oriel window over, are well known. This is the most notable feature outside; what there may be inside it was not vouchsafed to the excursionists to discover. The hall is built of white bricks with stone dressings, and, in consequence, its appearance is a little *triste*, and bodes ill for the future of many modern buildings of the same material, but which lack the spirit of Tudor work. Hengrave is extremely interesting from an historical point of view, inasmuch as it was one of the first unfortified dwellings which were erected, and because there went to its completion not only many ecclesiastical revenues but the actual stones and lead which had once formed part of certain monasteries in the neighbourhood. The blow which crumbled the church brought into existence another kind of architecture, not less interesting and quite as useful to the modern practitioner. The history of Hengrave has been written at large, as well as the doings of the Hemegraves, the builder, "Kytson, the Merchant," and the Gages. Those who desire to pursue the subject can hardly do better than go to the fountain-head for their information.

The church, which is not a stone's throw from the house, has long served simply as a mausoleum to the mansion. It contains some seventeenth-century monuments as fine as anything outside Westminster Abbey; while of the structure itself, the arcade and the baby clearstory over it will afford some interest and amusement. The day's labour found an end at Fornham All Saints, where a short stay was made. The church has been carefully restored, but however eminent the restoring hand, much of the real flavour goes under the process.

Tuesday saw the party *en route* for Wetherden, an interesting church, but not one of the finest examples of Suffolk work. It has, however, some excellent roofs, and a sadly defaced monument to a Sir John Salyard. The arch-destroyer, Dowsing, worked his will upon this Papistical relic, and not only knocked off the arms and noses of the little sculptured figures of Sir John and his three wives, but did his best to erase the words "Argus animæ propicietur Deus." Perhaps he objected to any mercy being shown to the soul of a Papist; but he might have reflected how few would read the petition, and that fewer still would echo its sense. The arms which profusely adorn the tomb are also to be seen scattered along the base of the south aisle outside, where they form part of a very handsome and characteristic series of flint and stone panels.

Woolpit, the next church visited, is in many respects finer than Wetherden. Its roofs are quite as good; there is more panel-work of flint and stone, and there is here a very remarkable south porch of two stories rising above the roof of the south aisle, and hiding much of the clearstory (from which it is detached). The design is vigorous and bold, but somewhat lacking in refinement. One need not come to Suffolk to see as good a porch, whereas one must do so to see such flint panelling as one meets here. The nave roof is a very elaborate double hammer-beamed roof, with angels at every possible possible coign of vantage. They nearly all bear some symbol or other, perhaps on a shield, perhaps not. Among these are included a key, a cross, a circle, a triangle, ladder, five wounds, anchor, chalice, money-bag, shell, crook, candlestick, and the letters L. X. J. S., besides others. The existing church is some centuries later than that to obtain which Abbot Samson, when yet a monk, made his perilous journey to Rome, passing for a pilgrim, and using as a talisman the curious phrase, "Ride ride Rome, tarne Cantuereburi," whose meaning, if any one will satisfactorily explain, he will greatly oblige readers of "Past and Present."

The next church, that of Rattlesden, had also been much restored, and though rich in flint panel work, and containing a good Jacobean pulpit, it did not detain the party long. The last and longest stay was made at Rushbrooke Hall, a fine, quiet Elizabethan red-brick mansion, rising from a picturesque but insanitary moat. The courtyard and one side next the moat still retain much of their original character; but the other two sides and the interior have been entirely recast in later times. There is much wood panelling and plaster work of the very Classic era, but the

p incipal charm lies in the unpretentious dignified aspect of the whole place. External detail there is little or none; but, with such colour, one seems to miss it less. To fill such a house worthily, to live up to it, in fact, one feels that the inhabitant must be a worthy man. Of course there is a tale of horror connected with it, though, strange to say, no one knows of any ghost. A young lady was murdered in one of the rooms, and her body miserably cast into the moat beneath. The blood stains are still shown, and are said to be indelible. No one offered to prove the fact, or to prove the efficacy of any detergent, as the miserable man did to the blood stains of Rizzio at Holyrood in the introduction to on > of Scott's novels. And, doubtless if any one had, the astonishment and wrath of the housekeeper would have been no less than that which agitated the guardian of the empty home of the Scottish kings.

The following remarks were made by Mr. Sedding at Wetherden in regard to the objects and value of excursions of this kind:—

"We are now doing architecture 'by picnic,' as my Lord Salisbury would say, and I am persuaded that it is only by picnics of this kind,—wholesale picnics organised by a caucus,—picnics extending over several consecutive days, and kept within the bounds of a given circuit,—that the architecture of our native land can be satisfactorily studied or the wealth and variety of its types be fairly explored. These systematic tours of ours should make systematic students of us all; they should not only extend our stock of examples, but quicken our instincts and make us keen and discriminating observers of the idiosyncracies of the district we pass through. To have learned the characteristics of a district is to possess the key that unlocks the meanings of things: you know then what to expect; you can interpret things idiomatically, as it were. And the knowledge is twice blest: it adds immensely to the delights of study, and endows every piece of design in a district with relative importance. Given an adequate sense of the local style of a district, and the humblest little church (provided it be unrestored) has value; as one of a group bearing the family likeness it takes its place along with the others. Herein, moreover, lies the great distinction between old art and new. The old bears the superscription of local origin, and each detail partakes of characteristics that have been slowly evolved by many generations of native craftsmen. It is idiomatic, hereditary, traditional, and full of characteristic traits. The new, on the other hand, has no local style, and no character, except that which is reflected from the personality of its nineteenth century architect. We parted last year in Somerset,—Somerset which is to me the architect's Utopia,—and this year our luck is to be in a county as different from that in architectural types as it is in physical surroundings. It is this fact that has led me to make these observations; and I think that perhaps it is a good thing that the flavour of the Suffolk work is so different to the other, insomuch as under the compulsion of contrast we can learn more of the wealth and variety of English design. But if the contrasts between the two counties are so striking, the coincidences are none the less so, and both of them abound in specimens of that period of English art which, in my opinion, deserves most to be prized for its detail—the Perpendicular. As to the local style of the East Anglian churches, I venture to think that it not only stands in some respects apart from the ruck of English work, but that there is much in the architecture that is quite unique. I would say that while the main qualities of Suffolk work agree in the main with those found in the contemporary architecture of other countries, yet Suffolk is the last place I should name to a foreigner as containing typical English work. It is *not* English in the same sense as Northampton or Somerset work is. I don't mean simply that you have not the same strange, vast churches elsewhere as are found here, nor the same materials used in so singular a way; but that standing in the presence of this Suffolk work, there comes to me an ever-recurring sense of something foreign about it. Yes, and I have met with curious traceries and strange mouldings, and peculiar treatments of wood, and stone, and brickwork, which I can't match elsewhere, and which one can only ascribe to foreign influences. It is English in a sense, but not wholly so. I would even hazard the opinion that the locality is indebted to Flemish and Dutch influence for its typical expansive churches—paroclial churches of so vast a size that, as in the cases of St. Nicholas Yarmouth and York Minster, is actually outrivalled in width. This is but a personal theory of mine. I would, however, say in support of it, first, that Flemish town churches are very spacious things; second, these that vast churches are entirely confined to the Perpendicular period—just when the Flemish influence was at its height. In my opinion, then, the Lavenham, Molford, Mildenhall, and Southwold type of churches, with their maximum of area and of fenestration, and their minimum of wall-space, represent the ideal of the Fleming imparted to the South-folk builders.

## Illustrations.

### DESIGN FOR PROPOSED NEW WAR OFFICES, BY MR. E. R. ROBSON.

We give this week the design sent in to the First Competition for the War Office and Admiralty Buildings, by Mr. E. R. Robson, a design which shows a great deal of careful adaptation to the peculiarities of the site. Mr. Robson regards the Horse Guards not as a building to be crushed out by the new one, but as forming "the very centre and turning point of any new design," and this has led to a careful manipulation of plan and design having for its object the greater emphasis of the centre. The tower of the Horse Guards is not shown on these drawings, but enough of the Horse Guards buildings is given to show the scale and the connexion of the new building with the old one. The stone screen now forming the eastern entrance to the Admiralty is preserved in nearly its present position, and the semi-circular sweep of the buildings within it would have had a fine effect. The Whitehall front is studied for street architecture; towards the Park windows are more freely recessed and balconies added. "Sculpture is not plastered everywhere, with no other meaning than a reference to the tax-paying powers of the British nation, but is studiously limited to proper positions, and confined to subjects symbolising the Queen, the Army, and the Navy." *

"The object of the plan has been that all the rooms should be well warmed, lighted, and ventilated; that the whole plan should be simple, the corridors straight, well lighted, and easily accessible from entrances and staircases. The ends of Courts are always placed next corridors, for light.

The approach leads to a Principal Court, where the great entrance of the Admiralty is found at one end, and that of the War Office in a corresponding position at the other. Through this a carriage-way leads, by a slight incline, up to the state-doors of the chiefs, and the entrances for receptions, &c. On each side a decline gives access to the vans and carts going down to the minor courts.

The entire scheme is so framed that separate blocks can be built in such order as may be desired.

Between Cocks' Bank and the new buildings is interposed a passage 10 ft. wide, forming a public thoroughfare equal to that now leading into Spring-gardens from Whitehall, and affording valuable light, air, and isolation to the new buildings themselves.

The warming and ventilation were to be modelled on the principles observed in the Municipal Offices at Liverpool. Every corridor to be treated as a reservoir of warmed fresh air; every room to have a small open fire; every room-door to have over the architrave louvres sloping upwards for admission of air, every room to have a separate flue for extracting foul air, of size proportioned to wants.

Every set of latrines open into a small separate court. Some of the lighting is necessarily obtained from wells, forming also the lighting and ventilation to w.c.'s, lavatories, &c.; but it is to be noticed that in all these cases *the windows towards corridors are for light only.*"

The rooms, we may observe, are not made too deep to be properly lighted from windows at one side or end, thus avoiding a serious defect to be found in some of the accepted plans. The arrangements for isolating one department from another, and the latrines from the offices and living-rooms, seem very complete, but it must be admitted that the site seems rather overbuilt. In giving Mr. Robson's views as to the architectural propriety of keeping the building low, and leaving the Horse Guards as a centre, we do not, of course, commit ourselves to that view; but it is a logical idea consistently carried out. The breadth of treatment in the elevations would give a building of solid, business-like character, and with an absence of anything like pretence, which seems suitable to an official edifice of whatever kind. Some people, perhaps, may think that a War Office should have more expression of "swagger" about it, but that impression belongs to the John Bull of the last rather than of the present generation.

* We quote from the Architect's "Report."

### LAVENHAM CHURCH, SUFFOLK.

The Church of St. Peter and St. Paul, Lavenham, one of the grandest parish churches of the fifteenth century in the kingdom, formed one of the main objects of interest in the excursion of the Architectural Association this week. We give a view of it, reproduced from a photograph by Mr. Spanton, of Bury St. Edmunds, and will give next week a similar view of Long Melford Church, a few miles from it, and another of the notable churches of Suffolk.

Lavenham (also called Lanham or Lanehaui) Church, was founded at the expense partly of the De Vere family and partly of the Springs, wealthy clothiers in that part of the country, to the memory of one of whom a chapel in the church is dedicated. Externally the church is a splendid specimen of flint masonry, the massive tower, about 140 ft. in height, offering an almost unpierced wall of irregular flints with their broken faces outwards, giving an exquisite variety and sparkle of colour. The parapet exhibits a succession of panels carved with highly conventional floral ornament of very bold and effective character, unusually so for such late work. Some of these details we have no doubt will have been carried away in the sketch-books of the Association party.

### ANCIENT ARABIC TABLE.

This beautiful piece of work is another of the specimens of ancient Arabic art in the Museum of the Mosque Al-Hakem, at Cairo, photographs of which have been forwarded to us by Franz Bey, and one of which we published in the *Builder* for July 19th of this year. The present example is a small table (Kursi). The top, which is shown on a second plate, is in perforated brass, the inscription and other ornament being in silver plate. The inscription states that this piece of furniture was the property of Mahomed ihu Kalaoûn. The table on side view wants outline and form, like so much other furniture of Oriental type, though covered with delicate and beautiful detail. In the design of the top the main form is better, and the detail even finer than on the sides, and the decoration has the merit (not always found in Oriental work) of being admirably grouped and subordinated.

**The College of Physicians and Cholera.** The College of Physicians, thinking that the public in England may fairly look to them for advice and guidance, have issued instructions. They, above all things, recommend sanitary measures, pure water, free ventilation, avoidance of overcrowding, great cleanliness, and thorough drainage. They point out the danger of excess in eating and drinking. Milk and also drinking water should be boiled; vessels used for food should be cleansed with boiling water. Persons engaged about cholera patients are not, with proper precautions, more liable to the disease. Of these precautions extreme cleanliness and the use of disinfectants, such as carbolic acid, are the principal. House-to-house visitation should be organised and temporary hospitals established. These hospitals should be numerous rather than large. Any unusual looseness of the bowels ought to be promptly attended to. Medical advice should be sought, and meanwhile ordinary medicines, such as chalk mixture and cinnamon powder, may be taken. These instructions are perhaps mild and trite, but they are sensible; and, as the most of them apply to other diseases as well as cholera, they cannot be accepted too gratefully by the public.—*Lancet.*



ANCIENT ARABIC TABLE,
FROM THE MUSEUM OF THE MOSQUE AL HAKEM, CAIRO.

# PROPOSED
# NEW ADMIRALTY & WAR OFFICE.

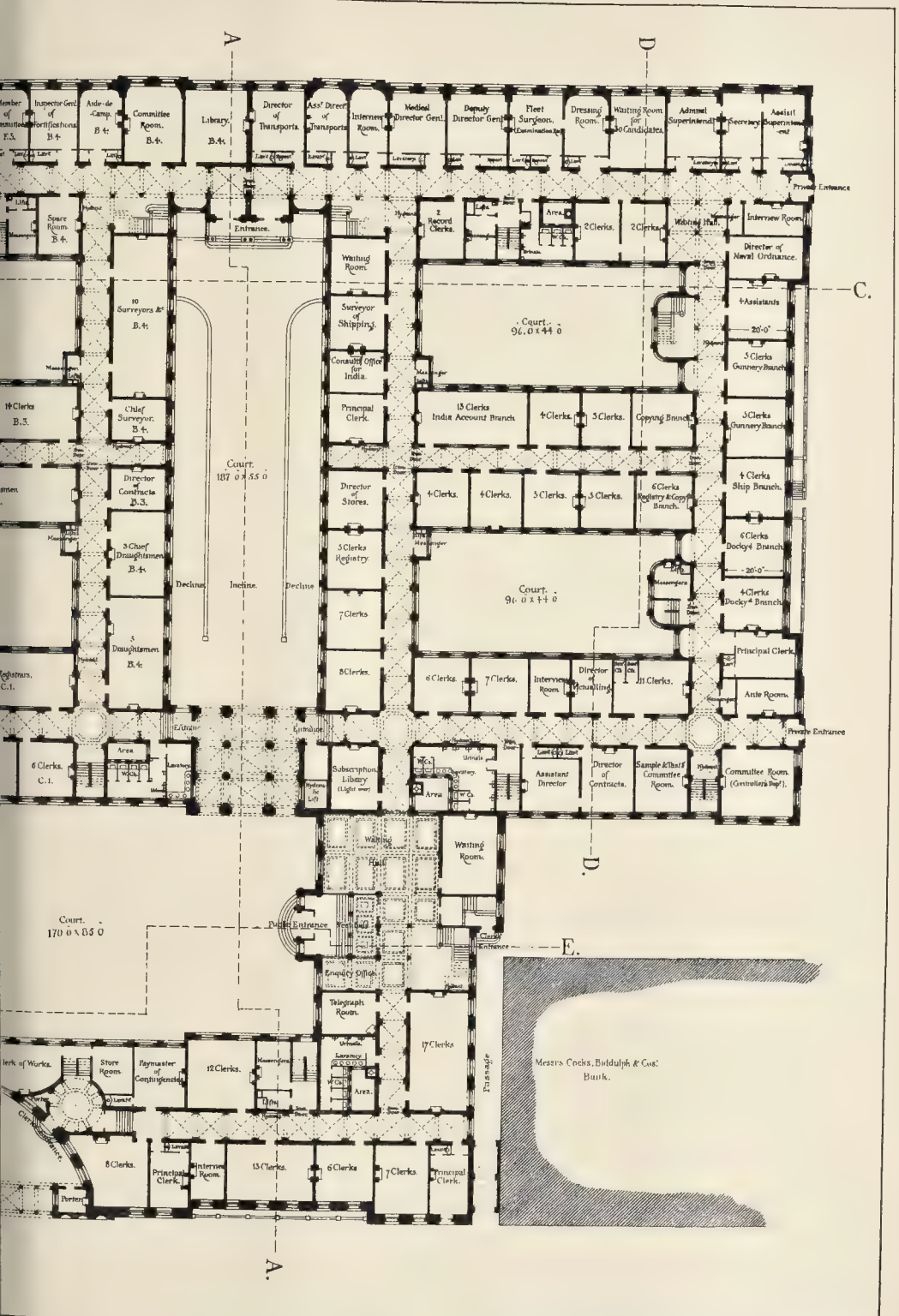
DESIGN SUBMITTED IN FIRST COMPETITION,

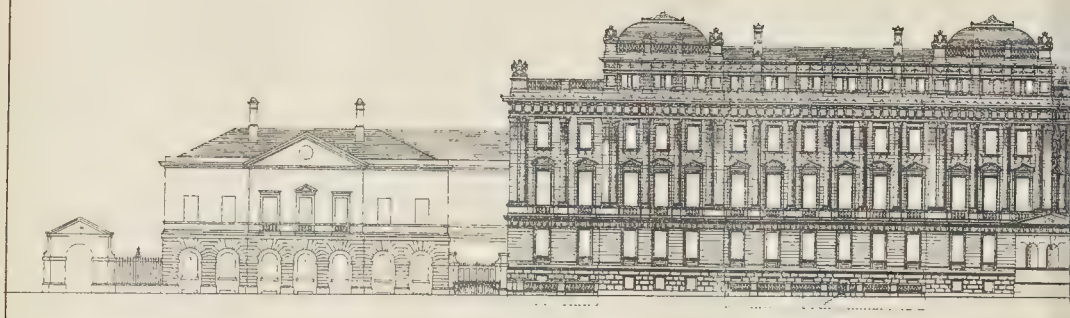
BY MR. E. R. ROBSON.

## Ground Floor Plan.



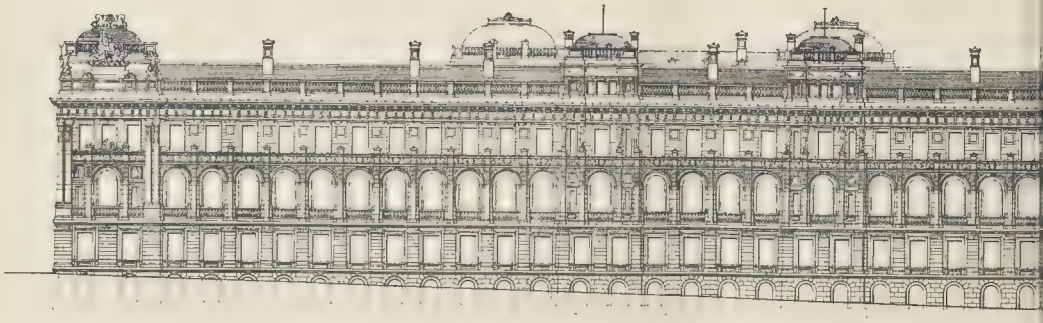

Wyman & Sons Photo-Lith.


A
D
C.
D.
E.
A.
Member of Committee F.S.
Inspector Gen.l of Fortifications B.4.
Aide-de-Camp. B.4.
Committee Room. B.4.
Library. B.4.
Director of Transports.
Ass.t Direct.r of Transports.
Interview Room.
Medical Director Gen.l
Deputy Director Gen.l
Fleet Surgeons. (Examination Room)
Dressing Room.
Waiting Room for 30 Candidates.
Admiral Superintendt
Secretary
Assist Superintendt
Private Entrance
Spare Room. B.4.
Entrance.
2 Record Clerks.
Area.
2 Clerks.
2 Clerks.
Waiting Hall.
Interview Room.
Director of Naval Ordnance.
Waiting Room.
Surveyor of Shipping.
Court. 96.0 x 44.0
4 Assistants
20'-0"
10 Surveyors &c. B.4.
Consulting Officer for India.
5 Clerks Gunnery Branch
19 Clerks B.3.
Chief Surveyor. B.4.
Principal Clerk.
13 Clerks India Account Branch.
4 Clerks.
3 Clerks.
Copying Branch.
3 Clerks Gunnery Branch
Court. 187.0 x 55.0
Director of Contracts B.3.
Director of Stores.
4 Clerks.
4 Clerks.
5 Clerks.
3 Clerks.
6 Clerks Registry & Copying Branch.
4 Clerks Ship Branch.
3 Chief Draughtsmen B.4.
5 Clerks Registry
Decline.
Incline.
Decline.
Court. 96.0 x 44.0
6 Clerks Docky.d Branch
20'-0"
7 Clerks
4 Clerks Docky.d Branch
5 Draughtsmen B.4.
8 Clerks.
6 Clerks.
7 Clerks.
Interview Room.
Director of Victualling
11 Clerks.
Principal Clerk.
Ante Room.
Private Entrance
Registrars. C.1.
Entrance
Entrance
6 Clerks. C.1.
Area.
Subscription Library (Light over)
Area.
Assistant Director
Director of Contracts.
Sample & Trial Committee Room.
Committee Room. (Controller's Dep.t)
Waiting Hall
Waiting Room.
Court. 170.0 x 85.0
Public Entrance
Clerks' Entrance
Enquiry Office
Telegraph Room.
17 Clerks
Messrs Cocks, Biddulph & Co.s Bank.
Clerk of Works.
Store Room.
Paymaster of Contingencies
12 Clerks.
Area.
Passage
Clerks' Entrance
8 Clerks.
Principal Clerk.
Interview Room.
13 Clerks.
6 Clerks
7 Clerks.
Principal Clerk.
Porter





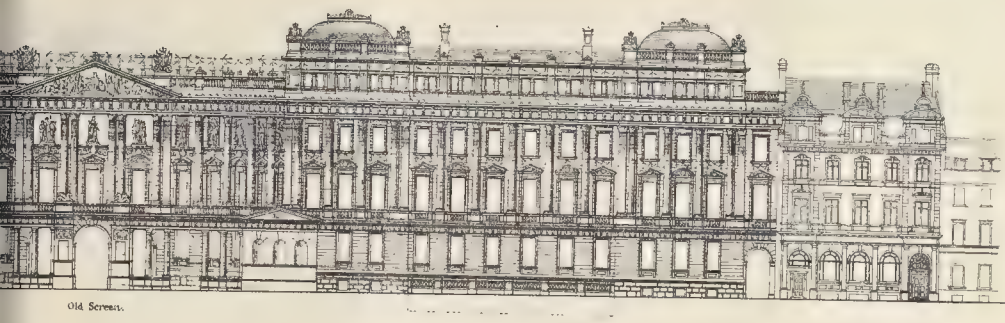

SECTIO



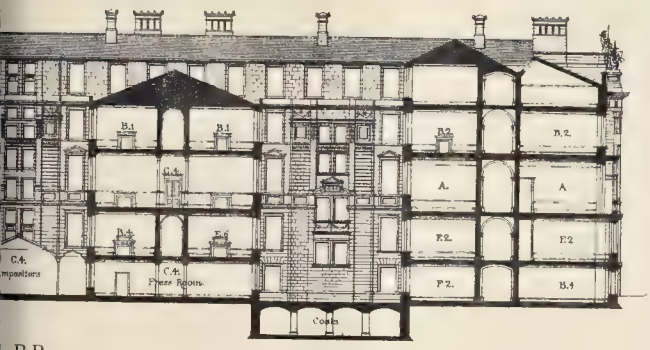
WES

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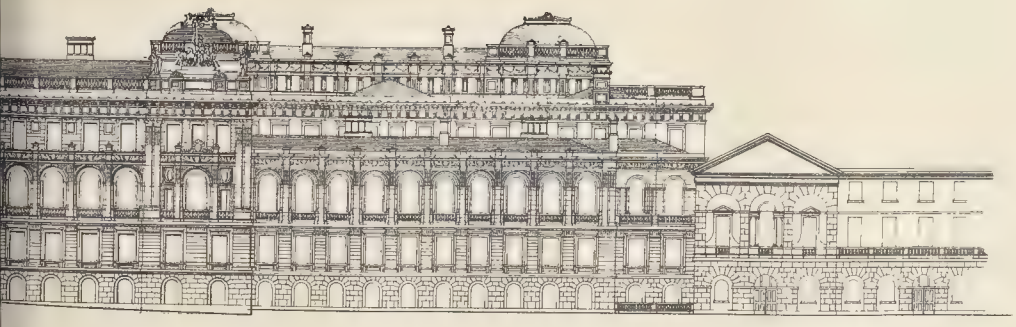
PROPOSED NEW ADMIRALTY AND WAR OFFICE.—




ION TOWARDS WHITEHALL.




E B.B.



ION.

C Queen St London W C

MITTED IN FIRST COMPETITION, BY MR. E. R. ROBSON.



INK PHOTO SPRAGUE & Cº LONDON

LAVENHAM

VISITED BY THE ARCHITECTURAL ASSOCI

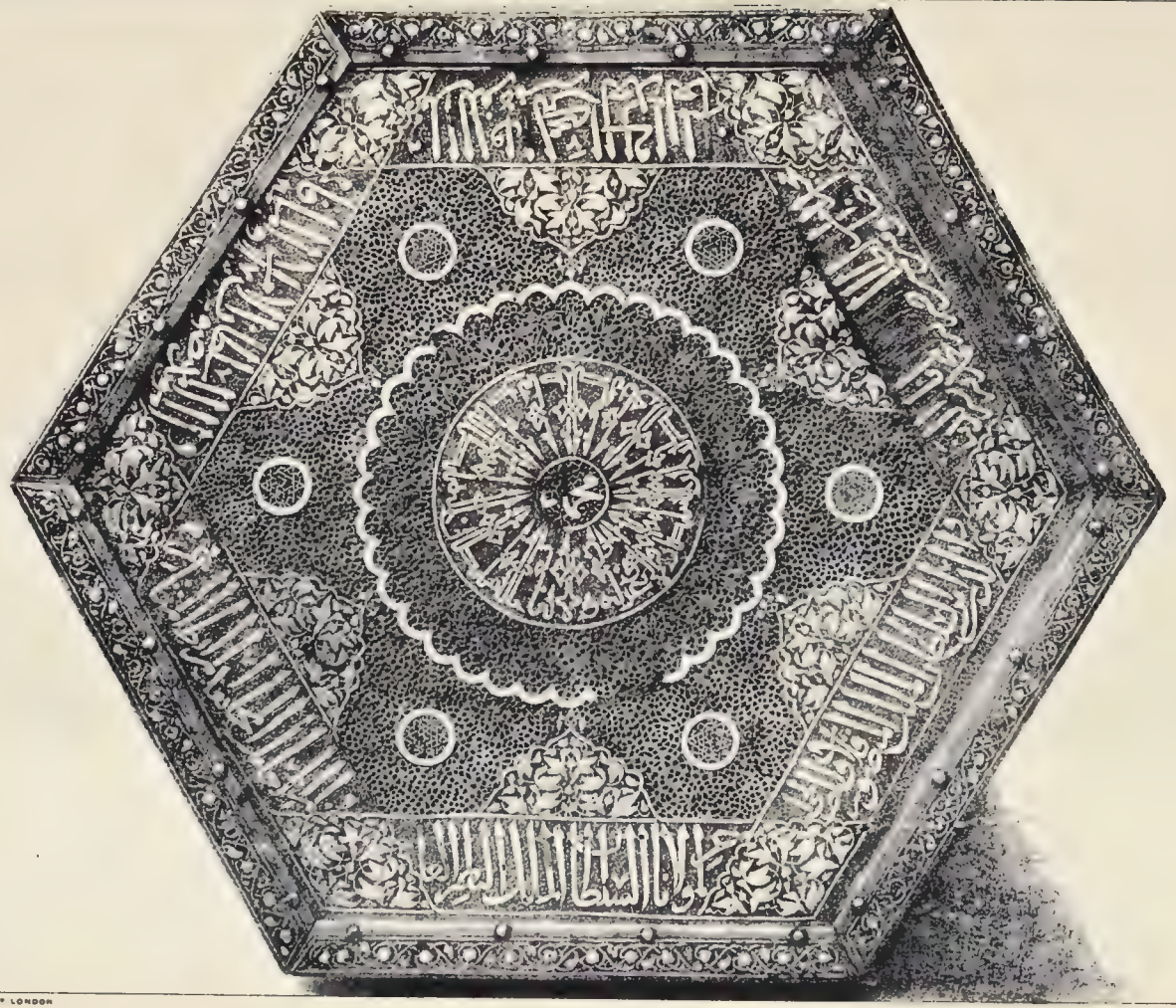
*From a Photograp*



H, SUFFOLK,

THEIR ANNUAL EXCURSION, AUGUST, 1884.

*Bury St. Edmunds.*



INK PHOTO. SPRAGUE & Cº LONDON

ANCIENT ARABIC TABLE.

FROM THE MUSEUM OF THE MOSQUE AL-HAREM, CAIRO

*(Plan of top.)*

## THE ROYAL ARCHÆOLOGICAL INSTITUTE AT NEWCASTLE.

We continue our notice* of the proceedings of the Archæological Congress just concluded at Newcastle-on-Tyne.

On Wednesday, the 6th inst., there were excursions to Warkworth and Alnwick. Arrived at Alnwick Castle, the excursionists were addressed by Mr. G. T. Clark, F.S.A., who observed that though Alnwick was less strong naturally than the frowning half-seagirt rock of Bamborough, less exposed to a surprise than the strongholds of Berwick and Norham, it was, nevertheless, for centuries the chief of the Border fortresses, and famous not only for its capacity and material strength, but still more famous for the great race of warrior barons who so long inhabited and maintained it. Nevertheless, Alnwick was a very strong place. Its position, thirty miles from the Tweed, protected it against sudden and unforeseen attacks; Prudhoe and Newcastle were in its rear, Warkworth, Harbottle, Wark, Ford, and a score of smaller but still strong places, lay at convenient distances, and looked to Alnwick as their central point. Alnwick, moreover, had been fortunate in the fate that had befallen it. It had maintained its local rank and condition. Although much even of the purely military part of the castle had been under the hands of the restorer, so skilfully had this work been accomplished that they had now before them the castle of the De Vescies and the Percys as it presented itself to friend or foe in the fourteenth century. But Alnwick fortress had an earlier history, for its position was such as was often selected by the constructors of strong places in the ninth and tenth centuries. Judging from the disclosures of modern excavation and research, Alnwick was probably the seat of a considerable Saxon estate, for at the Conquest it was certainly a place of some importance. Algernon, who became duke in 1847, set himself to work to restore the seat of his fathers to more than its ancient splendour. Happily, he secured the aid of Mr. Salvin, who, more than any architect of his day, understood how to restore, to rebuild, and even to add, without in any degree departing from the lines of taste and symmetry.

The Architectural Section was opened at Newcastle in the evening, when the President, Canon Raine, delivered an interesting address, observing that it was out of the domain of history that he looked upon the handiwork of ancient builders. The dates which the historian discovered were the framework upon which the whole system of architectural science was laid down. It was history, likewise, which reproduced men and manners, the feats of armies, and the achievements of the gentle life, without which stones were stones, and wood and water, the forest and the moor, lost half their charm. And there was added to history in Northumberland the poetry of legend and tradition, which invested tower and stream in that wide district with its own inimitable grace. Domestic architecture in Northumberland from the very earliest times was the architecture of defence, as was the case, although to a less extent, upon the borders of Wales. At Hexham they would find the most interesting remains of Anglo-Saxon work in the county, and they might mark the influence of the place in the churches in the neighbourhood, beginning with Ovingham. At Holy Island and Farne,—still more sacred ground,—there was little of that date; there was next to nothing else at Tynemouth,—later building had obliterated or concealed it; but at Whittingham, Edlingham, Bolam, Whalton, Longhoughton, and other churches, they would find Saxon towers or masonry, whilst the interlacing sculpture met their eye in many of the churches and churchyards. He would ask them to contrast the condition in the last century with that of the present day. There had certainly been a most remarkable change. In the archdeaconry of Lindisfarne nearly every church had been either rebuilt or restored within the last thirty years,—not always wisely or well, but still assuredly not in the spirit of that Northumberland vicar whom he could name, who chiselled away the whole corbel gable formed of grotesque heads, as he thought his congregation looked too much upon them when they ought to have been looking upon him. In the archdeaconry of Northumberland there had been less done, but still a great deal. He was unwilling to criticise. He remembered an old friend of his making the caustic remark that Mediæval architects erected buildings which we were unable to restore. He did not agree with that; but he did think that in far too many cases ancient remains had not been sufficiently respected, and that modern practitioners had often entirely overlooked the feeling and the character of the architecture of the district in the work which they carried out. Every county, —nay, various parts of each county,—had architectural features peculiar to themselves with which an architect ought at least to make himself acquainted.

The Historical Section held a meeting at the Castle, when Mr. Bain read a paper on "The Percys in Scotland." Before the Antiquarian Section, the Rev. Joseph Hirst read an interesting paper on "The Mining Operations of the Romans in Britain."

On Thursday, the 7th, there was an excursion to Holy Island, where the Dean of Chester delivered a short *extempore* address on "St. Aidan and King Oswald of Northumbria."

Mr. J. T. Micklethwaite, F.S.A., described the Priory from an architectural point of view. The ruins, he said, were an exceedingly interesting study. What they showed was what all the Benedictine churches of the twelfth century showed. All Benedictine churches were built in the eleventh or twelfth centuries. They were altered as people got more room or more ambitious, till very often very little of the original work was left. Here it was not so. This work had not been free from alterations, but it retained its original character more than any other that he knew of in England. There was no tradition of an old cathedral there at all. It was an entirely fresh beginning in Norman times irrespective of anything that might have been on the site before. The old church, part of the Scottish manor, might not have been such a shabby thing as some of their friends thought. It certainly was a wooden erection, but it was probably of a fair size, because they could compare it with what they knew to have existed in other places. With that later building, however, they started entirely free from any previous structure. The apsidal end and other evidences seemed to indicate that the church had been built at two periods in the Norman time.

Mr. Hodges, Newcastle, differed from Mr. Micklethwaite in regard to the old Saxon Church. He had carefully examined the ruins in company with eminent local antiquaries, and they came to the conclusion that the architectural history of the church had been written wrong all through. They believed it was "all bosh" about a wooden church; and that the site was the site of the Saxon Church of Lindisfarne. He thought in the apsidal end they had the remains of a Saxon Church. He should tell them that the church was built about 1130, after the nave of Durham Cathedral was finished, or was still going on; and it was almost a copy on a small scale of that cathedral.

Mr. Micklethwaite said Mr. Hodges's theory was a very tempting one, but he could not accept it without further testimony.

On Friday, the 8th, there was an excursion to Bamborough Castle, which was described by Mr. G. T. Clark, who said that here, not the first fortress in Britain was founded, but the first Saxon work of which we happen to know the exact date. Ida landed here, and so completely struck terror in the Celtic people of the district, that his name descended to us as Ida, the plane bearer. Ida founded Bamborough, so calling it in compliment to his spouse, Bebba.

In the Architectural Section a paper on "The Peles of Northumberland" was read by Mr. C. J. Bates. In the Antiquarian Section, the Rev. G. F. Brown read a paper on "The Fragments of Sculptured Stones at Monkwearmouth and Jarrow." He described at length the sculptured fragments at both places, and said that as many of them were exposed to the weather some step should be taken to preserve them. As many of the sculptured fragments in the country were in the same condition, he thought that measures should be taken to get pictures of them, so that they might not be lost altogether to posterity. His university, Cambridge, he believed, was prepared to move in that matter and had submitted to him a number of questions, one of which was as to what assistance there could be obtained from the local archæological societies. The reply of the Newcastle Society was very cordial. It would do the whole of the work for its own district.

On Saturday, the 9th, there were excursions to Monkwearmouth, where the church was visited and discussed; and to Ravensworth Castle, where Mr. W. D. Longstaffe acted as *cicerone*. In the Antiquarian section, in the evening, Dr. Bruce gave a lecture on "The Northumberland Small Pipes." In the Architectural section, which held a meeting at the Old Castle, the Rev. J. R. Boyle read a paper on "The Saxon Churches of Northumberland and Durham," making special reference to Monkwearmouth and Jarrow. The Historical Section also had a meeting, when the paper read was on "The Constitutional Rights of the Houses of Parliament," by Mr. J. P. Harrison.

On Monday last there was an excursion to the Chesters (the Roman Silurnum), and to the Roman wall. Dr. Bruce acted as *cicerone*. In the evening the Antiquarian Section held a meeting, when the Rev. G. R. Hall read a paper on "The British Remains in Northumberland." In the Architectural Section, Mr. C. J. Bates continued his paper on the Mediæval castles, towers, and bastle-houses in Northumberland, and Mr. W. H. St. John Hope read a paper as to "Recent Excavations on the Site of Alnwick Abbey."

On Tuesday last there were excursions to Prudhoe, Ovingham, Bywell, Corbridge, and Aydon Castle, Prudhoe Castle being described by Mr. Clark.

On Wednesday the proceedings were brought to a close by a visit to Brancepeth Church and Castle, and to Durham Cathedral and Castle.

* See p. 2[illegible], *ante*.

## THE ROYAL HISTORICAL AND ARCHÆOLOGICAL ASSOCIATION OF IRELAND.

At the August meetings held in Armagh, presided over by Lord Charlemont and by Dean Reeves, the following papers were read by Mr. James J. Phillips, architect, Belfast.

(1.) "Notes on some old Wrought-iron Grille Work in the Vicinity of Armagh." I could not help observing when first I visited Armagh, some eighteen years ago, the frequency with which, in certain parts of the city, one met with excellent examples of a peculiar class of architectural wrought-iron work, which, on a return journey to the locality some years afterwards, I noticed was very sensibly diminished, owing, no doubt, to municipal exigencies, and the structural changes of residences into shops, &c. There is, however, sufficient of this work now remaining in the vicinity of the cathedral and elsewhere to show that at one time this was the *locale* of the labours of a blacksmith or family of blacksmiths, whose artistic power was very considerable, and for the merit of whose productions we must entertain the highest respect. Owing to civic changes just referred to we need not seek in the bustling and changeful streets of the city, or even under the shadow of the Abbey Minster, for the culminating work of this handicraftsman, but in the more remote suburbs where cluster the gables of the quaint old mansions (few and far between though they be) of the county families, and to which such artworks serve as the harmonious adjuncts. Accordingly, we find in the pastoral village of Richhill, about five miles distant from Armagh, a veritable trophy of the blacksmith's handicraft, in which design and execution go hand in hand; and we have preserved to us here, where the *requiescat in pace* of a monumental work of art is little likely to be disturbed, the most beautiful specimen of old wrought-iron grille work in the province of Ulster. It is of a period of art which *sui generis* has its *habitat* in such classic localities as the Inns of Court in London, at Gray's Inn, and the Inner Temple, or in Cheyne Walk, Chelsea; and it is quite a charming surprise to us to come on it here in this quiet out-of-the-way village in Ireland, and leads one to cast about in the vicinity for old red brick mansions, with brindled brown-tiled roofs, or for that class of dormers and oriels, and such features, so greatly sought after by that school of architects who are partial to Free Classic treatments. In England such work has been variously termed late seventeenth-century work, and by some called Queen Anne work, although probably the majority of it was executed during the reigns of the two first Georges. Even the casual observer is struck with the dignity and

breadth of treatment of the grille and screen-work at Rich-hill, and with the clever manner in which each field of vertical bars is alternated with panels of characteristic scroll-work, the upper parts enriched with forgings, forming a sort of *chevaux-de-frise*, while the gates are crowned by convoluted and foliated forgings, which upheld the arms and crest of the owners, the details of which are manipulated with great taste and refinement. Sufficient effect is produced by simple treatments of the hammered bar without aping cut-stone mouldings or wooden carvings, or placing sheet iron festoons and garlands to rot in the humid atmosphere of this island, although we find many instances of this treatment in the contemporaneous art iron work in England and the Continent.

(2.) "The Ancient Abbey of Armagh."—This paper bore upon "The Carol of the Prior Clanstralis in Irish Abbeys."

## BUCKINGHAMSHIRE ARCHÆOLOGICAL SOCIETY.

The annual meeting and excursion of the Architectural and Archæological Society for the County of Buckingham took place on Monday last, August 11th. The day was fine but extremely hot, and the programme occupied all its sunniest hours. The members left Aylesbury by special train at 11 a.m., and reaching Buckingham at noon, paid a visit to the parish church and the few other objects of interest which the town contains. The church possesses scarcely a single feature on which either architect or antiquary can look with pleasure, except it be the site. It stands upon a natural rock of some elevation, and known as the Castle Hill. No doubt in earlier times the spot was occupied by some sort of fortress, and massive foundations and a deep wall have been discovered. But the church itself dates only from the year 1780 and, until 1862, was a conspicuous example of the worst characteristics of the eighteenth century. The late Sir Gilbert Scott,—who was born at the parsonage house of Gawcott, a district of Buckingham,—did his best to turn Grecian into Gothic, and certainly deserves much credit for what he was able to achieve. New windows, buttresses, and parapets were introduced, and a chancel of fine proportions was added. The pillars, alternately stone and marble, have, on the whole, a good effect, and the tower and spire, rising to a height of 150 ft., rescue the town from appearing absolutely insignificant. The manor house and the house occupied by Mr. Hearn, and said to have been King Charles the First's quarters in 1644, are worthy of notice, and still more so is the old Grammar School, part of which dates back to the fifteenth century. Leaving Buckingham, the excursionists ascended the hill on the north-east side of the town, and visited the church of Maids Moreton, which is said to have been built by two maiden sisters of the Lord Peover in the fifteenth century, and is rich in beautiful details of Perpendicular work. The tower, by a peculiar arrangement of its buttresses, has the appearance of being octagonal, and the groining of the western porch is unusually elegant. The same term may be applied to the sedilia, which have been restored with great care by Mr. St. Aubyn. The old chancel screen is of good design, and the pulpit, presented by the family of the Bishop of Winchester, is an admirable example of modern skill. From Maids Moreton to Lillingston Dayrell is a drive of some three miles through rather pretty country. The parish church was restored about fifteen years ago, and a north aisle added by Mr. G. E. Street. It is rich in sepulchral memorials of the Dayrell family, in whose possession the manor has continued from the reign of Henry III. to the present time. The excursion ended in a visit to Stowe House, where the Duke of Buckingham and Chandos (the President of the Society) entertained the members and their friends at luncheon. Although shorn of its former splendour, and wholly wanting in archæological interest, the mansion, with its noble portico, colonnades, and pavilion wings, forming a frontage 916 ft. in length, has a certain grandeur which compels admiration, and the gardens and pleasure-grounds are of unusual beauty. It may be doubted how far these excursions serve the cause of archæology, but there can be no question that when combined with ducal hospitality they are inconveniently popular.

## SUSSEX ARCHÆOLOGICAL SOCIETY.

The Sussex Archæological Society held its annual meeting on the 7th inst., at Brickwall, Northiam, the seat of Mr. E. Frewen. The *Sussex Advertiser* says that the meeting was a complete success. About 150 ladies and gentlemen took part, proceeding by special train from Brighton, Lewes, and other stations to Robertsbridge, where carriages were in waiting to convey the excursionists to Salehurst Church, a picturesque old building. Here a paper on that church was read by the Rev. J. W. Loosemore, vicar of the parish. The party next proceeded by carriage to Bodiam Castle (built in the reign of Richard III.), some members separating to walk round by Robertsbridge Abbey, the remains of which were inspected and explored. At Bodiam Mr. Lacy W. Ridge read an able paper, explaining the principal features of the building, chiefly from an architectural point of view. Thence the party drove to Brickwall Park, where the dinner-tent stood pitched. Mr. Frewen took the chair. Archdeacon Hannah proposed the only toast drunk, viz., the Chairman. Dinner over, the visitors were conducted over Brickwall House, and shown the valuable oil paintings and other objects of interest stored there, including Queen Elizabeth's shoes. The party next visited the Queen's Oak, under which Queen Elizabeth had dinner on her journey from London to Rye. [The oak is shortly to be bricked up where decayed, for its better preservation.] The company also went over the church, part of which was supposed to be of Saxon origin, and the mausoleum of the Frewens, and then drove to Battle Station, where the special train was waiting to carry them home. The weather was all that could be wished, and the excursion proved most enjoyable.

## CRYSTAL PALACE SCHOOL OF ENGINEERING.

On Saturday last the thirty-fifth term closed in the usual manner, and Lieut.-Gen. Sir Gerald Graham, V.C., K.C.B., R.E., presented to the students the certificates awarded by the examiners, who, for this term, were Mr. W. H. Stanger, A.M.I.C.E. and Mr. John Brunlees, M.I.C.E.

The course of lectures for the term was on "Railways: their Construction and Appliances." The highest number of marks attainable was 278. Mr. H. Copeman was first with 221 marks; he also received a certificate of merit for work in the drawing-office. Forty students attended the lectures, thirty-six were eligible for examination, and twenty-three received certificates. Mr. G. A. Keene was first in the order of merit for work in the drawing-office, with 174 marks for lecture examination; twelve certificates were awarded to other students for work in the drawing-office. For work in the pattern-making and smith's shops twelve certificates were awarded, Mr. G. H. Sowray was first with 147 marks for lectures; in the fitting-shop eleven certificates were awarded, Mr. J. A. Taylor first with 149 marks for lectures.

For students in the Civil Engineering Section, taken in the second year's course, the honours awarded were,—first term, general surveying and preparation of plans for Parliament, five certificates, Mr. J. A. Marrot, first; second term, calculations, plans, and estimates for railway and dock, four certificates, Mr. L. O. Cowper-Coles, first; third term, design and construction of existing and other engineering works, eight certificates, Mr. W. Worsfold, first.

In the Colonial Section thirteen certificates were awarded, ten of the first, two of the second, and three of the third grades.

General Graham briefly addressed the students, saying that he had in his visit seen enough, in his examination of the students' work, to impress him deeply with a sense of the value and importance of the instruction and training given. The unoccupied field for engineering talent and enterprise was illimitable. Roads and railroads over and under land and sea were only a branch of the subject; others vastly important lay in the directions of electrical engineering and mechanical inventions, improvements, and adaptations. He regretted much that he had been unable to visit the camp of the students in the colonial section, and to overhaul their cooking, living, and sleeping arrangements and provisions, to have seen how they "roughed it," as well as to have inspected the construction of their floating and spar bridges and other work. He considered the course in this section of great importance, in the trained intelligence with which it equipped intending colonists, a power that they would find much more effective and useful than money or letters of introduction without such training. It was not surprising that the school, which commenced nearly twelve years ago with fifteen students, should in the last term have had above eighty in attendance; that about 120 former students of the school should now be in the employment of well-known civil engineers, and about as many with mechanical engineering firms; and that others were occupying useful and honourable positions, for which they had received an important part of their qualification here.

Mr. Stanger, Examiner, on behalf of his colleague and himself, said that their duties had resulted in the greatest satisfaction with regard to both teachers and taught. He had no suggestions to offer as to the lines on which the examination should be conducted, but he would take leave to say that examination did not always secure to the "steady slogger" the honours he had earned by conscientious hard work. Mr. Stanger commented on the work of a number of the students, and, among the cautions he offered were those against loading drawings heavily with colour and depending upon sand-paper rather than sharp tools in pattern-making. He also urged the students strongly to thoroughness in all their work.

Mr. Kimber moved a vote of thanks to General Graham for presiding, and Mr. J. W. Wilson, Principal of the School, gave some interesting particulars respecting former students.

## PURCHASES BY THE ART-UNION OF LONDON.

The following works have been selected from recent exhibitions by the prizeholders of the Art-Union of London for the current year:—

*From the Royal Academy.*—Is Duelling Lawful? painted by S. W. Lee, 45*l.*; On the Cornish Coast, by T. S. Croxford, 40*l.*; A Toiler of the Sea, by Carlton A. Smith, 40*l.*; The Mourne Mountains, by Walter F. Stocks, 31*l.* 10*s.*; In the Wood, by Wm. F. Hulk, 30*l.*; Making Friends, by Thomas Pyne, 20*l.*; Our Ironbound Shore, by T. Malcolm Stewart, 15*l.* 15*s.*; Sunny Days, by E. Clegg Wilkinson, 15*l.* 15*s.*; and Twilight Grey, by W. Ayerst Ingram, 10*l.* 10*s.*

*From the Society of British Artists.*—Sleep, painted by G. H. Barrable, 50*l.*; The Wandering Minstrel, by W. Holyoake, 50*l.*; The Gossip, by Wm. Bromley, 45*l.*; Who Killed Cock Robin? by Mary K. Benson, 35*l.*; Flowers of the Forest, by Edward Holmes, 35*l.*; Moel Siabod, North Wales, by Sidney R. Percy, 35*l.*; A Turn in the Lane, by J. Clayton Adams, 30*l.*; Near Tintagel, North Cornwall, by T. S. Croxford, 30*l.*; A Summer's Morning, by Gustave de Breanski, 30*l.*; My Face is my Fortune, by Edwin Roberts, 30*l.*; Loch Ard, a Bright Day in Autumn, by J. J. Bannatyne, 25*l.*; 'Tis Sweet to visit the Still Wood, by Yeend King, 22*l.*; The Rivulet, by Alfd. W. Williams, 25*l.*; My Lord's Luggage, by R. S. James, 23*l.* 3*s.*; The Thames at Wargrave, by Stuart Lloyd, 20*l.*; Summer Sea, by L. C. Nightingale, 15*l.* 15*s.*; The First Fence, by A. C. Dodd, 15*l.*; The Farmstead, by J. E. Grace, 15*l.*; Autumn Morning, by Stuart Lloyd, 15*l.*; The Llugwy, North Wales, by James Peel, 15*l.*; A Bit Hard o'Hearing, by Everton Sainsbury, 15*l.*; and On the North-east Coast, by R. Hollyaght, 10*l.* 10*s.*

*From the Grosvenor Gallery.*—In the Stillness of Autumn, painted by Thos. Ireland, 45*l.*; Hark! through the dim woods dying, With a moan, faintly the winds are sighing, by J. Whipple, 40*l.*; October, by Miss Flora M. Reid, 30*l.*; An Old Bridge in Surrey, by J. E. Grace, 31*l.* 10*s.*; and Phillis, by Lady Louisa Charteris, 15*l.* 15*s.*

*From the Royal Society of Painters in Water-Colours.*—Sunset, Early Spring, painted by C. Davidson, 30*l.*; and On the Wharfe, by W. Eyre Walker, 2 *l.*

*From the Royal Institute of Painters in Water-Colours.*—Funeral March of a Hero, painted by W. L. Wyllie, 100*l.*; A Wiltshire Village—Evening, by C. J. Lewis, 2 *l.*; and King Harold's Bridge, Waltham Abbey, by Alfd. Hutton, 12*l.* 12*s.*

*From the Nineteenth-Century Art Society.*—Looking up the Muskee, Cairo, painted by R. M. Chevalier, 75*l.*; St. Peter's Port, Guernsey, by Chas. F. Draper, 20*l.*; A Woodland Path, by Fred. Hines, 20*l.*; and Resting in a Wood, by Geo. D. Hiscox, 10*l.* 10*s.*

*From the City of London Society of Artists.*—Quiet Pools on a Highland River, painted by Wm. J. Ferguson, 20*l.*

*From the Society of Lady Artists.*—After the Rains, painted by Fanny Assenbaum, 15*l.*

*From the Crystal Palace Picture Gallery.*—At Antwerp in the olden time, painted by H. Schaeffels, 60*l.*

**"The Bakeries at the Health Exhibition."**—Messrs. Harris & Co., of Upper George-street, Bryanston-square, write to say that whereas on p. 186 of our last issue we mentioned Messrs. Watt & Son as occupying the next stand to Messrs. Hill & Son, and working Messrs. Perkins's steam oven, they (Messrs. Harris & Co.) have, from the commencement of the Exhibition, occupied the position referred to, and are the patentees and sole manufacturers of the "Angels' Cake" to which reference was made.

## IMPERMEABLE CONSTRUCTION.

Your correspondent, "H. T." (p. 210), whose initials I do not at present recognise, seems to have missed the point of my remarks on the preservation of the external faces of buildings. I do not profess to cure bad stone, or to render as good as new stone which has already decayed. But I have proved to my own satisfaction and from my own experience that it is quite possible to preserve from premature decay stones which, without the preventive measures I am accustomed to employ, would certainly not resist the effects of the atmosphere. "H. T." speaks of arresting decay after it has set in; I speak of what it is desirable to do to prevent decay before it has set in. I prefer to find the key before the horse is lost.

With regard to the preservation of new stonework by the application of linseed oil, Professor Cockerell adopted this wise course with reference to Hanover Chapel, with the result I had the opportunity of proving when I cleaned down the building with the steam jet.

I will take the opportunity of early inspecting the various buildings to which I have applied the Indestructible Paint Company's solution as the buildings were cleaned down, and will note the result. E. C. Robins.

## WARWICKSHIRE EARTHWORKS, &c.

Sir, Allow me briefly to reply to the letter of Mr. J. Tom Burgess, F.S.A., in your issue of August 2nd, wherein I am accused of propagating a wilderness of errors through not having availed myself of the best published information on this subject. In answer, let me say many if not all authorities within reach were duly consulted, the several sites inspected, and much information obtained on the spots from old inhabitants personally. It was never my intention to thoroughly exhaust the subject under notice, and accordingly much information was rejected as superfluous, speculative, or unsuited for general information. If my views do not suit or coincide with any particular theory of Mr. Burgess, I cannot help it, but am pleased to say that Mr. M. H. Bloxam, F.S.A., and several other good authorities, have sent me flattering and congratulatory letters, as to the worth and success of the series of papers now publishing; and one of them goes so far as to hint that I "might well have expected Mr. Burgess's wrathful criticism, for does he not state that he is himself publishing a long-promised work on the subject, and by his letter draws the attention of the public to his book, thereby effecting a cheap advertisement of it?" It is not now my intention to open up a controversy in your pages on the points disputed, and I have no leisure time on my hands to do so; but I shall be pleased to see Mr. Burgess's map of early earthworks, and his sketch of the keeper's lodge and enclosure, Chesterton, at a suitable time hereafter. W.

## LEAKY SLATE CISTERN.

Sir,—Thanks for kindly inserting my query [p. 176], and also Messrs. Christie's note in reply thereto [p. 210]. The leak, which was stanched on Monday by my steward, after a Wicklow tradesman had tried it ineffectually, has not yet shown any symptoms of passing the water. The sole cause of leakage was a vein shelving towards the centre,—a simple flaw in the floor.

I will adopt Messrs. Christie's suggestion, and also keep the tank always filled. The cistern is flush with the lead of the house, and 4 ft. deep, protected on three sides by the thick walls of the dwelling. It seems impossible for any alternation of heat or cold to affect it, especially when covered on the top with timber 1½ in. thick, added to which sacks filled with straw could be placed over it.

Bombazeen.

**Asphalte Work.** — The Brunswick Rock Asphalte Paving Company's tenders have been accepted for the following among other works—(1) For laying with asphalte 1-inch thick seven warehouses in Royal Victoria Docks, for the London and St. Katharine Docks Company; (2) for laying footway of main line entrance to Liverpool-street Station, for the Great Eastern Railway Company; (3) for the whole of the asphalte work at the new Mansion House Station, for the Metropolitan District Railway Company; (4) for laying the floors of new buildings at Caterham Asylum, for the Metropolitan Asylums Board.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—VII.

### LOMBARD AND RHENISH.

Now let us turn again to Keith Johnston's Physical Geography, and on the third of the small maps of the known world at consecutive periods, we shall see that, while the Roman Empire was in "full swing" about the year 300 A.D., there is a northern district appearing on the scene, coloured purple, and called Germania. It is kept well within bounds, while the yellow colour of the Roman Empire ranges from side to side of the map, spreading from Britannia at one extreme, round by Spain and North Africa, across the Red Sea, and over Syria, until it touches Persia. The next map tells a very different story. It is dated about 500 A.D., and all the north-western and western and south-western yellow colour has given way to the invading purple.

The text tells us that this is due to the Goths, both Ostrogoths and Visigoths, the Vandals, the Franks, and the Huns, sweeping down from various directions north of the Alps, and, after vicissitudes of victory and defeat, displacing the power of Rome in all but its eastern empire.

Of these invaders we have to notice Theodoric, king of the Ostrogoths, 493 to 525 A.D., who not only visited Rome, but went further, and built himself a palace at Ravenna, at which place his tomb remains, and will be found illustrated on page 518 of Fergusson's Handbook. It is chiefly remarkable for its circular roof formed of a single slab of stone 35 ft. in diameter, with handles left in the solid by which it was raised into position. The palace has excited the admiration of Freeman, who, in his "History of Architecture," page 163, revels in strong language in praise of a succession to the then effete Roman style, which he holds in contempt. He says, "In this first of Teutonic buildings, every mind, not warped by the pedantry of classicalism, must at once recognise not only a wonderful change, but a wonderful improvement. The architect at once grasped the great law that the construction and the decoration must be derived from the same source."

We are told that the Goths were got rid of by Justinian, but that, soon after his death, another race of conquerors came down from the North to enjoy the fertile plains watered by the river Po. These were the Lombards whose name has stuck to that country ever since. They, too, are the people who developed a style of architecture which may be regarded as a reaction from the monotony of the Roman style, and which certainly took unheard-of liberties with the sacred "orders," of which we now take leave for many centuries. Fergusson says, on p. 350 of his Handbook, that, before the age of Charlemagne, viz.,—768 A.D.,—the transformation was complete as regards the valley of the Po being inhabited by the same races who occupied that of the Rhine. As a consequence, the change in the architecture is distinct and clear, and he illustrates the chapel at Friuli, built in the eighth century, as an early and characteristic example of Lombard work, as may especially be seen in its groined stone vault.

In this form of roof lies one of the chief distinctions between the styles that we have now to consider, and the basilican churches which were, as a rule, covered with wooden roofs only. It will soon be noticed that the various portions of the superstructure which had to be supported, regulated the size and disposition of the piers that had to carry them, whereas the columns and arches in a basilica had simply to carry a flat wall, and there was an end of the matter.

This difference will soon be seen in glancing through any of the following works:—Osten's "Bauwerke in Lombardie," seventh to fourteenth century, one vol. folio; De Dartein's, "Étude sur l'Architecture Lombarde," 1865, parts 1 to 5, fol. [this book also illustrates the Basilican, Romanesque, and Byzantine styles referred to in the last article]; or Grüner's "Terra-cotta Architecture of North Italy," with coloured plates by Lose, 1867 (one vol. large quarto). Hope's "Essay on Architecture" now becomes an important work, while Ruskin has a good deal to say on the subject in the course of his "Stones of Venice,"—for example, on page 359 of vol. 1, on the "Northern Energy." In fact, there is very little sympathy between the temper of these invaders of the sunny South and of the nations whom they supplanted, so that we shall find, as usual, the expression of their temper in their architecture; and as to their decorative sculpture, it shows, according to Ruskin, amongst other things, that the Lombard was strongly imbued with the love of a joke.

After contemplating the high degree of execution that the Romans had attained in sculpture, especially of the human figure, it seems rather a drain upon one's credulity to be asked to admire these Lombard bogeys. One must borrow a pair of spectacles from Ruskin or from Freeman in order to see them in their proper light. The former especially devotes a great many pages to "the grotesque" in art.

Most authors agree in pointing to the Church of St. Michele at Pavia as an exponent of all the peculiarities of the Lombard style; Fergusson going so far as to say (page 536 of his Handbook), that there is hardly any feature worth mentioning which was invented after the date of this church, which took its present form either at the end of the eleventh or the beginning of the twelfth century.

Let us then examine the design of this building, which is illustrated by drawings to a large scale in De Dartein's book. There is also a ground-plan of it in Rosengarten, page 232, and an internal view on page 235, while Fergusson gives a longitudinal section and an external view of the apse on page 537. The plan shows a choir, transept, and a short nave of four bays only, with side aisles; but even these few bays are broken into main groups by greater and lesser piers, and a glance at the internal view or section shows that certain portions of the piers extend higher than others, some having capitals to carry the arches dividing the nave from the aisles, and the vault over the aisles, others rising to the level of the triforium, or gallery above these aisles, while others pass by this level and ascend to the springing line of the vault over the nave. This vault, moreover, is not only groined, but is strengthened by transverse and diagonal ribs. The piers, besides having the above-named duties allotted to certain portions of them, have further subdivisions which, when traced up to their capitals, are found to carry corresponding subdivisions in the arches.

Such subdivisions were not known in the arches of the basilican churches described in the last article, wherein any relief or ornament that might be required would be obtained by panelling the soffit, as at St. Clemente, in Rome.

The vaulting of the nave and aisles has a further influence on the plan of St. Michele, by requiring external buttresses, which now become a recognised feature in the style.

Next we come to the crux, or crossing of the nave and choir, and the transept. Here is no such dome as we have described in the Byzantine churches, but one changed from the square to an octagonal plan, in which form it is continued up above the surrounding roofs. This polygonal form of central so-called dome continued to be a favourite feature with the Italians long after they had shaken off the Gothic style, as may be seen in Strack's "Central und Kuppelkirchen in Italien," 1882, two vols. folio, and in Laspeyre's "Kirchen du Renaissance in Mittel Italien," 1882, folio, which books illustrate buildings as late as the sixteenth century.

To return to St. Michele. The exterior of the apse has a row of narrow semicircular-headed windows, just under the eaves, which were the forerunners of the characteristic galleries in a similar position in many subsequent churches, such galleries lighting the space between the back of the vault and the outer wooden roof, and, as Fergusson points out on page 536, they are an admirable substitute for a cornice. These galleries came to be repeated on other parts of the buildings, the west front of St. Michele exhibiting them along the gable. This front has also semicircular-headed doorways with several subdivisions in the jambs and arch, such as we noticed inside, while the opening itself is square-headed, the space between the lintel and the arch being devoted to sculpture. There are two ordinary features of Lombardy architecture which are lacking in this west front; one is the projecting porch with its columns carried on the backs of animals carved in stone, and the other is the usual wheel-window in the nave gable.

There are, however, both inside and out, several specimens of reed-like piers or pilasters

of slender proportion, which would have taken away the breath of any Roman architect; indeed, the tendency of the whole style is towards vertical lines. Before leaving the neighbourhood of the Alps, the early architecture of Switzerland should be noticed. There is an excellent work on the subject; Blavignac's "Histoire de l'Architecture Sacrée du 4me. au 10me. Siècle dans les anciens Évêchés de Genève, Lausanne, et Sion," 1853. It is in two volumes, one of which has illustrated text, octavo, and the other plates,—oblong folio. The playful liberties taken with Roman details will be found amusing. Fergusson has selected from it, on p. 550 of his Handbook, the plan and a view of the Church of Romain-Motier, consecrated in 753 A.D., which already shows a distinction from Lombard churches of an early date, being more in harmony with the next great group of buildings that we have to examine, and which constitute what is known as the Rhenish style, or German round-arched Gothic.

Of this Fergusson says, on p. 559, that there is none perhaps of the Mediæval styles so complete within itself and so easily traced; he also says that it begins absolutely with Charlemagne, —768 A.D.,—up to whose time Germany seems to have been in such a state of anarchy and confusion that no great buildings were or could be undertaken. There are two important books bearing specially on this subject. Moller's "Denkmaehler der Deutschen Baukunst," two vols., small folio, that is to say, the first volume, for the second one treats of the later pointed examples, which have ceased to be distinctively Rhenish. The other work is Puttrich's "Denkmale der Baukunst des Mittelalters in Sachsen," &c., 1836 to 1843, four vols. quarto. There is great need of rearrangement of, and a good index to, the plates of this work, which has been published in numbers from time to time.

There is one building which may be earlier than the date of Charlemagne, namely, the Porch of the Convent of Lorsch (Fergusson, page 560, and Moller, vol. I, pl. 1), as it is made up of Roman orders, Corinthian and Ionic,—which are quite extinct in the Dom at Aix-la-Chapelle (or Aachen), built by Charlemagne, which, with the exception of the later choir, is a polygonal church consisting of an octagon surrounded by a sixteen-sided aisle, and is, historically, very important. Charlemagne is said to have been a great traveller and to have studied Byzantine and Lombard art, and to have copied this building from St. Vitale at Ravenna. There are other polygonal churches of this style illustrated in Fergusson; the typical form, however, of Rhenish churches is that of a long nave and aisles with a transept eastwards, and with the peculiarity that semicircular apses are used to terminate nearly every limb of the building both eastward and westward. The churches at Cologne are very pronounced examples of this fashion, as will be seen from the illustrations of them in all the handbooks; indeed, the Cathedral of Mayence has a triple apse grouped around the western-most bay. Western doors become conspicuous by their absence.

The eaves galleries of the Lombards were carried to great perfection in Rhenish churches, and in the form of the many towers to each building, variety was carried to a greater extent than in any other style. Moreover this style was carried on with the exclusive use of round arches long after the pointed arch had been established in other countries.

In taking leave of the Early Gothic style, the origin and development of the pointed arch must not be forgotten; but this will be treated of in connexion with the perfected thirteenth-century Gothic style. Gailhabaud's work, before mentioned, is illustrative of these as of other styles.

Meanwhile another distinct style, arising from the adoption of the Mahometan religion, has appeared on the scene and has darted about into so many parts of the world that the next article seems the fittest place for considering it.

**The Extensions at Waterloo Station.**—In our description of the extensive works here, it was stated that the Iron Roof Construction Company were doing the ironwork. We are asked to explain that all this ironwork is being manufactured by Messrs. M. T. Shaw & Co., at the London Constructive Iron and Bridge Works, Millwall, and that they are also the contractors for the erection of the same.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*Aug.* 1.—10,835, G. Gowing, Ripon, Scraping and Cleansing Drains.—10,850, D. Cockshaw, Normanton, Jointing Sanitary Pipes, &c.

*Aug.* 2.—10,875, F. L. Fear and P. Wilson, Birmingham, Door-springs.—10,876, J. Wilkinson, Birmingham, Ball-castors.

*Aug.* 5. 10,912, J. Green, Sheffield, Screening Cinders.—10,931, A. C. Henderson, London, Alarm Latches. Com. by O. Blanchot, Paris.—10,940, R. R. Parker, Dalmuir, Securing Lock and Door Handles to their Spindles.

*Aug.* 6.—10,972, G. F. Newman, Birmingham, Spring Hinges for Closing Swing-doors.—10,977, G. Sinclair and D. Hearnshaw, Birmingham, Holding the Cords of Window-blinds, &c.

*Aug.* 7. 11,021, A. Hubner, Cologne, Retaining-walls.—11,041, S. Lawrence, Glastonbury, Roofing Tiles.

### SPECIFICATIONS ACCEPTED.†

*Aug.* 5.—1,112, T. S. Wilson and H. T. Johnson, Manchester, Ventilation of Soil-pipes, &c.—6,306, E. Page, Forest Gate, Grease-intercepting Gully-trap for Sinks.—9,657, J. J. Green, Halifax, Chimney-pots.—9,770, J. H. Johnson, London, Safety Bar for limiting the Movement of Doors, &c. Com. by MM. Varicle & Cie. and MM. F. Moulin, Paris.

*Aug.* 8.—365, J. G. Ackroyd, Sowerby Bridge, Raising and Lowering Window-sashes.—711, G. Bisley, Rotherhithe, Fasteners for Window-sashes.—8,931, C. Dolin, London, Chimney-tops and Exit Ventilators.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending Aug. 16, 1884*

5,493, F. Leslie, London, Chimney Cowls and Ventilators. (Nov. 23, 1883, price 6d.)

A series of truncated conical shells are mounted one above another, the lowest being fixed as a collar round the top of the flue-pipe. On the top of the uppermost cone is a horizontal annular metal plate, the opening in its centre being rather larger than that in the cone, and above all is another horizontal plate, which may have a domed top, and is larger in diameter than the annular plate and cones to throw off the water.

5,760, H. Darby, London, Warming Air for Heating Apartments, &c. (Dec. 4, '83, 6d.)

Two vertical tubes form standards for supporting the stove, and they are connected together by several horizontal tubes, into the lowest of which the chimney of the lamp or the flue of the stove is led. A partition is here fixed, so that half the heat, &c., passes one side and half to the other, then along the other horizontal tubes, and down the two low standards to the outlets, below which are receptacles for the condensed vapours.

5,925, J. S. Stevens and C. G. Major, London, Spring Hinges for Doors. (Dec. 29, '83, 6d.)

This is an improvement on Patent No. 5,281 of 1883, in fixing the piston to the piston-rod and attaching the outer end of the rod, to the end or back of the box. The cylinder also has its head towards the joint of the cover, to the arms of which it is connected by rods, which are hereby free to move in the box. Thus, when the door is opened the cylinder is moved on the piston, and not the piston in the cylinder.

## Miscellanea.

**New Refrigerating Chambers at the Central Markets.**—During the last few months a massive and lofty chimney-shaft has been in course of erection at the west end of the Poultry Market. This structure is in connexion with refrigerating apparatus, which is being constructed by the New Zealand Frozen Meat Company for the purpose of storing and preserving the cargoes of raw meat which they import. The company have leased from the Corporation a large portion of the basement under the Poultry Market. Several of the arches in the basement have been converted into air-tight chambers, and in these the meat will be stored. The refrigerating apparatus will be driven by powerful engines now in course of construction. The chimney-shaft is 10 ft. square at the base, and rises to a height of about 120 ft. It is faced with red brick, relieved by Portland stone and blue brick bands, the upper portion of the structure being in Portland stone upwards of 6 ft. in height. The four sides of the structure are in the form of panels. Communication with the meat chambers in the basement will be effected by lifts for lowering and raising the meat. Although the works have been carried out by the New Zealand Company primarily for their own special business, the apparatus will be available for use by the dealers generally in the markets. The air-tight chambers and other works, including the erection of the chimney-shaft, have been carried out by Messrs. Dove Bros.

**The "New Town" of Earlsfield and the South-Western Railway.**—The South-Western Railway Company are making large extensions at their new station at Earlsfield for the accommodation of the traffic to and from that station (between Clapham Junction and Wimbledon), which since its opening a few months ago has considerably exceeded the company's expectations. They are at present engaged in the erection of waiting and refreshment rooms, together with other accommodation, on both sides of the station, the covered platforms of which are upwards of 600 ft. in length. This station promises to be one of the most profitable of the company's roadside suburban feeders, owing to the rapidity with which Earlsfield and the locality are being developed. A large proportion of Earlsfield is being erected on the Garrett Park estate, which is in the immediate locality of the station. The estate is upwards of 40 acres in extent, and a considerable part of this large area having already been laid out for building upon, between 200 and 300 houses have so far been erected, the houses and villas being let at rents ranging from about 30*l.* to 60*l.* per annum. Building on the estate is still going forward, more than 100 houses being now in course of erection, and it is intended shortly to lay out a further portion of the estate. The ultimate intention of the owners of the estate is to convert a portion of it into public recreation-grounds. The plans likewise include the conversion of the old Manor House into a suburban hotel for dining and pleasure parties. In the meantime two hotels are about to be erected in the locality, one on the estate, to be called the Garrett Park Hotel, and the other adjoining the railway station called the Station Hotel. In other directions in the immediate vicinity of the station, building is actively going forward, more than 200 houses having recently been erected in Earlsfield-road, nearly one mile in length, which runs parallel with the railway, in the direction of Wandsworth-common. The increasing population of the locality has resulted in a line of omnibuses which commenced running on Monday last between Wandsworth, Earlsfield, and Tooting.

**Precautions against Cholera.**—This was the subject of an able paper read by Mr. Edwin Chadwick, C.B., on Monday evening last, before the members of the Association of Public Sanitary Inspectors. The following are the main conclusions of the paper:—That our inquiries at the first general Board of Health have been affirmed by the latest and widest experience. That the Asiatic cholera is not spread by human intercourse, and that the practice of quarantine is useless and mischievous. That the most efficient preventives are the effectual cleansing of places and of persons; of persons by constant head-to-foot washing by tepid water. That the most effective treatment of cholera is in the earliest premonitory stages ascertained by house-to-house visitations, under competent instructions. That the fatality of pronounced attacks is aggravated by removal to large hospitals. That in the earliest detection and action of premonitory symptoms of all epidemics, officers of health should be appointed to make regular visits of examination to schools and workshops, followed by visits to examine the conditions of houses. That the power should be early exercised for the reduction of overcrowding. That for these purposes and the reduction of the expenses of preventible sickness, premature working disability, and excessive funerals, an augmentation of efficient sanitary service is required by the increase of the force of qualified sanitary officers. The discussion on the paper was adjourned.

**Parcels Post Accommodation at St. Martin's-le-Grand.**—When arrangements were in progress at the General Post-office for the accommodation of the Parcels Post Department, the space beneath the open area on the south side of the Post-office buildings, extending from St. Martin's-le-Grand to Foster-lane, was converted into a spacious apartment for the reception and despatch of parcels, the parcels being lowered into and raised from this apartment by lifts fixed along each side of the ground-level above, which was asphalted. For the protection of the horses and vans in waiting, and generally to facilitate the work of this department of the postal service, the area or space referred to has just been covered in to its entire length by a roof of iron and glass. The contractors for the work are the St. Pancras Iron Company.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

**The Comedy Theatre, Manchester.**—The new theatre which is to be called "The Comedy," now erecting in Manchester for Mr. Edward Garcia, is situated in Peter-street, nearly opposite the Theatre Royal. The principal façade, 105 ft. in length, and main entrances, will be towards Peter-street, the gallery and stage entrances being in Bootle-street. The new theatre will be adjacent to Albert-square, immediately opposite the Central Station, and within a few minutes' walk of the Oxford-road Station. The building is arranged and divided longitudinally into three parts. The front portion contains the entrances and exits, the foyer, retiring and refreshment rooms; the centre portion is occupied by the auditorium, and the back part is devoted to the stage and its appliances; the adjacent property on the western boundary has been secured by Mr. Garcia, in which will be placed the dressing-rooms, property rooms, and the paint room, all of which will be approached directly from the street, but conveniently connected with the stage. The means of ingress and egress have, we are informed, had the most careful consideration of the architect, and have been arranged in consultation with the City Surveyor. All public staircases are 5 ft. wide, 12 in. tread, and 6½ in. rise; they are constructed of solid concrete resting on iron supports, and without "winders." The seating accommodation will be as near as possible as follows:—Stalls, 70 seats; pit, 667; dress circle, 200; upper circle, 264; gallery, 710; making a total of 1,920 seats, which, with standing accommodation, would realise an audience capacity of about 2,500 persons. The style adopted by the architect is "Venetian Gothic." The façade is faced with red brick, and strings, corbellings, oversails, and pointed arches are executed in terra-cotta from Mr. Edwards's works at Ruabon; the labels, columns, balcony, &c., are executed in Halifax stone. The proscenium will be finished with a deeply-moulded architrave, forming a sort of frame to the stage pictures. Above the proscenium will be a recessed arcade. In the centre compartment will be a seated figure typical of the Drama, those on the right and left being filled respectively with figures symbolic of Music and Painting. These figures will be flat and decorative in character, and in the style of the proscenium frieze executed for the Prince's Theatre by Mr. H. Stacy Marks, R.A. The building has been designed, the plans prepared by, and the whole of the works, including the decorations, are being carried out under the immediate superintendence of, the architect, Mr. Alfred Darbyshire, F.I.B.A., who for many years was associated with Mr. Calvert and Mr. Browne in the decorations and alterations at the Prince's Theatre, Manchester, and more recently with Mr. Irving, at the Lyceum, London. The contractors for the entire work are Messrs. R. Neill & Sons, of Manchester.

**An Ancient Lead Font.**—A correspondent writes:—There are so few ancient lead fonts remaining in England that any fresh discovery should be preserved. Very recently, in commencing the restoration of St. Margaret's Church, Wychling, under Mr. Joseph Clarke, F.S.A., the diocesan architect, the bowl of a circular lead font was discovered enclosed in a mass of brickwork, measuring 11¼ in. deep and 1 ft. 8 in. in diameter. The lip is turned over with the rest on one side for the cover cast on, spreading and carried down as a band to the bottom of the bowl; but on the other side the rest seems to have been added after the font was cast. The ornament is curious: the circumference is divided into ten panels, and the lower parts of these panels are subdivided by a small semicircular band in the centre. The upper decanal panels have each a stem terminating under lip by a band, with a beautiful floriated pattern. The semi-panels are quite plain. There is a fillet at the bottom of the bowl, all being cast in low relief. The lead is singularly thin, but these surface castings add strength. The usual hole for the drain-pipe remains, but has been mutilated. The date is probably late in the thirteenth century, or early of the fourteenth century. There are as well other interesting remains in this church, which is situated in one of the most secluded parts of Kent.

**North London Tramways.**—The tender of Messrs. Wilkes & Co., of 17, Devonshire-square, for altering the North London Tramways to make the line suitable for steam traction, has been accepted.

**Resignation of the Surveyor to the Vestry of Chelsea.**—We regret to hear of the resignation of Mr. George H. Stayton, C.E., the surveyor to the Vestry of Chelsea. The cause which has led Mr. Stayton to take this step is ill-health. During the time Mr. Stayton has held the appointment of surveyor to the Vestry (since Feb., 1875) important works have been carried out under his direction. Principally may be mentioned the establishment of the wharves and plant at an outlay of 26,000*l.*; the construction of several miles of new sewers and improvement of others in various parts of the parish at a cost of 32,000*l.*; the erection of the public offices at Kensal Town, which cost nearly 3,000*l.*; the laying down of three miles of wood pavement by the Vestry's own staff, at a cost of nearly 26,000*l.*; and the re-arrangement of the system of public street lighting at a saving of some hundreds of pounds a year. The formal acceptance of Mr. Stayton's resignation has been deferred by the Vestry till the first meeting after the recess. The members of the Vestry expressed great regret at Mr. Stayton's determination. Mr. Stayton purposes leaving England for Australia before the ensuing winter.

**Refuge Harbours and Ports of Shelter.** A meeting of noblemen, members of Parliament, harbour authorities, shipowners, and others, will shortly be held at the Westminster Palace Hotel, over which Lord Waveney has kindly consented to preside, to consider the details of a Bill and to make a concerted effort to give effect to recommendations of the Royal Commission and recent select Parliamentary Committee on Harbours and what is most desirable should be done to save the lives of our seafaring population. Also the best method of settling the question of sites for these harbours. Any particulars relative to the meeting alluded to will be gladly forwarded in reply to letters addressed to the Hon. Secretary, National Refuge Harbours Society, 17, Parliament-street, London.

**A Memorial Pulpit.**—A memorial to the late Rev. John Purton, for forty-nine years rector of the parish, has just been erected in Oldbury Church, near Bridgnorth. It consists of a carved oak pulpit in the Early English style, with clergy desks and seats. The whole has been executed by Messrs. Jones & Willis, of Birmingham and London.

**Mr. G. S. Aitken, F.S.A. Scot.**, an architect practising in Dundee, has in preparation an illustrated and descriptive work of the three Scottish Abbeys of Arbroath, Balmerino, and Lindores. Measured drawings and views will be given, and the work will cover a field not hitherto occupied.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| New School | Redruth School Board | 25*l.* | Sept 13th | ii. |
| Public Baths | Corporation of Stockport | £50, £30, £20 | OCTOBER 1st | ii. |
| Municipal Hall and Offices, Bombay | Municipal Commissnrs. | Rs. 5,000, 3,000, 2,000 | Nov. 6th | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Troop Stable-Barracks at Canterbury | War Department | *Official* | August 19th | ii. |
| Painting Workhouse | Guardns of St Leonard, Shoreditch | Lee & Smith | August 20th | ii. |
| Relief, &c., Offices, Longton | Stoke-on-Trent Guardns | E. E. Scrivener | do. | ii. |
| Painting, Netley Hospital | War Department | *Official* | August 21st | ii. |
| Iron Staircases | Guardians of St. Mary, Islington | Wm. Smith | do | ii. |
| Guernsey Granite Spalls | Dover Union | | do. | ii. |
| Sea Wall at East Cowes | Admiralty | *Official* | August 22nd | ii. |
| Stone | Rehmnd (Surrey) U.S.A. | | August 25th | xx. |
| Repairs, &c., Public Buildings | Commissioners of Wks | *Official* | August 25th | ii. |
| Roads, Drains, &c., Hospital at Winchmre Hill | Met. Asylums Board | Pennington & Bridgen | do. | xx. |
| Stone | Borough of Folkestone | | August 30th | ii. |
| County School at Doulting | Hugh Sexey's Hospital | G. J. Skipper | do. | ii. |
| Wrought-Iron Roofs | Huddersfield Corportn | *Official* | do. | ii. |
| Drainage Works, Petersfield | Petersfield Union | W. Barns-Kinsey | Sept. 1st | xx. |
| Houses, Bridport Harbour | The West Bay Bridport Land & Bg. Co., Ld. | Prior & Alexander | Sept. 2nd | ii. |
| Masonry of Two Viaducts | Great Western Ry. Co. | *Official* | do. | ii. |
| Pipe-Sewers, &c. | Claines Local Board | do. | Sept. 4th | xx. |
| Surface-Water Drains and Sewers | Wimbledon Local Brd | do. | Sept. 9th | xx. |
| Brick and Pipe-Sewers, &c. | Met. Board of Works | do. | Sept. 25th | ii. |
| Re erroir, Ramsden Clough | Todmorden Waterwrks Company | James Farrar | Sept. 26th | xx. |
| Building Nine Houses at Stratford | W. Bigg | | Not stated | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Surveyor and Inspector of Nuisances | Clevedon L. B. of Hlth | August 23rd | Not stated | xvi. |
| Assistant to Surveyor's Office of Works | Civil Service Com. | Sept. 5th | do. | xv. |
| Clerk of Works | Willesden Local Board | Not stated | 3*l.* 10*s.* per week | xvi. |

### TENDERS.

For the erection of new premises, for Messrs. Th upp & Maberly, Oxford-street. Messrs. Henry S. Legg, of Christ's Hospital, and Arthur Kinder, of Queen Victoria-street, joint architects:—

| | |
|---|---|
| Wall Bros. | £14,997 0 0 |
| Chappell | 14,919 0 0 |
| Jerrard | 14,550 0 0 |
| Kirk & Randall | 14,175 0 0 |
| Holland & Hannen | 13,831 0 0 |
| Perry & Co. | 13,766 0 0 |
| Hall, Beddall, & Co. | 13,680 0 0 |
| Brass (accepted) | 12,973 0 0 |

For pulling down and rebuilding Nos. 1, 3, 5, and 7, Great Portland-street, 37 and 38, Great Castle-street, and premises in rear of Oxford-street, for Mr. J. P. Robinson —

| | |
|---|---|
| Holland & Hannen | £53,040 0 0 |
| Lawrence & Sons | 52,989 0 0 |
| Hall, Beddall, & Co. | 52,553 0 0 |
| W. W. McGregor | 50,600 0 0 |
| G. Shaw | 43,969 0 0 |
| W. Brass | 41,276 0 0 |
| Perry & Co. | 38,299 0 0 |
| Higgs & Hill | 37,740 0 0 |

For additions at 24, Park-lane, for Sir T. Brassey, K.C.B., M.P. Messrs. E. George & Peto, architects. Messrs. Stoner & Sons, surveyors:—

| | |
|---|---|
| Hall, Beddall, & Co. | £16,840 0 0 |
| Simpson & Sons | 14,695 0 0 |
| Brass | 13,980 0 0 |
| Colls & Sons | 13,600 0 0 |
| Peto Bros. | 13,220 0 0 |
| Manley | 11,816 0 0 |

For the construction of brick and pipe sewers, precipitation-tanks, preparat on of land for filter-beds, &c., for the Willesden Local Board, being Contract No. 1, for the Brent District Main Drainage. Mr. O. Claude Robson, engineer to the Board.

| | |
|---|---|
| Williams, Son, & Wall ngton | £31,850 0 0 |
| Bottoms Bros. | 27,965 0 0 |
| Oliver | 26,660 0 0 |
| Cooke & Co. | 25,971 0 0 |
| J. W. & J. Neave | 25,840 0 0 |
| Beadle Bros. | 25,614 0 0 |
| Rogers & Dickens | 25,590 0 0 |
| Nowell & Robson | 25,414 0 0 |
| W. Neave & Son | 24,938 0 0 |
| C. Killingback | 23,697 0 0 |
| G. Felton | 22,100 0 0 |

For additions to residence and erection of stabling, Chapter-road, Willesden Park, for Mr. Henry Dobbin. Mr. Walter Graves, architect. Quantities by Mr. H. E. Pollard :—

| | | | |
|---|---|---|---|
| William Oldrey | £651 | 0 | 0 |
| S. Melville | 625 | 0 | 0 |
| C. Cheshire | 569 | 0 | 0 |
| Cowley & Drake | 555 | 0 | 0 |
| Ward & Lamble | 547 | 0 | 0 |
| E. Toms | 529 | 0 | 0 |
| Ben. T. Wood | 510 | 0 | 0 |
| W. Martin (accepted) | 490 | 0 | 0 |

For the erection of detached residence, Willesden Park, for Mr. Henry Dobbin. Mr. Walter Graves, architect. Quantities by Mr. H. E. Pollard :—

| | | | |
|---|---|---|---|
| J. C. Tanner | £1,300 | 0 | 0 |
| W. Martin | 1,069 | 0 | 0 |
| E. Toms | 979 | 0 | 0 |
| S. Melville | 960 | 0 | 0 |
| Ben. T. Wood | 941 | 0 | 0 |
| Ward & Lamble | 937 | 0 | 0 |
| Cowley & Drake | 895 | 0 | 0 |

For alterations, repairs, and decorations to 60, Brompton-square, for Mr. J. R. Stevens. Mr. Alfred Wright, architect, Belgrave House, 190A, Brompton-road :—

| | | | |
|---|---|---|---|
| Crasko | £218 | 0 | 0 |
| Jelly | 168 | 0 | 0 |
| Wilkins & Kent | 163 | 0 | 0 |
| W. Johnson (accepted) | 144 | 7 | 0 |

For the erection of house and shop at King-street, Ramsgate, for Mr. H. Maull. Messrs. Hinds & Son, architects. No quantities :—

| | | | |
|---|---|---|---|
| Paramor & Son | £438 | 0 | 0 |
| Duckett | 420 | 0 | 0 |
| Martin | 414 | 0 | 0 |
| Smith | 398 | 0 | 0 |
| Bowman | 395 | 0 | 0 |
| Miller | 380 | 0 | 0 |
| Newby (accepted) | 370 | 10 | 0 |

For paving Pepys-road as a new street, for the Greenwich Board of Works :—

| | | | |
|---|---|---|---|
| Mowlem & Co. | £1,053 | 0 | 0 |
| Woodham & Fry | 1,049 | 0 | 0 |

[Only two tenders received.]

For the Foundry Bridge, Norwich :—

*Bridge complete.*

| | | | |
|---|---|---|---|
| Horton & Sons, Darlaston | £7,258 | 3 | 10 |
| J. Barnes, Norwich | 6,988 | 0 | 0 |
| Downing & Sons, Norwich | 6,927 | 0 | 0 |
| B. Cooke & Co., Battersea | 6,702 | 0 | 0 |

*Ironwork only.*

| | | | |
|---|---|---|---|
| Barnard, Bishop, & Barnard, Norwich | 2,814 | 12 | 0 |
| Cleveland Bridge and Engineering Company, Darlington | 2,368 | 18 | 0 |
| Jukes, Coulson, Stokes, & Co., London | 2,346 | 0 | 0 |
| R. Tidman & Sons, Norwich (accepted) | 2,053 | 1 | 8 |

*Bri kwork and Ironwork.*

| | | | |
|---|---|---|---|
| J. Butler, Leeds | 5,451 | 10 | 4 |

*Brickwork only.*

| | | | |
|---|---|---|---|
| G. E. Hawes, Norwich | 3,040 | 0 | 0 |
| H. Lacey | 2,676 | 8 | 9 |

*Foundations and Brickwork.*

| | | | |
|---|---|---|---|
| W. J. Botterill, London | 3,796 | 0 | 0 |
| Cook, Bennett, & Thew, Spalding | 3,694 | 0 | 0 |
| T. H. Blyth, Foulsham, East Dereham (accepted) | 3,600 | 0 | 0 |

*Foundation only.*

| | | | |
|---|---|---|---|
| J. Holrough, Norwich | 980 | 15 | 3 |

For painting and decorating externally the several buildings of the Licensed Victuallers' Asylum, Old Kent-road, consisting of the chapel, chaplain's residence, Board-room, library, lodges, and 170 houses. Mr. W. F. Potter, architect. Quantities prepared by Mr. C. R. Griffiths :—

| | | | |
|---|---|---|---|
| Brazier & Son, Blackfriars-road | £937 | 0 | 0 ! |
| F. & C. Hersee, Peckham | 737 | 0 | 0 |
| B. Cook, Stonecutter-street, E.C. | 736 | 0 | 0 |
| E. F. Walesby, Horton | 660 | 0 | 0 |
| W. Wythe, Dalston | 544 | 19 | 0 |
| W. Wells, Paddington | 540 | 10 | 0 |
| S. Hayworth, Kingsland (accepted) | 440 | 0 | 0 ! |

For internal repairs at the above Asylum :—

| | | | |
|---|---|---|---|
| E. F. Walesby, Horton | £185 | 0 | 0 |
| F. & C. Hersee, Peckham | 180 | 0 | 0 |
| W. Wells, Paddington | 145 | 0 | 0 |
| W. Wythe, Dalston | 129 | 0 | 0 |
| S. Hayworth, Kingsland (accepted) | 115 | 0 | 0 |

For new roads and sewers from Lordship-lane, on the Alleyn's College Estate, Dulwich :—

| | | | |
|---|---|---|---|
| Mowlem & Co., Westminster | £6,550 | 0 | 0 |
| Henry Hart, Great Dover-street, Southwark | 5,696 | 0 | 0 |
| Wilkes & Co., Bishopsgate | 5,575 | 0 | 0 |
| G. Butler, Camberwell-road | 5,425 | 0 | 0 |
| Wheeler & Hindle, Bankside | 5,205 | 0 | 0 |
| Eyles & Co., Wimbledon | 4,875 | 0 | 0 |
| W. Harris, Camberwell | 4,682 | 0 | 0 |
| R. Mayo, Brixton-road | 4,485 | 0 | 0 |
| Eli Wilson, Walthamstow | 4,262 | 0 | 0 |

For additions to Arundel-street Schools, Portsmouth, for the Borough of Portsmouth School Board. Mr. George Rake, architect, Portsea. Quantities by Mr. C. W. Bevis, of Southsea :—

| | | | |
|---|---|---|---|
| Earwaker | £1,856 | 0 | 0 |
| Biden | 1,850 | 0 | 0 |
| Evans | 1,656 | 0 | 0 |
| Roberts | 1,596 | 0 | 0 |
| White | 1,550 | 0 | 0 |
| Clark | 1,490 | 0 | 0 |
| Lewis | 1,423 | 0 | 0 |
| Tull | 1,420 | 0 | 0 |
| Quick | 1,397 | 0 | 0 |
| A. Light (accepted) | 1,350 | 0 | 0 |

For painting and other repairs at Furnival's Inn, E.C., for Mr. H. Peto. Mr. R. Groom, architect, 171, Queen Victoria-street :—

| | | | |
|---|---|---|---|
| C. Wall | £1,417 | 10 | 0 ! |
| W. Nash | 1,396 | 0 | 0 |
| Goodwin | 992 | 19 | 0 |
| Gregory & Bence | 835 | 7 | 6 |
| Oldis Bros | 827 | 0 | 0 |
| Kirk & Randall, Woolwich (accepted) | 753 | 7 | 6 ! |

Accepted for building new premises and altering present premises, at Mare-street, Hackney. Mr. Mark W. King, architect :—

| | | | |
|---|---|---|---|
| Oldis Bros., Wilson-street, Finsbury | £589 | 0 | 0 |

Accepted for shop front building and shop fitting, at No. 153, Fulham-road. Mr. W. Newton Dunn, architect :—

| | | | |
|---|---|---|---|
| Oldis Bros. | £170 | 0 | 0 |

For alterations and additions to the Crown public-house, No. 46, Stanhope-street, Clare Market, for Mr. Thos. Finch. Mr. John T. Woodward, architect. Quantities not supplied :—

| | | | |
|---|---|---|---|
| Philps & Bisiker | £1,149 | 0 | 0 |
| F. Love | 1,078 | 0 | 0 |
| Beale | 917 | 0 | 0 |

For building a new bank at Canterbury, for the directors of the London and County Banking Company, Limited. Mr. J. G. Hall, architect, Canterbury :—

| | | | |
|---|---|---|---|
| Wiltshire, Canterbury | £3,100 | 0 | 0 |
| Wilson, Canterbury | 3,075 | 0 | 0 |
| Gaskin, Canterbury | 2,948 | 0 | 0 |
| Paramor & Son, Margate | 2,898 | 0 | 0 |
| Denne & Son, Deal | 2,760 | 0 | 0 |
| Naylar & Son, Rochester | 2,733 | 0 | 0 |
| Adcock, Dover (accepted) | 2,627 | 0 | 0 |

For the erection of new residence at Maidenhead Thicket, Berks, for Mr. A. Lawrence. Mr. Arthur Vernon, architect, 20, Great George street, Westminster, and High Wycombe, Bucks :—

| | | | |
|---|---|---|---|
| Snell | £3,414 | 8 | 0 |
| Lovell | 3,329 | 0 | 0 |
| Martin | 3,256 | 0 | 0 |
| Taylor & Grist | 3,216 | 0 | 0 |
| Cooper & Son | 3,200 | 0 | 0 |
| Hunt | 3,119 | 0 | 0 |
| Silver, Sons, & Filewood (accepted) | 3,115 | 0 | 0 |

For pulling down and rebuilding the Horse and Groom, Upper Holloway, for Mr. W. H. Chapman. Messrs. Perry & Reed, architects, 9, John-street, Adelphi. Quantities supplied

| | | | |
|---|---|---|---|
| Clark & Bracey | £4,829 | 0 | 0 |
| Outhwaite | 4,527 | 0 | 0 |
| Patman & Fotheringham | 4,374 | 0 | 0 |
| Brass | 4,357 | 0 | 0 |
| Macey | 4,115 | 0 | 0 |
| J. Beale | 4,057 | 0 | 0 |

For new counter and alterations to Coffee House Tavern, Beak-street, Regent-street, for Mr. North. Mr. George Treacher, architect, 23, Carter-lane

| | | | |
|---|---|---|---|
| Langridge | £280 | 0 | 0 |
| Drew & Cadman | 218 | 0 | 0 |
| Hewlett | 181 | 0 | 0 |
| J. Beale | 180 | 0 | 0 |

For London and County Bank, Kensington. Mr. A. Williams, architect; Messrs. Widnell & Trollope, surveyors :—

| | | | |
|---|---|---|---|
| Chamberlain | £14,554 | 0 | 0 |
| Chappell | 13,850 | 0 | 0 |
| Lovett | 13,785 | 0 | 0 |
| Holland & Hannen | 13,736 | 0 | 0 |
| Trollope & Sons | 13,625 | 0 | 0 |
| Aldin & Platter | 13,426 | 0 | 0 |
| Perry & Co. | 12,845 | 0 | 0 |
| Peto Bros. | 12,494 | 0 | 0 |
| Rider & Sons | 12,428 | 0 | 0 |

For the erection of the first portion of the monastic buildings of Buckfast Abbey, Buckfastleigh, Devon, for Right Hon. Lord Clifford of Chudleigh. Mr. Frederick A. Walters, architect, 4, Great Queen-street, Westminster. Quantities supplied by Mr. W. H. Brayshaw :—

| | | | |
|---|---|---|---|
| Wakeham | £4,344 | 18 | 0 |
| Lethbridge | 4,244 | 7 | 8 |
| Mosss & Son | 3,890 | 0 | 0 |
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| | | | |
|---|---|---|---|
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| | | | |
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| | | | |
|---|---|---|---|
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| | | | |
|---|---|---|---|
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|---|---|---|---|
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# The Builder.

Vol. XLVII. No. 2163. Saturday, August 23, 1884.


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### *On Structural Proportion in Nature and Art.*

THE *Journal of Hellenic Studies* for October last contains an article by Professor Michaelis of Strasburg, who has already explored so assiduously the private collections of ancient art in England, upon a remarkable basso-relievo among the Arundel collection at Oxford. It is illustrated by an excellent plate, after a photograph, and is replete with proofs of the learning and the labour which the author has always at command for a worthy subject. The slab is in the form of a pediment, but with the narrow angles cut off by a vertical line, and bounded on all sides and horizontally by a narrow projecting border. The surface is occupied by the figure of a man, somewhat above life-size, in relief, with arms extended and open palms. The head, shown in profile, reaches to the central angle, and the figure is cut off a little below the line of the nipples by the horizontal cornice. The features are battered; but the arms, though in low relief, are boldly modelled, and exhibit distinguished mastery of outline. In the field, as it may be called, above the right arm, is the outline of the sole of a foot, formed by a shallow scraped line, which shows distinctly the contour of the toes. Fortunately this has not suffered so much, scratched and rubbed as it is, as to frustrate the recovery of its exact dimensions.

This sculpture is of interest from three points of view,—on all of which the Professor disserts with true German elaboration. As a specimen of ancient sculpture it invites consideration as to its period and its style; it then appears to supply authentic original evidence on matters metrological,—the standard foot of the sculptor's nation,—and lastly, what we are now chiefly concerned with, we appear to have before us a visible memorial of the modulus of the artist as applied to the proportions of the human figure.

Those who are acquainted with the present German school of archæological research and criticism will be quite prepared to find that little difficulty is made of assigning the work to a particular half-century by indications of style; and that a hankering is even indicated for narrowing the limitation within a precise decennium. We may pass over this discussion, contenting ourselves with the remark that if there were no other reason for disallowing an Attic origin for the monument, we should decline to give weight to the argument that "an Attic artist would certainly have raised from the ground all the outlines rather strongly with a sharp edge, and would have represented the muscles of the arms with more subdued modelling." This seems to be an inference from some characteristics of the frieze of the Parthenon,—a work executed for an exceptional position; but even there, if the critic will look again, he will find that not "all the outlines" were so treated, and a little further observation will reveal a reason for the variation of method.

Again, only a few sentences can be spared for the very acute and learned, but nevertheless slightly perplexing, metrological analysis.

The best measurement that can be made of the footsole gives it as 0·296 m., which coincides with the Roman *pes monetalis*, and differs by ·012 m., or more than the eighth of an inch, from what has been the very generally accepted Attic foot, 0·308 m. But we are not allowed by the Professor to assume that we have before us a work executed in Greece when under Roman domination. We are called upon to accept 0·296 as the true measure of the Attic foot which became the model for the Roman. Be it so; but it is then pointed out that this foot is exactly one-seventh of the breadth given by the extended arms of the sculpture, from finger-tip to finger-tip, and an anomaly declares itself in consequence, which is frankly recognised. This extent is called a fathom; but the Attic foot which is represented by the sculpture, was reckoned by the current standard, the sixth of a fathom, not the seventh. The Egyptians, however, we are reminded, had two fathoms, of which the longer, the royal fathom, just meets the case: assume that it was this which Herodotus said coincided with the Samian fathom, and the difficulty may be surmounted by the further assumption that the monument is to be referred to Samos; we are then, it is true, face to face with the incongruity of the association of an Egyptian or Samian fathom with an incommensurate Attic foot; but the learned author is equal to the occasion, and meets this new difficulty, better or worse, by the conjecture that "possibly the conditions of international commerce at Samos were such as to require an indication of a double system," &c. "The addition of the Attic standard measure would then be far from startling. Possibly this addition was only made after Samos had passed entirely into the dominion of victorious Athens," and so forth.

But all this ingeniously-buttressed superstructure rests precariously upon the assumption that the full extent of the expanded arms of the sculptured figure must necessarily represent a definite measure of a fathom, the accepted equivalent of the height of a well-grown and developed man. But it is clear that the figure represents the proportions of the human figure upon, not a natural but an enhanced scale,—a scale which gives a stature of the excessive height of seven standard Greek feet.

The most certain fact in the case is an intention to exhibit the proportion of the length of foot of a well-made man to the extent of his expanded arms and hands, as one-seventh; and doubtless with reference to the common and notorious experience that this extent was equal to his full stature. But a pure exhibition of proportion is independent of the natural scale; the sculptor might have taken any stature at choice or at random. He chose to take, not the length of an actual human foot of a man 6 ft. high at the utmost, but the reputed foot,—the standard Attic foot measure as a modulus,—conceding, for argument sake, that the foot measure, 0·296 m. is the true Attic. This decision fixed him with a representative figure beyond the ordinary life-size; in fact, of an implied height of 2·070 m., instead of about 1·750 m.,—that is, of 7 ft. instead of 6 ft., and consequently a breadth for the expanded arms of his monument which by the same difference exceeded that of the average or ordinary man. Had the sculptor adhered to Xenophon's definition of the fathom, the extent within reach of the extended arms of an ordinary man, he must have given up the Attic foot, whether ·308 m. or ·296 m., as a modulus, and engraved a shorter foot-sole,—a foot-sole not exceeding 1·75÷7=) ·250 instead of ·296.

Assuming, then, that the expanded arms are to be taken as index of stature, we find that the length of one-seventh of this given to the foot is in accordance with the rule laid down by Leonardo da Vinci, but not specified by Vitruvius in his well-known canon.

The Vitruvian rule of making the hand, measured from wrist to tip of middle finger, one-tenth of the stature, is borne out very closely by the marble; and so also is the rule of one-tenth for the face from the chin to the roots of the hair above the forehead.

The record of Vitruvius again gives the height of the head from the crown to the chin as one-eighth of the stature, and the monument approaches this as nearly as 0·255 in. to the required 0·259.

A number of other precisely-adjusted proportions may be detected in this interesting

effigy, but enough have been noted for the purpose at present in hand. It will be observed that in these proportions as derived and copied from Nature's own handiwork, the dimensions brought into comparison are not reducible to terms of a single uniform modulus. Dimensions which compare variously in terms of different prime numbers, 2, 3, 5, 7, &c., defy reduction to a common unit of moderate subdivision. It is this difficulty which occurs in tuning musical instruments of fixed notes, and which is met or modified by the contrivance of equal temperament. The equivalent of this in architecture is the regulation of dimensions by subdivisions of a fixed modulus; this is very largely favoured by Vitruvius, but it is observable that he still preserves traces of the more scientific system of regulation by direct proportion. Modern examination has gone far to prove that this system was practised exclusively in the best Athenian age.

Of course there is no record to inform us how early the Greeks, in their devoted admiration for the human figure, began to recognise exact numerical standards of proportion for its most perfect development; but that it was at a very early age can scarcely be doubted. The conditions of health, activity, and athletic vigour occupied their attention from the earliest times of which we have historical record; and incomplete and fragmentary as are the remains of their early sculpture, an art which was steadily progressive through centuries, they are sufficient to indicate a sustained endeavour to approach nearer and nearer to distinct typical forms of which the characters were directly dependent on proportion. That the arts of sculpture and architecture should have been in course of development and intimate connexion together, through a long series of years, without mutual reactions, is not to be supposed; it were vain to speculate which of the pair was under greater obligation to the other. It is quite possible that the sculptor owed first to the architect his confirmed conviction of the value for artistic expression of exact and appropriately adjusted numerical proportion. However this may be, it most certainly appears, upon study of the finest productions of either art, that they held in common by the principle that an harmonious whole was not to be built up out of varied combinations of one uniform elementary dimension, or fixed invariable unit, but by varied proportionate subdivisions freely based upon the simplest of the prime numbers, 2, 3, 5, 7, more especially.

A notice remains of the principle which one ancient writer adopted and worked out in a lost treatise on the proportions of the human figure, which in itself has much to recommend it; he set forth that the proportion of every member, from the least to the larger, was adjusted to that with which it is in immediate organic relation. The finger has dimensions proportionate to the hand, the hand to the forearm, the forearm to the upper arm, the arm to the body, and so onward by a series of deductions and comparisons, which would lead ultimately to the estimate of full bulk and stature. This scheme is virtually implied in the proverbial phrase, *ex pede Herculem;* the foot of Hercules being given, the proportions of the hero at large are given. That the given foot would determine stature, within certain limits, is unquestionable; and it is also to be conceded that it would, within certain limits again, decide the character of the figure, —would give assurance of a frame as contrasted as possible to that of a Ganymede or an Apollo. But still, apart from previous knowledge of the type, it would by no means suffice for the recovery of the sculptor's ideal. The tracery of a window, or even the fragment of a moulding, suffices for general conclusions as to the style and period of a ruined cathedral, but will go little way indeed towards enabling us to restore, with any completeness and precision, the lost glories of a vast original and complex structure. The creative impulse of true artistic design, as of natural organisation, enforces the subordination of parts to a whole, of the subsidiary as derived, to the superior as antecedent. In both cases what controls the number, the nature, the interdependence of component members and their proportionate adjustments, is the equivalent to a primary characteristic idea; it is therefore from this idea that the processes of invention and imagination are most safely understood to start, and analytical study is only complete when this generative thought is recovered. The human foot is doubtless most admirably subservient to the purposes of the general organisation, but, taken by itself, it might be studied for ever, and no process of deduction would derive from it a knowledge of the marvellous mechanism of the human hand with which it is so intimately associated. Few triumphs of sagacity are more surprising than that of Professor Owen, who by minute scrutiny of a single fossil bone sent to him from Australia, announced the former existence of a bird of proportions that to the uninstructed seemed inconceivable, until confirmed by subsequent transmission of more of the skeleton. But the divination was effected by quickness of observation, sagacity and study, co-operating with stored knowledge of other complete organisms. The bone, taken by itself, would no more reveal even to an Owen, or necessitate all the details of the organism, than a moulding from Glastonbury would give up to an Australian Fergusson the plan and elevation of a cathedral. It is, no doubt, true that invention and imagination the most emancipated, when exercised upon an architectural problem, cannot emancipate itself from relation to material conditions, and will be largely controlled, if not governed, by them. It may be allowed to the imagination of the poet to give a local habitation and a name to "airy nothing," but an architect cannot escape from having to take into account the cohesion, resistance, and equilibrium of wood and marble, of bricks and mortar, and must, perforce, submit to limitations of proportionate parts, of voids and solids, of spans and scantlings accordingly. But this does not deliver over the mastery of his art to the material it is employed upon.

He works in this respect on parallel lines with the creative energies of nature. The foot of the camel has relation in size, strength, and elasticity, to a sandy desert, and the hoof of a horse to springy turf. But in both cases these particular material conditions are quite insufficient to decide the general habits and capacities of the animals. They are, as they have to be, regulated and subjugated in a manner and to an extent which gives them their place in a series of correlative adjustments. It is only so that they display their proper significance and become instrumental in conciliating a variety of secondary purposes in furtherance of main and important ends. It is only when this conciliation is perfected in the completed work, an ultimate harmony of admirably correlated functions and services, be it the organised animal or the architectural structure, that the idea which has governed the regulating and subjugating process all through becomes apparent and obtains its full expression. The material conditions in each case set limits to what can be done with them, but cannot determine what shall be or what must be done. Hence it is, that if we hope to discover the secret of those proportionate adjustments which in either case hold a complex of details and members together in unity, we must consider the main purposes, and, therefore, the largest relations first, and descend from those to the subordinate. By starting from the stature of the man we may more safely deduce not only foot and hand, but the limbs and general proportions; even as the proportions of nave and choir will guide us most satisfactorily to the appropriate dimensions of aisles or entrance-porch, or the predetermined scale of reception-rooms will impose and govern the nature and distribution of offices.

In dealing with any practical problem whatever, the primary requirement is a well-studied and distinct conception of the end proposed,—the chief purpose which renders it necessary or worth while to entertain the problem at all, and then of all the indispensable accessory aids and completions of that purpose. When we further proceed to realise the conception, particular adjustments are necessarily influenced by the nature and limitations of the means and materials at command. But the managing and moulding power still resides in the intelligence, and intelligence works from the end in view to the means by which,—from the general to the particular,—from a purpose as a whole to the several secondary and inferior furtherances as parts. Such is the grand conception of Cuvier as it is of Aristotle, almost the first name of importance on such a subject, that we come to looking back through the centuries before Cuvier. It was propounded by Anaxagoras that man is the most intelligent of organised beings in consequence of having hands: nay, argues Aristotle, man has hands because he alone of animals is gifted with sufficient intelligence to make right and full use of them. To the like effect, when in his treatise on the Generation of Animals he disserts on the development of the embryo, he notices that nature manifests the most essential characteristics, first in decisive outline, and afterwards brings forward the subordinate completions, even as a painter, he says, first makes a general sketch, and settles the leading contours of his design to be completed afterwards by filling in details and finishing with colours.

It appears, then, that if we are to hope to attain to a thoroughly worthy and masterly conception of the principles of proportion in the human figure we must not be contented to rest in compiling a list of the proportions of particular members,—mere detached hints and notices which may have their use in keeping an artist clear of any very gross divergences from a normal standard: what is required is a comprehensive theory which shall embrace the entire system in a simple scheme, and a coherent unity from which subordinate proportions are developed in appropriate gradation. That a somewhat nearer approach to a solution of the problem than is provided by the systems most in vogue is not hopelessly unattainable, may be set forth in a future article. The theory of composition in all the arts is in closest relation to a theory of harmonious proportion, and if ever a clue to its true significance is to be grasped, it may be hoped for from the study of that work of nature of which Hamlet is only echoing Aristotle's reverential awe and admiration when he exclaims,—"What a piece of work is man! In form and moving how express and admirable!"

## THE METROPOLITAN BOARD OF WORKS AND LONDON THEATRES.

STIMULATED to action by the destruction of the city of Chicago and the disastrous fire at the Brooklyn Theatre in 1876, a Select Committee of the House of Commons was appointed in the year 1877 to inquire into the constitution, efficiency, emoluments, and finances of the Metropolitan Fire Brigade, with a view to providing further security from loss of life and property from fire. This Committee, which was presided over by Sir Henry Selwin-Ibbetson, consisted of twenty-one members, and included Sir Andrew Lusk, Mr. Locke, and Mr. Ritchie as representing Metropolitan constituencies, and Sir James McGarel-Hogg, the chairman of the Metropolitan Board of Works.

The immediate object of the Committee was to inquire into the working of the Metropolitan Fire Brigade, but the scope of the inquiry was enlarged by an instruction, moved at the instance of Mr. Onslow, that the Committee should have power to take evidence and report, with special reference to better means of preventing loss of life and property from fire in theatres and other places of public amusement. This instruction led to the taking of a considerable amount of evidence with regard to the construction of theatres, the means then available for the extinction of fire and the preservation of life in theatres and music-halls, and resulted in an important amendment of the law as affecting these places.

The Committee received evidence as regards theatres, &c., from the then Lord Chamberlain

(the Marquis of Hertford), the permanent secretary of the Lord Chamberlain's department (Mr. S. Ponsonby-Fane), and the architect officially consulted by the Department (the late Mr. J. T. Robinson); Mr. J. F. Pownall, the chairman of the Middlesex magistrates; Mr. George Vulliamy, the Architect to the Metropolitan Board of Works; Captain Shaw; Mr. Edwin Chadwick, C.B.; Mr. F. C. Penrose, the Surveyor to St. Paul's Cathedral; Mr. C. J. Phipps, the architect of several of the London theatres; the proprietors or lessees of the Court Theatre, the Criterion Theatre, the Folly Theatre (now Toole's Theatre), the East London Theatre, the Pavilion Theatre, and the Gaiety Theatre; the proprietor of the Canterbury Music-hall; Mr. Maberley, the architect to Exeter Hall; and Mr. Mitchell, one of the Committee of Management of the Sacred Harmonic Society.

One of the most important witnesses examined by the Committee was the Hon. Spencer Ponsonby-Fane, the controller or permanent secretary of the Lord Chamberlain's department, who, in the course of his evidence, admitted that the control of the Lord Chamberlain over theatres was inefficient, and suggested that there should be a Government department to superintend all public buildings as regards their construction; that the Lord Chamberlain's licence should be preserved, but that the issue of such licence should be dependent upon the production of a certificate from the department that the building to be licensed was in a satisfactory condition. The censorship of the Lord Chamberlain over pieces to be performed, Mr. Ponsonby-Fane suggested, might be retained.

Speaking of the Opera Comique Theatre, Mr. Ponsonby-Fane, in the course of his evidence, characterised it as being "one of the most fortunately placed theatres in London," and explained that the tunnel under the street was made after the theatre had been built and had been opened to the public, and that the tunnel had been added by the permission of the Lord Chamberlain. "I must point out to the Committee," he concluded, probably anticipating objection, "that it is underground; that it is fire-proof; people might be drowned there, but certainly they could not be burned."

It was elicited from this witness that the Lord Chamberlain had no power to require structural alterations to be made to existing theatres, and that in fact the only means of reaching a manager who disregarded the Lord Chamberlain's recommendations was the withdrawal of his licence, and this, he considered, would be too great a punishment. "The Lord Chamberlain," he said, in reply to a question (No. 1,251), "has no staff of inspectors. I, as the permanent Secretary of the Department, look to it entirely, assisted by the Examiner of Plays, who is an officer of the department. We also employ from time to time the best surveyor we can find to accompany us in those inspections, but we cannot be always inspecting. The inspection takes place once a year, or at the request of any manager if he is going to make an alteration."

The Committtee made a report, in which they stated that in their opinion the structural conditions and arrangements of places of public amusement requisite to meet the danger of fire or panic are mainly regulated by practical considerations, and can only be settled by experts. As a safeguard against fire from without, the Committee recommended that the building should be isolated, either by an intervening space or by a wall of proper strength and material. With regard to the interior, in addition to the necessity of substantial fireproof construction, four points appeared to the Committee especially to require attention, viz.:—(1) Subdivision of risk, by separating from each other the various parts of the buildings, rooms, and passages by fireproof partitions; (2) distribution of rooms, with a view to minimise the chance of a fire breaking out; for instance, no room should be constructed above the stage, nor should the carpenters' shop be allowed to be placed above the lights of the gallery; (3) facility of egress. The outlets should be numerous and separate; passages should widen outwards, and be large enough to contain a considerable proportion of the whole audience. In these passages no steps should be allowed, or other impediments likely, in case of pressure, to throw down persons or injure them. At the same time arrangements should be made to break the pressure by the interposition of barriers at intervals, or giving an angular direction to the passage; all doors should open outwards; (4) appliances for the extinction of fire. Hydrants in connexion with the mains, and provided with hose, should be placed round the building, and also carried within, capable of throwing a jet to any part of the interior.

The report, in conclusion, recommended that no new theatre or large music-hall in the metropolis should be finally licensed until it had been certified that in respect of *position* and structure, it satisfied all due requirements for the protection against danger from fire, and that the Metropolitan Board of Works should be the certifying authority.

The report also recommended that, with respect to existing theatres and halls, the Metropolitan Board should have power to call on the proprietor to remedy such structural defects as appear to the Board to be the cause of special danger, and to admit of being remedied by a moderate expenditure, option being allowed to the proprietor to refer the whole question to arbitration.

That, with a view to the prevention of danger from fire, the Lord Chamberlain and the justices should be authorised to make regulations as to the management of theatres and music-halls under their jurisdiction; that, for the purpose of ascertaining whether such regulations are complied with, provision should be made for the inspection of these buildings, and that any breach of the regulations should be punishable on summary prosecution.

It was further recommended that effect should be given by the Legislature to these recommendations.

In the session of 1877-8 a Bill was introduced into Parliament by the Metropolitan Board of Works, which became law as the Metropolitan Management and Building Acts Amendment Act, 1878 (41 & 42 Vict., ch. 32). By the 11th section of this Act the Board are empowered to require the proprietors of theatres and of certain music-halls in use at the time of the passing of the Act to remedy structural defects which may result in special danger to the public frequenting the same. The consent of the Lord Chamberlain in the case of theatres under his jurisdiction, and of the Home Secretary in the case of all other buildings, is necessary before any proceedings can be taken by the Board, and the defects must be such as can be remedied by a moderate expenditure. Music-halls containing a superficial area of less than 500 superficial feet for the accommodation of the public are exempt from the operation of the Act.

The penalty imposed by the Act for non-compliance with the Board's requirements is 50*l.*, and a further penalty of 5*l.* per day in case of the continuance of such default. Provision is made for an appeal, the matter in dispute being referred to an arbitrator appointed by the First Commissioner of Works.

The Board are further empowered by the 12th section to make regulations with regard to new theatres and such music-halls as are not exempted from the Act, with respect to the requirements necessary to protect the public from danger in the event of fire, and may alter or vary the same from time to time.

No new building can be opened or used as a place of public amusement'; that is to say, for the public performance of stage plays, or for "dancing, music, or other entertainment of the like kind" (these words being the form used in the Act of Geo. II.,—25th Geo. II., cap. 36), without a certificate from the Board that the building was on its completion in accordance with the Regulations made by the Board, so far as the same are applicable, and to the conditions (if any) annexed thereto.

In accordance with the provisions of this Act the Board, on the 2nd of May, 1879, drew up a series of regulations for the construction of theatres and music-halls. These regulations provide that previously to any house or other place of public resort being opened for public entertainment, notice shall be given to the Board, accompanied by drawings of the building, with a specification of the materials to be employed, and a statement as to the number of persons to be accommodated in the building. If the drawings are approved, a certificate is issued by the Board in respect of the building, on its completion in accordance with the drawings approved by the Board.

The regulations further require that every theatre shall have a proscenium wall of brick to separate the stage from the auditorium; that the staircases and the floors of the several passages, lobbies, corridors, and landings shall be constructed of fire-resisting materials; that the minimum width of all staircases and corridors shall be 4 ft. 6 in.; that a clear passage-way, not less than 3 ft. wide, shall be reserved round every part of the building appropriated to the audience; that all iron-work used in construction should be protected from the action of fire; that a separate exit should be provided from every tier or level, communicating directly with the street; that all doors be made to open outwards; that where the building is warmed artificially hot water only, at low pressure, shall be used; that the means of ventilation shall be explained on the drawings; that no rooms be formed over the auditorium or in the space under the same; that the scene-docks, property-rooms, and store-rooms be separated from the theatre or other buildings by fireproof construction; that provision be made for extinguishing fire; and that all gas-pipes be of iron.

The Metropolis Management and Building Act Amendment Act, 1878, received the Royal assent on the 22nd of July, 1878, but very little was done under its provisions with regard to existing theatres and places of amusement until the occurrence of the disastrous fire at the Ring Theatre at Vienna in December, 1881, which again called public attention to the subject.

In 1882 an Act was passed to confer various powers on the Metropolitan Board of Works and to amend certain Acts relating to that Board: the 45th section of this Act,—the Metropolitan Board of Works (various powers) Act, 1882 (45 Vict., c. 56),—gives the Board power to regulate the times during which the exit doors of places of public entertainment shall be kept open; the conditions under which such doors may be closed, and the persons to be charged with the duty of closing and opening the same; the nature of the fastenings to such doors; and the notices to be posted in such house, room, or place of public resort, specifying the means of exit.

The penalty for non-compliance with the Board's requirements is 10*l.* for every day, and the Board are authorised to enter and inspect any place of public resort for the purpose of ascertaining that their requirements have been complied with at any time.

On the 18th of April, 1882, shortly after the Easter recess, Mr. Dixon-Hartland called attention in the House of Commons to fires in theatres, and moved for a Select Committee to investigate the state of the exits of the metropolitan theatres and the appliances existing for the prevention and extinction of fires in theatres and music halls. Sir Wm. Harcourt, the Home Secretary, thanked Mr. Dixon-Hartland for calling attention to the matter, but assured him that in his (the Home Secretary's) opinion the then existing machinery was perfectly effective if put in force, adding that he had instructed Captain Shaw to report upon the condition of the London theatres; that he had already received reports as regards eight theatres, and that he had communicated with the owners of the rest. On receiving this explanation Mr. Dixon-Hartland withdrew his motion.

On the 17th of July, 1882, Captain Shaw presented to the Metropolitan Board of Works a report upon the remaining thirty-three theatres in the metropolis, he having on the 21st of March reported upon eight others. These reports were made at the instance of the Home Secretary, moved thereto, it was reported, by an exalted personage; the reports were printed and were forwarded to the Home

Secretary, and by him communicated to the various managers, but they have not been made public for obvious reasons. Captain Shaw's reports are of an exhaustive nature, and deal with every branch of the subject, including recommendations with regard to the site, the number of persons to be accommodated in different parts of the House, the lighting, warming, and ventilation, the storage and protection of scenery and properties, watching, and appliances for the extinction of fire, all of which are matters beyond the control of the municipal authority. It is satisfactory to know that, as regards the watching and fire-appliances, in only ten instances are they condemned as bad, and that out of these ten theatres eight have been rebuilt, and in eight cases only the appliances were reported to be insufficient and to require supplementing chiefly by additional lengths of hose.

There are at present forty-three theatres in London and the suburbs, of which number nine have been recently rebuilt or remodelled, and six may be called new, having been erected since the passing of the Metropolitan Building and Local Management Amendment Act, 1878, upon sites not previously occupied by theatres.

The following is a complete list of the theatres kept open under the authority of Letters Patent or of a licence from the Lord Chamberlain or from the Justices of the Peace :—

| | |
|---|---|
| Adelphi Theatre. | Hengler's Grand Cirque. |
| Albambra. | Her Majesty's. |
| Astley's (now Sanger's Amphitheatre). | Imperial. |
| Avenue. | Lyceum. |
| Britannia. | Marylebone. |
| Connaught (now Holborn) | Novelty. |
| Comedy. | Olympic. |
| Court. | Opera Comique. |
| Covent Garden. | Pavilion. |
| Criterion. | Philharmonic. |
| Crystal Palace. | Prince's. |
| Drury Lane. | Princess's. |
| Elephant and Castle. | Royalty. |
| Empire. | St. George's Hall. |
| Folly (now Toole's). | St. James's. |
| Gaiety. | Sadler's Wells. |
| Globe. | Standard. |
| Greenwich. | Strand. |
| Grecian. | Surrey. |
| Hackney or Clapton Park. | Savoy. |
| Haymarket. | Vaudeville. |

The new theatres are the Avenue, Comedy, Empire, Novelty, Prince's, and the Savoy.

The total number of theatres licensed by the Lord Chamberlain in 1877 was forty-four, by the magistracy six, making, with the two patent theatres, Drury Lane and Covent Garden, a total of fifty-two, from which it would seem that the total number of theatres in London has decreased instead of having increased, as might be supposed from the numerous new theatres recently opened.

The course adopted by the Board with regard to old theatres is to make complete drawings to scale of every theatre, which include plans of the several tiers, elevations, and sections, so that any system of construction can be debated apart from the actual building, and the whole of the facts brought under the notice of the Board. The preparation of these drawings necessarily takes some time, weeks, and, in some instances, months being occupied in the admeasurement and drawing out of the plans, &c., of a single building. When the drawings of a theatre or other building are completed the premises are surveyed by the Superintending Architect of the Board, who reports as to the condition of the premises and suggests what alterations are, in his opinion, necessary to secure the safety of the public in the case of fire. The Architect's report is considered by a Committee specially appointed for the purpose, who inspect the building if they consider it advisable to do so, and report to the Board the result of their deliberations. The next step is to serve a draft notice upon the owner, and to invite the owner to confer with the Theatres and Music Halls Committee. The Board are not required by the Act of Parliament to confer with the owner, but they have adopted this course with a view to consult, as far as possible, the convenience of owners and managers, and in order to avoid making requisitions which may be found to be impracticable. At this conference the Board's draft notice is discussed, and any modifications suggested by the owner are taken into consideration and accepted or rejected by the Committee as they may think fit. It sometimes happens that the whole, or nearly the whole, of the Board's requisitions are agreed to by the owner without material alteration.

The Board then proceeds to serve a sealed notice upon the owner, having first obtained the consent of the Lord Chamberlain, and this notice becomes binding unless appealed against within fourteen days from the service of such notice. In the event of the owner appealing, the appeal is heard by an arbitrator appointed by the First Commissioner of Works, who has power to confirm the same with or without modifications as he may see fit, or may refuse to confirm the same, and order the payment of the cost of proceedings at his discretion. In the case of an appeal the time specified by the Board for the completion of the works (which is generally six months) does not begin to run until the day after the appeal has been decided by the arbitrator.

The principle upon which the Metropolitan Board has acted with regard to existing theatres has been to endeavour, as far as possible, to bring them in harmony with the Board's regulations for the construction of new theatres, regard being had to the special circumstances of each case. It is, of course, impossible to deal with the question of site, the action of the Board being confined by Act of Parliament to the enforcement of such structural alterations as may be considered necessary in order to secure the safety of the public, and in the case of old theatres the site has been perforce accepted as satisfactory, although in some cases it is notorious that the site does not fulfil the conditions which would be required in the case of the erection of a new theatre.

We break off here, reserving some further remarks on the subject for a future article.

## CONCENTRATION.

IT is of daily increasing importance, both to men of science and to men of practice, to arrive at those clear and definite laws which regulate concentration. It is not by any means as an academical question that this is chiefly necessary. Concentration, to a certain extent, is the work of nature herself. Intentionally or unintentionally, it is always going on, over vast districts of the surface of the earth, from the simple natural action of increase of population. For good or for evil, the process is unsleeping and irresistible, and it becomes all those who have to do with the housing, the feeding, or the medical and sanitary care of their fellow-men, to make themselves fully acquainted with the nature and the details of the process.

But it is not alone, or even principally, as a natural process that concentration has to be regarded. It may be considered as a central principle in a large class of human actions. The birth of civilisation is due to a certain amount of concentration; to that degree of association between individuals to which we owe the birth of families, of tribes, of municipalities, and of nations. The art of war has been described by one of its greatest masters as consisting in the concentration of overpowering force on definite obstacles, while at the same time maintaining such a distribution as to allow of the full service of necessary supplies to the attacking force. As in war, so in civil society, and so in mechanical or other physical operations. Rightly to balance the two energies of concentration and of distribution is the great outcome of practical wisdom.

In those appliances which, within the past fifty or sixty years, have placed the provision of the necessaries of life, for crowded masses of human beings, on a wholly novel basis, the importance of knowing how far it is advantageous to concentrate is cardinal. We do not, of course, imagine that the rate of increase of the seven millions of men, women, and children who now inhabit the valley of the Thames, and their tendency to agglomerate in one or other locality in that basin, is likely to be affected by any study of the rules of concentration. But given the material facts of the growth and distribution of the population, there are many points connected with their welfare which will be well or ill carried out, according as the measures taken are, or are not, in accord (whether designedly or otherwise) with the laws of concentration and distribution.

It may almost be predicated that concentration, as a general rule, tends rather to mischief than the reverse. That first and simplest form of association to which we owe,—let us say,—the village community, can hardly be spoken of as concentration. Up to a certain point, as yet undecided, the increase of population on a given area is or may be attended with the increase of health, wealth, and comfort. But the time arrives when health is affected by density of population; and from that point (the position of which is determined by many conditions, of climate, of soil, of elevation, and of sanitary care), the death-rate rises with the increase of numbers. This is, perhaps, the simplest form in which it is possible to measure the effect of concentration.

Again, in cases where a destructive effect is intended, as in the procedures of war,—concentration pure and simple may defeat the object of those who have recourse to it. Mere aggregation of mass may have none but a disastrous result. The hosts of Xerxes, mass for mass, could have devoured the little band of Leonidas. At Crecy, at Agincourt, at Waterloo, mass was ever in favour of the French. But increase of rigidity, of hardness, of consistency, of temper of some kind, is an absolute necessary for the successful concentration of mass. An enormous hammer of lead, or even of iron, would tear itself to pieces on a small steel anvil. Concentration of mass may be simply mischievous unless attended by concentration of strength.

There is, however, one form of concentration to which we owe most of our material and scientific progress. That is what is usually known as the division of labour. By concentrating his thoughts on one study, or by continually directing his arm to one repeated operation, a man can, usually, do both more and better work than by any more dispersive direction of his powers. We do not speak of the educational effect on his character, but simply of the outcome of his work as a producer. And as it is with one workman, so it is with many. The idea of the factory is to facilitate that concentration of detailed energy which we call the division of labour. And thus we have seen of late, and seen with much regret, the monster manufacturer, merchant, or tradesman overshadow, stunt, and finally ruin those hundreds of smaller industrial workmen who are unable to compete with the organised power of concentration.

To this, however, there is a limit. It may be hard to say where the line is drawn. But of its existence there can be no doubt, and some light may, perhaps, be thrown on its whereabouts.

In the familiar case of the movement of an armed host, indeed, there is no doubt where the power of concentration finds its limit. It is in the genius of the general. Masses of men which Marlborough, Napoleon Buonaparte, or Wellington could have moved with the ease and certitude of pawns on a chess-board, may be simply massed as victims for slaughter by such generals as led the armies of France at Sedan or at Metz. And so in civil or mechanical procedures a degree of magnitude may be attained under the rule and guidance of a man of genius, which will fall into hopeless confusion on his death or departure.

A striking instance of the self-imposed limits of concentration may be traced in our railway system. With the admirable coaching system which rose to its zenith from 1815 to 1835 the object proposed and attained by the traffic manager was to take his passengers to the very heart of the towns linked together by the four-in-hand vehicles. When the iron horse began to displace the well-bred team, Robert Stephenson, Brunel, and our other early engineers would fain have run their trains to the "White Horse Cellar" or the

"Saracen's Head." But a hostile interest intervened. All over the country mayors, aldermen, burgesses, and municipal authorities of all kinds barred the way. To stop at the outskirts of a town was all that was permitted, and even that grudgingly. Oxford and Cambridge bristled up against the Great Western and the Eastern Counties lines as if they had been the very fortresses of the Consistory of Rome; and Stephenson had to halt at Camden-town and Brunel at Paddington.

As the new mode of transport developed its powers people became conscious of the fault committed. Then, at tenfold cost, and often but imperfectly, central stations rose in Birmingham, Manchester, and elsewhere. London itself was bridged and tunnelled, and for a certain time the idea of a central station for the metropolis was entertained, and the creation of one heart for the regulation of all the great arteries of the railway systems was regarded as, if not probable, at any rate desirable.

Beyond that stage we may be said now to have grown. There can be little doubt, we apprehend, that if between 1835 and 1845 a central London station had been built, the enormous concentration of traffic would by this time have rendered it inadequate. Space would have failed, at any admissible cost, for exterior growth. Streets and roads would have been blocked by accumulated traffic. Subdivision would at such times become more important than centralisation, and a certain number of suburban main termini, linked together by through lines, would have been desired. In point of fact, something approaching our present arrangement, only provided with better intercommunication, would have been adopted from the first, if the wants of the future had been foreseen, and if we had been wise enough to provide for them.

This question of concentration assumes just now its most serious form with reference to the main drainage of London and of other districts. It comes to the fore in the lamentable series of events, detailed in a recent number, that have resulted in leaving the Thames Valley undrained. We ought to think ourselves fortunate if we are not taught by pestilence that to concentrate the sewage of a vast province like London at one spot and then to throw it into the river was a mistake of the gravest kind. We are told now by the Metropolitan Board of Works that the sewage is "deodorised." But before the report of the Royal Commission this same Board told us that, as it then was, it was unobjectionable. The true mode of dealing with sewage has not yet been arrived at, thanks to the utter want of organisation in which the framers of the Health Bill of 1872 took delight. To concentrate on one spot a large amount of matter which was to be destroyed, without having arrived at any plan for effecting the destruction, is perhaps one of the most unfortunate instances of concentration which the world has yet seen.

One of the advantages proposed from concentration is the saving of cost of management. On this score some persons are very sanguine. To a certain extent they are justified. But it is only to an extent that may be very easily determined. When competing interests,—coaches, railways, docks, gas works, water-works, or what not, grow up, or rather are forced into existence in rivalry with each other, duplicate establishments are formed, and a more or less completely double cost is incurred. And, as contrasted with a similar enterprise which from the beginning had been in one able hand, it is possible that the waste may be great. How far, however, it may be reducible by a subsequent fusion of the formerly competing interests is generally very doubtful. But it is a matter which, in each case, admits of anticipatory solution. A certain normal cost of management is well known to be appropriate to each great industry. It may be increased, to any amount, by quarrelling. It can never be reduced below the normal minimum; and experts familiar with the subject can generally give a shrewd guess as to that normal rate.

The one industry as to which it is not easy to fix a limit of profitable concentration is the manufacture of gas. That exception to the general rule is intelligible. In all cases of concentration,—take a coal station, for example,—three things have to be considered. The material for the industry has to be brought to the spot, to be treated on the spot, and to be conveyed from the spot. In the mineral traffic of railways the second operation appears at present to fix the limit of concentration. It is easy by the confluence of several lines of railway, to pour into a given terminus a stream of coal traffic such as it would prove impossible to sort or to arrange. Space fails; and the cost of shunting becomes enormous. Here, too, occurs a double difficulty in removal; for first the empty railway trucks have to be sent back by rail, and then the retail dealers' wagons have to be sent away by road. The station work at present limits the capacity of a coal station. Next to this, the wharfingers' or carmen's work,—or removal by road,—would do so. The amount of mineral that could be concentrated in a given time would be prodigious, but then the block would be absolute.

In gas the removal of the chief product, the gas itself, is so simple and so easy that no limit can be readily imagined as to quantity, and the procedures are so simple and orderly that the increase in area of ground required for increased production can be foreseen. As to the removal of the subsidiary products there may be more difficulty, but the amount received for residuals per 1,000 cubic feet of gas sold differs so little (regard being had to the price of coal) over thirty-five different great gasworks in town and country, that it may be doubted whether the difficulty of removing them has begun to tell, and for the simple concentration of coal an enormous amount is manageable.

In this respect, however, we think gasworks stand alone. For mineral trade, for merchandise, even for passenger traffic, for drainage and sewage, and for water supply, either the possibility of concentration beyond a certain point, or, at all events, its feasibility, is more than doubtful. The subject is not one that should be approached, as has hitherto been too often the case, under cover of a cloud of platitudes. It is one that demands the careful investigation of the man of business, an investigation which can hardly fail to be attended with a considerable success.

Of the influence of concentration on architecture we have not now room to speak. Its most obvious results take the form either of increase in the relative height of buildings, as we now witness in London, or in the creation of a quasi-palatial street architecture (as in Paris, and even more conspicuously in Turin), in which the individuality of the house, as an architectural unit, disappears. We recently spoke of the effect of concentration in raising the cost of urban life, and were able to point out the very simple numeric law which appears to regulate that increase. It is possible that in this case the evils induced by concentration may bring with them their own remedy. Such, however, is not the case as to the concentration of sewage,—the effect of which, as at present carried on at Barking, was illustrated most forcibly the other day by the seizure of two members of a scientific deputation to the spot with diarrhœa. With all that, abroad and at home, now menaces health, it is hardly too much to say that, unless we find an adequate mode of destroying sewage,—that is to say, of oxidising all the effete organic matter that it contains, for the mineral matter has agricultural value,—accumulated sewage will, perhaps not destroy London, but grievously scourge the inhabitants of the Thames valley.

## NOTES.

WE learn that considerably over one hundred portfolios of designs for churches were sent in by architects desirous to compete for the Liverpool Cathedral. These were pretty soon reduced to forty, and then came the tug of war to result in the survival of the fittest. Among the twelve architects selected were Mr. Pearson, Mr. Waterhouse, Mr. Bodley, Mr. Brooks, Messrs. Paley & Austin, Messrs. Somers Clarke & Micklethwaite, Mr. Emerson, Mr. J. O. Scott, and Mr. Blomfield. It is rather odd that while in the case of the War Offices competition (in which Mr. Christian was a juror whose opinion probably had considerable weight) the selections were mostly from among architects who had not attained the highest position, in the Liverpool competition,—in which the same eminent architect is principal adviser,—the result seems to have been the selection of several of the best known church architects. Are we to look for the explanation in the fact that in the one case the designs to be judged of were mostly Classic, and in the other case probably all Gothic?

A PUBLIC MEETING was held last week at Woolwich which may possibly do more towards solving the problem of the best method of communication across the Thames below London Bridge than has been accomplished by the committees which have lately been engaged in discussing this question. The inhabitants of North and South Woolwich having waited so long in vain, have, it appears, determined to take the matter now into their own hands, and called a meeting to hear the particulars of a scheme for steam ferries, which has been designed by Mr. W. May, C.E., by means of which vans and carts with loads of any weight would be transported from one side of the river to the other without difficulty, and at a small cost. The main features of the scheme consist in an improved method of constructing the platforms and staging, so as to avoid any inclines for horses with heavy loads. At stations where the traffic will be the greatest there are to be one tidal and two travelling platforms, each of which is to run on a pair of rails securely fixed on the foreshore. The tidal platform is to be manœuvred by machinery as the tide rises and falls, so as to bring its deck on a level with the deck of the boat, and is to be worked automatically by means of electricity. The boats are to be fitted with double engines and twin screws, and lighted with the electric light. They are to ply three times in the hour between 5 a.m. and midnight, and the tariff is as follows:—Vehicles with load and one horse, 9d.; with two horses, 1s.; with three horses, 1s. 6d.; with four horses, 2s.; cab and driver, 6d.; pony-cart, donkey, &c., from 6d. to 3d.; passengers, 1d., with a discount of 25 per cent. on all return tickets, and of 50 per cent. on all workmen's tickets. The latter will thus be able to go to and from their work for a penny daily. There seems to be little doubt but that, if once fairly started, the scheme, which is in accordance with what we have repeatedly recommended, will prove abundantly remunerative, for the capital required to start it is estimated at 15,000*l.*, a sum which will probably be forthcoming from the inhabitants of Woolwich, who it is to be hoped will thus lead the way in providing for their own accommodation, and so point the moral of the late proceedings of the Metropolitan Board of Works in proposing to lay out 750,000*l.* on a single bridge.

IN a foot-note in our last, attention was called to what is, no doubt, a serious defect in the selected design for the new Admiralty and War Office. The principal court is only 80 ft. wide, and is closed at both ends (there being, however, gateways on the north and east sides); one of the courts in the south wing is 35 ft. wide, and the other courts are each only 25 ft. wide. The buildings fronting on the principal court are about 90 ft. high, and those abutting on the minor courts are about 100 ft. high. It is not fair to blame the architects for the exiguity of the means of internal lighting and ventilation; the fault lies rather with the Government, who, with ill-judged parsimony, persist in endeavouring to cram two large departments upon a site which is too small for the purpose. The question of the site has never been fairly discussed in Parliament, and it is not too late to appoint a Commission to consider the relative merits of the Great George-street site and the Spring-gardens site. The latter was selected by the First Commissioner on account of its comparative cheapness, most of the houses in

Spring-gardens being already occupied as Government offices, but we repeat what we have often urged before, that in the case of an important public building its economical erection should not be the only consideration, and that other questions should be taken into account, the foremost being the capability of the site as regards sanitation.

SOME of the competitors proposed to utilise the stone screen in front of the Admiralty in the new buildings, but there does not appear to be any provision to that effect in the selected design. We shall probably be told by the First Commissioner that he intends to preserve this screen, and its ultimate fate will in all likelihood be that it will be sent to join the Burlington House Colonnade, which is at present used as an impromptu gymnasium in Battersea Park.

THE prorogation of Parliament and the consequent scarcity of news has caused the recent fires that have taken place in the metropolis to be noticed more prominently than they would have been had they occurred during the session, and the newspapers are full of suggestions intended to guard against a similar loss of life to that which lately took place in Pimlico. One of the most obvious precautions would be to make the upper floors of every house fire-resisting. This might be done by pugging between the joists with coke-breeze and Portland cement. The additional cost of this treatment of the floors of a three-story house of a rental of from 30*l.* to 35*l.* per annum would not exceed 5*l.* The Legislature recently required the site of every house to be covered with a layer of concrete to prevent the damp rising, and it would not be unreasonable to require this additional precaution to secure the safety of the tenants in the case of fire.

IT is impossible for us to read the accounts of the alarming fire which occurred on the morning of the 15th inst. in the rear of the Mansion House Railway Station without feeling serious misgivings as to the safety of large numbers of workpeople similarly situate to those who were with so much difficulty rescued from the burning building in question. Here is a case in which what is described in one account as the only available staircase to several floors occupied by male and female workers is set on fire and becomes impassable; and this, be it observed, during the working-hours of the day. How long will it be before the papers will have to chronicle an appalling sacrifice of life under such circumstances as these? And how much longer will it be tolerated that large establishments, occupying several floors, and employing, it may be, hundreds of hands, are "provided" (as are some that we know of) with only one staircase, and that of most combustible materials, thus making the workshop a veritable death-trap in case the staircase is on fire and no other means of rescue are available? Lofty buildings of the workshop type should, under such conditions as those mentioned, be provided with at least two staircases, and it goes without saying that these staircases and their approaches should be as far as possible of incombustible materials, and so constructed as to resist the rapid spread of fire. In addition to these obvious precautions, other safeguards should be provided. Theatres have lately had their due meed of attention in this particular, and it behoves all concerned (whether as guardians of the public safety or as employers) to see that our workmen and workwomen are not cut off from all means of escape from fire while pursuing their occupation.

RAILWAY travellers passing through Rugby of late will have observed a new station rapidly rising. The poor and shabby station of the London and North-Western Railway has long been so familiar an object to the traveller to and from the North that he will almost experience a feeling of regret at seeing the new building about to supersede the old one. But in truth it was high time that Rugby had a larger and better station. We do sincerely hope, however, that the great company to whom the line belongs will take care that some attempt is made to make the new station not only useful for its practical purposes, but a pleasing piece of architecture. A place like Rugby, the seat of an historic public school, ought not to be put off with a building hideous to the eye, as is the case with the majority of railway stations. Without attempting striking artistic effects, the architect of railway stations has admirable opportunities for doing work which shall be pleasing to the eye. It is a thousand pities that more attention has not been given to this aspect of the railway station question, so that the opportunity may be seized of doing something to improve the neighbourhood of railway stations from an artistic point of view. The actual cost of carrying out a pleasing design is but at the most a trifle more than that of carrying out one without artistic merit or ornamentation. Among roadside stations many will recall Box-hill, as an instance of a successful attempt to break away from the ordinary routine of station architecture. But large buildings, such as the new station at Rugby, should at any rate have some care bestowed on their external appearance as well as on their fitness for practical use.

THE letter from Mr. Charles Barry which was read at the last meeting of the Metropolitan Board of Works deserves a passing note, inasmuch as it announced the intention of the Governors of Dulwich College, who are large land-owners in the sylvan suburb, to allot seventy-six acres of land to the purposes of a public park. But it appears that the Governors cannot appropriate the land in question to such a purpose without the authority of a special Act of Parliament, and for specified reasons they are unable to take upon themselves the trouble and expense of this process. Accordingly they have asked the Board to promote a Bill in Parliament authorising the Governors to set apart the land for the purposes of a park, and to hand it over to the Metropolitan Board for custody and maintenance. The letter was referred to a Committee of the Board for consideration, and it is to be hoped that no technical difficulty will intervene to prevent the appropriation of the land to the purposes of a park. Railways and tramways, and the work of the house-builder, are rapidly altering the face of this still pleasant suburb. The picturesque aspect of Croxted-lane and other spots has been effaced, to the regret of many besides Mr. Ruskin.

IT is proposed to form a new society for the preservation of London antiquities. We should have thought that there are already sufficient societies for that purpose, and that to start a new society would only have the effect of crippling the resources of existing societies. What is the Topographical Society for London (which was established with the laudable object of preserving a record of Old London, now fast vanishing away) doing?

IF we may believe the account communicated to the daily papers, a French military engineer, Captain Renard, has solved the problem of propelling and steering balloons irrespective of the wind. The motive power is said to be electricity, served from a series of accumulators, providing a sufficiency of power for several hours. The balloon to which the machine was attached, was experimented with over Meudon, and brought round in a semi-circle against "a slight breeze";—so the *Times* correspondent of Wednesday last. We should hesitate to accept this vague account of the partial solution of the problem (for to travel a short distance against a slight breeze is not, after all, to accomplish much) as an indication of the commencement of a new era in locomotion; but we shall, at all events, look with interest for further and more exact particulars. It may be that aërial locomotion is only a question of time, but it is probable that a considerable period will elapse before all the difficulties connected with it are overcome.

ON Monday afternoon we attended, at the invitation of Mr. Parker-Rhodes, to see him "square the circle" by means of his "invention of a geometrical instrument for commercial and educational purposes, which discovery and invention he offers gratuitously to this and foreign countries." Briefly stated, the method which Mr. Parker-Rhodes adopts to obtain the square of a circle or of any irregular-shaped figure is to take two sheets of stout millboard, superposed. The upper sheet is perforated with the circle or the irregular-shaped figure to be squared, either full-sized (where practicable) or to scale. The lower piece of millboard is placed beneath the perforated piece, so as to form, as it were, the bottom of a shallow trough whose outline is formed by that of the perforation of the upper piece. Into the shallow trough so formed small shot is poured until the whole area contained within the lines of perforation is covered with shot (in one layer), as closely packed together as possible. The amount of shot thus enclosed is then poured on to a square slab, bounded on two of its sides by raised borders or ledges, ruled and figured; and by means of movable L-squares (varying in size according to the space occupied by the shot) the shot is "cornered" on the square slab, and the dimensions of the square covered by it seen at a glance. Mr. Parker-Rhodes thinks that his invention would be useful to the land surveyor in dealing with a piece of land of many angles and unequal sides, as he could, after obtaining the actual measurements of the sides of the land, make a drawing of its outline to scale, and then cut out this figure in millboard, see what quantity of shot would be required to fill the area of the perforation, and then ascertain the size of the square which the same quantity of shot would fill. Mr. Parker-Rhodes must have a delightful idea of the simplicity of surveyors.

IN the *Builder* for May 10th we printed a portion of a paper read at a meeting of the Balloon Society by Mr. H. Lefevre, on "The Study of Earthquakes," together with a letter from a Mr. J. S. Green, of Yokohama, addressed presumably to the reader of the paper, and forwarded to us with his manuscript, as a kind of rider to it. From a copy of the *Japan Gazette*, which a correspondent has obligingly forwarded to us, it appears that Mr. Lefevre is accused of having taken much of his information unacknowledged from the proceedings of the Seismological Society of Japan, published in the *Japan Gazette*, and that a Mr. T. R. Green is also, for reasons we do not make out, very angry about it, and very anxious to state in the Japanese paper that he is not Mr. J. S. Green,—a proposition which appears self-evident. We need only observe that we printed Mr. Lefevre's paper, as we print any other paper read at a public meeting, on the responsibility of the author, and that it rests with him, and not with us, to answer the charges made against him from Japan, and to settle the claims of the two Mr. Greens of Yokohama.

## THE ARCHITECTURAL ASSOCIATION'S EXCURSION.*

(With Illustrations.)

WEDNESDAY morning in last week saw the excursionists on their way through the pleasant Suffolk roads to Lavenham, which boasts the magnificent church illustrated in our last week's number. It is, indeed, a beautiful building, and is, in some respects, more easy of comparison with modern work than most Mediæval churches, in that it is (except the earlier chancel) practically all of one style instead of having gradually grown up through different periods. Many of the smaller churches one loves for their very mixture of styles; they carry their history written on their front. Like many faces, they charm as much by their expression as by their features. Lavenham, however, is an acknowledged and conscious beauty. It is purely a bit of design, owing nothing to chance, but all to skill. It was the result of the

* See p. 223, *ante*.

prosperity which successful trade induces. In the fifteenth century Suffolk and Norfolk were the seat of a large woollen industry, which has now migrated to Yorkshire, leaving many villages hampered with magnificent churches, far too large for the diminished population. Indeed, in some parts of Norfolk it is melancholy to go into church after church and find them too big to accommodate the entire parish, all told. Lavenham, however, is not in this sad condition, for, though the ancient glory of the place is dimmed, there is plenty of life left, and the church is treated with all befitting care. It is almost entirely Perpendicular in style, having been built by two wealthy and powerful families towards the end of the fifteenth century,—the noble De Veres and the commercial Springs, who were closely allied by marriage. After the fashion of the age, the arms of the founders play a conspicuous part in the decoration of the fabric, and help to form a particularly fine base all the way round, the five-pointed mullet of the De Veres serving the purpose very well. Those were days when heraldry was still a living art, and a man's arms gave legitimate scope for unaffected decoration. May not the nineteenth century sometimes ease its despairing envy a little by reflecting how very much circumstances were in favour of the Mediæval architect? The buttresses are particularly good, and so is the parapet, except for the introduction of a large leaf out of all scale. Inside, the quiet, handsome roof strikes one as more dignified than the florid timber-work of Woolpit; but if florid work is desired, no better specimen could be found than the wonderful Spring pew, now in the north aisle. It is inclosed by a screen, the tracery of which presents an infinite variety of beautiful carving. It is true that the old Gothic forms are entirely superseded, but the delicacy of the carving, the vigour of its lines, and the exuberance of fancy displayed, must delight all whose sympathies are not very narrow. We hope to illustrate one or two scraps from this work, which probably owes its peculiar characteristics to Flemish influences. There are several other good screens, and some good brasses, in the church, while in the village are a few interesting houses and the Wool-hall.

Leaving Lavenham, a few miles' drive brought the party to Melford and the adjacent Hall of Kentwell. Here, again, it is not the detail which charms, but the general air of the place, its picturesqueness, and, above all, its colour. The red brick has toned down into an infinity of shades, the mortar has fallen out, and covered the surface with a network of delicate black lines, and brilliant lichens creep here and there, carrying all lovely hues, from orange to tender grey, wherever they go. Tall chimneys rear their insecure length in picturesque confusion; dormers peep out in unexpected places; a long length of timber and plaster overhangs the moat on its wooden joists; ivy clambers along the terrace walls and droops into the still waters of the moat; and the sketchers rise from their work like men who have feasted on bon-bons. Of solid food there is little: nothing to measure. But they find good, wholesome diet at Melford Church.

Like Lavenham, Melford Church is practically of one design throughout, although the pillars of the nave seem to be some decades earlier than the rest of the work, which ranges from 1450 to 1490. Here, as at Lavenham, the size and number of the windows recall "Hardwick Hall, more glass than wall." When the church was in its prime, before the first iconoclasts had left their mark upon it, it must, indeed, have been a wonderful sight. Every window glowed with rich glass; across the whole breadth of the church stretched the "fair rood-loft with the rood; Mary and John of every side, and with a fair pair of organs standing thereby." * Beyond this, at the east end, stood the altar with the Crucifixion over it, and on each side "a goodly tilt tabernacle, reaching up to the roof of the chancel." At the end of the "Jesus Ile" stood another altar with a fine reredos, and on each side "a fair tilt tabernacle," one with a figure of Our Lord, the other enshrining Our Lady of Pity. No church could have been richer in works of art or in its vestments and furniture. There were in the vestry, says old Roger Martyn, whose account we have been quoting, "many rich copes and suits of vestments," and a cope-press with "devices to hang on all the copes, without folding or frumpling of them."

All this glory and splendour lasted barely a hundred years, for with the Dissolution of the Monasteries and the throwing off the Papal yoke, there arose a spirit of antagonism to much of the religious superstition hitherto prevalent; and ignorant zealots indulged their natural instinct for destruction by smashing or defacing as many of the superstitious paintings, coloured windows, and images as they could. It is at least charitable to suppose that their destructiveness, like Falstaff's cowardice, arose from "instinct." It would be, however, a mistake to suppose that the Puritans are responsible for all the mischief. No doubt they did much, and zealots like Dowsing thought they were doing God's service in dishonouring the memorials of the "Scarlet Woman." But nearly a hundred years before the Commonwealth the tide of destruction had set in, and the churchwardens of Melford gave one man sixteen pence in 1562 for "ye scrapeinge owt of the payntinges all ye lengthe of ye quire," and another man 2s. in 1579 for "defaceinge of ye sentences and imagerye in ye glasse wyndowes." And no doubt these are but isolated instances of the vandalism of the times when Shakspeare sighed to see,—

"Brass eternal slave to mortal rage."

Notwithstanding the liberality of the churchwardens of Melford towards their destroying agents, there is still some very fine glass left, although it is not in its original position.

Long Melford Church is remarkable in that the names of its founders and benefactors are given in long inscriptions that run the length of the parapets, desiring prayers for the souls of those mentioned, who repaired such and such arches, or covered the porch, or glazed certain windows. The inscription round the Lady-chapel, for instance, calls on the reader, in the orthography of the time, to "pray for the soul of John Hill, and for the soul of John Clopton, esquire, and pray for the soul of Richard Loveday, butler with John Clopton, of whose goods this chapel was embattled by his executors. Pray for the souls of William Clopton, and Margery and Marg'y his wives." The good man had two wives of the same name, and apparently, to avoid confusion, had recourse to calling one Margery and the other Marg'y. We are also requested to pray, not only for the soul of John Clopton, but also "for all the souls that the said John is bound to pray for." The inscription closes with calling Christ to witness that the builder did not place these names on record from vainglory, but that the souls might be remembered. When we recollect that within some half-century from the utterance of this devout prayer, all praying for departed souls was held to be superstitious, and is so held now by the frequenters of the very church where the impassioned prayer is inscribed, may we not reflect without horror that perchance our great-grandchildren will forego with equanimity some of the privileges we now hold most precious, and forsake without disaster the views we now most highly cherish?

Inside the church one of the most curious features is the Clopton Chapel, where on a wood cornice are painted a number of verses, said to be the production of Monk Lydgate, the poet. They have suffered much at the hands of many workmen, but a great deal may still be deciphered. They are in effect a long cry for mercy, many of the verses ending with the refrain,—

'Graunt or we deye shrifte hosell and repentaunce."

The Cloptons, who did so much towards the erection of the church, whose litany adorns their chapel, and who so ardently desired the prayers of the world for their souls, lived at Kentwell, but in an older and different house from that which now exists. They also built the remarkable Lady-chapel at the east end,—a work of excellent proportion outside, and of very curious plan. There are several interesting monuments and brasses in the church, the finest being a Renaissance monument to Sir Wm. Cordell, who died in 1580. This is a work of great refinement and delicacy; of course it is not Gothic, not,—as Pugin would have said, —not Christian; nevertheless, it is well conceived, well balanced, full of grace and freedom, and the mouldings are particularly refined. Indeed, as a matter of sheer design and display of imagination, the finer Renaissance monuments will bear comparison with anything of an earlier era.

With Long Melford the day's work ended; and a better day could not be spent in any county. But before the village was left the rector, the Rev. C. J. Martyn, who had done all he could to further the objects of the Association, sped his parting guests with a cup of afternoon tea, an attention much appreciated by the hot and weary sketchers.

On Thursday, the 14th, the first place visited was Hawstead, a church of various dates, but with a particularly elegant tower, built by the Sir R. Drury who lived at the demolished Hall or Place. There are some good brasses and monuments, among them a monument in the north wall of the chancel to a Fitz-Eustace, with a boldly-carved floral pattern on the arch. There is also a delicate and charming Renaissance monument to Elizabeth Drury, who died in 1610. She was the only daughter of the last of the Hawstead Drurys, whose memory lives in Drury-lane. She is said, by a local tradition, to have died from a box on the ear administered by her father; but the only reason for this supposition is that her effigy is carved with her head leaning on her hand, a position which brings to mind the remarks of Bosola to the Duchess in John Webster's play of the "Duchess of Malfi" (1623). Bosola says, "Princes' images on their tombs do not lie, as they were wont, seeming to pray up to Heaven; but with their hands under their cheeks, as if they died of the toothache." Elizabeth Drury is just as likely to have died of the toothache as of a box on the ear. But, however she may have died, she was particularly well buried; and, to judge by the work, Italian artists may have been employed on her tomb.

Stanningfield Church only detained the party a quarter of an hour, which, however, gave time to sketch the pleasant little tower, and to look at the font and the Rookwood monumental slabs. Thence a short drive led to Coldham Hall, once the seat of the Rokewoods, and built in 1574 by Robert Rokewood. The details of the porch, as well as the mullions and labels, are of brick covered with stucco, as are most of the dressings of domestic buildings about here. The details are, architecturally speaking, extremely poor, but here, as at Rushbrooke and Kentwell and Pakenham, poverty in detail is atoned for by picturesque grouping and fine colour. The house is interesting historically from the fact that the son of the builder, Ambrose Rokewood, was concerned in the Gunpowder Plot, and suffered death at Tyburn in 1605. The unfortunate gentleman seems to have been more sinned against than sinning, for, as he touchingly said at his trial, "he had been neither author nor actor," but only the depositary of the terrible secret, which, out of love to his friend Catesby, "whom he loved above any worldly man," he would not divulge. It must have been true love that was content to prove itself at the cost of life.

Plumpton Hall came next on the list, where Mrs. Bevan entertained the whole party at luncheon, and afterwards read a short paper on the history of the place, from which the following is extracted:—"Lands in Whepsted were given to the Abbot and Convent of St. Edmund at Bury as far back as 1040, in the reign of Edward the Confessor, and Plumton was a dairy and orchard farm to the Abbey. At the Dissolution, about 1540, the manor of Whepsted and all lands belonging to it, including Plumton, were granted by the Crown to Sir William Drury of Hawstead, and his heirs, in consideration of 819*l.* 11s. On the partition of the Drury estate, in 1618, in consequence of the death of Elizabeth, sole daughter and heiress of Sir Robert Drury, who was betrothed to Henry, Prince of Wales, and is said to have died at the age of fifteen, of a box on the ear given by her father, this part of the property fell to the share of Diana, wife of Sir Edward Cecil." The property eventually came into the hands of Sir Thomas Hammond. As a favourite attendant and high official in the household of the Prince Regent, being his first Equerry, and Clerk Marshall of the Royal stables, Sir Thomas Hammond lived much in the gay world of the day, and adopted the rage for French fashions which prevailed in the Whig party of the time during Napoleon's career as First Consul.

Plumton, which had been up to this time only a farmhouse with a good deal of timber in the building and with stout old oak floors, was now transmogrified by a French architect into an imitation of a French château, six of the old rooms in three stories of the old house being

* See Sir Wm. Parker's "History of Long Melford," quoting an account written about 1550.

cleverly added to, so as to give an outward appearance of unity of design. The house was thus altered and renovated between 1800 and 1807, and, being released from Lady Hammond's settlement in 1851 by her death, it was purchased by Mr. Bevan, who "renovated the roof and walls and made substantial repairs throughout, but, except dispensing with the ornamental parts of the outside, in no way altered it. With regard to the plan of the house, it is to be observed that the angles being at the points of the compass, it gives most pleasant aspects on all sides. N.E., S.E., S.W., and N.W., each gets the sun in turn, and, while no side is absolutely sunless, no side is exposed to the scorching heat of the full south."

At Ickworth another modern example was seen. The mansion consists of a central cupola with two long circular corridors leading from it to two pavilions, a plan more telling on paper than in execution. It was built chiefly for the reception of a fine collection of art treasures, which, however, fell a prey to the French in their journey to England. There are, nevertheless, many fine pictures in the house. The gardens are beautiful, and the view from the top of the cupola is most extensive. The Marquis of Bristol himself pointed out some of the chief objects of interest, and for the second time in the day the party experienced the hospitality of a host whose house they had invaded. The return to Bury was made by way of Little Saxham, where the church, with its round tower, is of some interest. Many of the churches in East Anglia have these round towers, which have puzzled antiquaries a good deal, efforts having been made to assign them to very early dates. Little Saxham, however, is clearly of Norman work, the bulk of the tower being of plain flint walling, while the topmost stage is well arcaded. The circular form was probably adopted to avoid the use of freestone quoins, which would have been necessary to bond in with the flints had the tower been square. The nave arcade is much later than the tower, and has some curious and elegant little corbels attached to the columns about 4 ft. from the floor.

On Friday, the first stay was made at Pakenham, where the restored church detained the visitors a few minutes. Most of them soon left for the picturesque hall, which presents a three-gabled front of red brick, with mullioned windows, and a large porch with canted corners. It is dated 1622, but no history of it is forthcoming. There, again, the detail is devoid of interest. The three gables, the decaying bricks, the tiled roof, and the colour, give all the interest. At Ixworth there is a good church, with a large variety of flint panelling; but here it is particularly observable how perishable is the beauty of this kind of ornamentation. The pattern is sunk square in panels of stone (which presumably would not stand any fine tracery work), and then filled in flush with pieces of broken or cut flint. The sinking is not always deep, and in all the patterns sharp angles must occur where the flints cannot get good hold. The consequence is that much of the flint work has come out, leaving the panels in a bald and rough condition. The tower is said to have been built by Robert Schot, abbot of Bury, in 1470, a native of Ixworth. His name appears on the south-east buttress, in the panel below the weathering, just above the caves of the nave. There are the crown and arrows of Bury Abbey, and below:

MASTR ROBERT
SCHOT ABOT.

It is rather curious that this church was built close to the precincts of an Augustinian priory, which, of course, had nothing to do with the Benedictine establishment at Bury. Some remains of the priory,—a room with a double row of vaulting and a vaulted corridor,—still exist. They are of much earlier work than the church (being Early English), and the deep hollow mouldings of the ribs, the clean vigorous curves of the caps, brought comfort to the soul of one of the party who has not yet succumbed to the "late and flat" wave.

At Bardwell is a very picturesque manor house of brick, timber, and plaster. The front towards the road is quiet and homely, while the crow's-foot gables are surmounted with chimneys of excellent design. The church is a noble structure, not particularly elaborate, not florid or ornate, but striking by reason of its simple dignity and noble proportions. It was a matter of general regret that the time available was so short. At Stowlangtoft, too, there was only time to admire some of the carved woodwork, when the party had to hurry off to Walsham-le-Willows. The church here is a fine building, in a beautiful churchyard. The north porch is noticeable, as it has chequers of stone and flints in diamond pattern, instead of as usual with horizontal beds. Of course there are the usual flint inlaid panels in the parapets and elsewhere. Inside there are some excellent bench-ends, a good font, and a good rood-screen. The quarter-master's whistle, which collected the scattered sketchers, sounded all too soon: there was only just time for them to fortify their resignation by reading an inscription on the porch seat, "God's will be done in Hevun and Erthe," and away they had to fly to the carriages. In the pleasant evening air, between the glowing cornfields, or past the jovial harvest-men poised on the top of their great loaded wagons, the excursionists made their way home, and entered Bury from the last of their expeditions.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

FIFTH NOTICE.

OUR last acquisition, the Island of Cyprus, was celebrated in the ancient world, but under the sway of the Turk it declined greatly from its ancient wealth and importance. From the time the Turks became its masters, in 1570, when it was well-clad with timber, which sheltered the plains during summer from the sultry blasts which blow from the deserts of Africa and Arabia, until now, when the forests have almost disappeared, the fertility of the island has declined. Let us hope that under a more enlightened Government it may regain its ancient position, and prove a monument to the honour of its present rulers. The corn of Cyprus is of excellent quality; but wine is the staple product of the island. The wines are sweet, and require to be kept many years before they are fit for use. All the valuable kinds are white, the red being merely used as *vin du pays*. The apricots of Cyprus are delicious, and may be purchased at 3s. a bushel; and many varieties of the gourd and pumpkin are produced. Upon the lofty chain of mountains which traverse the island from east to west, some good specimens of forest trees still remain. The once plentiful *Cupressus fastigata* is now rare; sections of it are exhibited, as also of *Cedrus Libani*, *Pinus laricio*, and *Pinus maritima*, from which two last resin is obtained. There are also a few varieties of oak. The wood appears to be of good quality, and the sections indicate that the trees are of considerable size.

Mauritius is not productive of many useful vegetables, but depends mostly for supplies upon Bourbon. The exports consist of coffee, raw sugar, cloves, cotton, and indigo. The surface of the island is composed chiefly of rugged and irregular mountains; from these flow numerous small streams which water the intervening valleys where considerable forests exist. The wood does not appear to grow to any great size, judging from the specimens exhibited, which embrace seventy different varieties. There are also shown two hundred specimens of fibre, some of which is very fine in texture.

When Great Britain took possession of the island of Singapore, in 1819, its population did not reach 200 persons, mostly fishermen and pirates. It now exceeds 40,000, living under the guarantee of British protection, and is the seat of a flourishing trade. When the island came into our possession, it was well wooded, but, through the want of supervision, it is being rapidly deforested, and no attempts appear to be made to supply the defects by planting. Attention has now been drawn to the matter, and something may be done to suppress the wanton waste, and to provide new material. This is all the more necessary as one of the valuable timbers for building purposes in the tropics, the Tampinnis, is rapidly disappearing. It is a hard wood, and resists the attack of the white ant. Amongst other trees are the Ballon or Johore Teak, the Daroo, and the Seriah, which grows to a considerable height. The forest products of Siam are abundant, and there is not a region of the world which produces fruits more various and more exquisite. About 500 specimens of natural woods are exhibited, amongst the chief of which are sandal-wood, ebony, teak, rosewood, and spari.

One of the most valuable medicines in the pharmacopœia is quinine, and great part of the bark of the chinchona tree, from which it is made, comes from Ceylon. As much as 7,000,000 lb. were exported from the island last year; specimens of it are shown in different stages of preparation. Amongst the specimens of wood exhibited, which are forty in number, are beautiful samples of satin-wood and cocoa-nut-wood, and there is a box inlaid with calamander-wood, which is very effective. Besides the specimens of chinchona bark, there is shown a collection of medicinal herbs and seeds. Amongst the most valuable of the Ceylonese plants is the cinnamon-tree, of which there are ten species, but only five of these are considered fit for use. The island is famous for its coffee, but, owing to a blight having attacked the plants, the produce has considerably decreased, although upwards of 200,000 acres are still devoted to its culture. Specimens of tea, the cultivation of which has recently been successfully introduced, are shown, as are also samples of sugar, tobacco, and cocoa. The wooded parts of the island are destructive to the health of strangers, and in them are found the boa constrictor, which is said sometimes to reach the length of 30 ft., and is free from poison; but there are some of the most venomous species, as the cobra di capella, a specimen of which is in the collection, together with stuffed birds, butterflies, and beetles, with their larvæ, many of which are destructive to trees. From the Ceylon Almanac we gather that a considerable number of the accidental deaths occur from falling from trees and the bites of serpents. Ceylon is rapidly improving under British sway, and strenuous efforts are made to improve the intellectual and moral character of the people. The population numbers upwards of 1,500,000.

We are apt to associate China and Japan, two Empires which until recently were both jealously guarded against the intrusion of strangers,—but in one especial respect they differ materially. Whilst the Chinaman holds in contempt the outside "barbarians," his neighbour assimilates freely with other nations, and takes every advantage of the new fields of commerce open to him. The inhabitant of the "Celestial Empire" is a thorough conservative, adhering tenaciously to the manners and customs of his ancestors, and when he deigns to mix with foreigners and to adopt their costume for a time his pig-tail is sure to be hidden beneath the broadcloth which sits so uneasily upon him. The dweller in the land of the "Rising Sun," on the other hand, is a thorough-going radical. When he comes amongst us it would be difficult from his accent to discover his nationality, and he has the manners of a staid and respectable European.

Whilst China is not represented in the present Exhibition, and there are many products of the "Flowery Land" worthy of a place in it, Japan sends the largest and most perfectly arranged collection exhibited. These fill the whole space of both arms of the eastern transept, and are arranged with admirable precision and neatness. It is almost impossible, even were the space at our command not practically limited, even to allude to the numerous objects of interest which are met with. These include models of various erections in timber, and of peculiar modes of fencing, models of charcoal kilns, examples of the lacquer work for which the country is famous, brilliantly coloured, conventionally-treated landscapes, with birds of gay plumage perched on the branches of trees; photographs showing foresters at work, and how the trees are transported from the steep mountain sides, &c.

The mountainous islands which compose the Empire of Japan extend over 15 degrees of latitude, and the climate varies so that the country possesses vegetation common to both temperate and tropical zones. The rocky soil is favourable to tree life, and the rainfall is abundant, so that on the plains bordering the sea, in the deep valleys and on the hills, which often rise to 6,000 ft., the natural forests contain numerous species of timber-bearing trees. From a chart exhibited, we learn that the Empire has an area of 38,563,718 chos, the cho being equal to 2,455 acres, giving about 96,000,000 acres. The forest area, excluding the Loo Choo and Bonin islands, is 11,866,620 chos, or about 29,000,000 acres, and this is held, in nearly equal portions, by the Government and by private owners. The native arboriculturists have

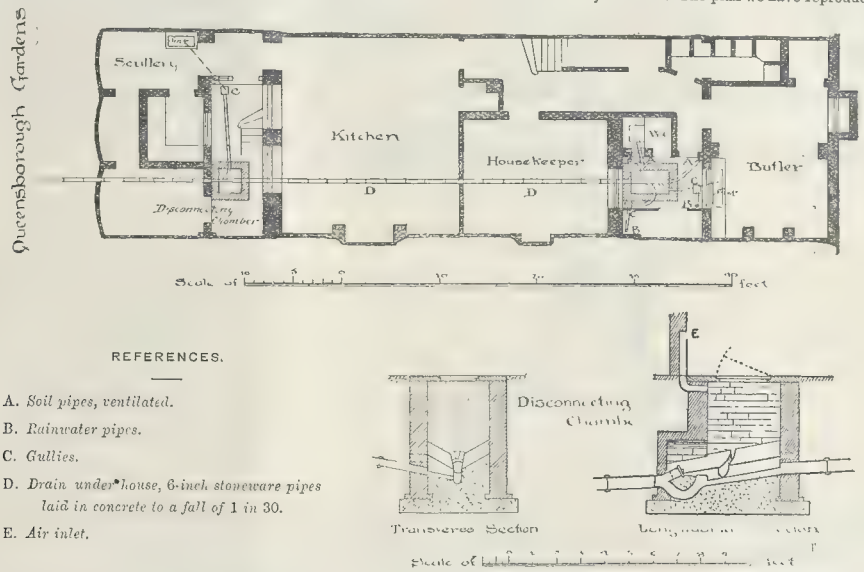
carefully mapped out the empire into five regions, each bearing different varieties of trees. In the first of these, where the temperature is high, the forests consist of broad-leaved evergreen trees, of which *Ficus Wightiana* is given as a typical example. In the temperate region are found the oak and beech and broad-leaved deciduous trees, along with cedars and arbor vitæ, amongst which the magnificent tribe of *Thuyas* and *Retinosporas* are of great utility. The pines and firs abound in the higher regions, of which the *Abies Veitchii* is chosen as the representative.

Many graceful dwarf varieties of the *Retinosporas* have been introduced into this country for ornamenting our lawns, whilst the camphor wood and keyeki are largely used in shipbuilding and cabinet-making. The members of the *Arbor vitæ* family, which with us are seldom of great size, and are used merely as ornamental features in pleasure-grounds, attain to great dimensions in their native mountains, and are largely used by the cabinet-maker and builder; the timber is of fine texture and beautifully marked. Amongst the exhibits is a splendid slab of *Retinospora obtusa*, which attains a height of 120 ft., with a girth of 20 ft. It bears considerable resemblance to the red woods of California. Other examples of the same wood are yellow and some white in colour. Beautiful slabs are also shown of maple, yew, bird cherry, juniper, and *Cryptomeria japonica*, which latter only appears here as a mere shrub. The Japanese oak, of which there are several varieties, does not appear to equal English oak in quality, but from it the finest charcoal is produced. There are 302 specimens laid out for inspection, and there are two large cases containing a collection of vincers, each about the size of a playing-card, neatly fitted into separate compartments containing several varieties of the same species, all carefully labelled. In Japan, the Government Forestry Department is an important State institution, having attached to it a school of forestry, the curriculum of which embraces chemistry, surveying, botany, planting, and rearing of trees, besides natural philosophy. The school is attended by about 150 pupils, some of whom seek to qualify themselves for employment in the Government forests, whilst others are sons of landowners desirous of a knowledge of how best to manage the woods on the paternal acres. Large plantations have been formed under Government auspices, and every year the area of forest land is being added to,—the cedars, oak, spruces, and firs being the trees more generally planted. The systematic surveying of the forests is also a work that is being pushed forward, one of the maps exhibited, showing what is being done in that way. Within the last few years an important experiment has been made in the introduction into Japan of the seeds of trees and shrubs from foreign countries. Tea, of course, is extensively cultivated, and the making of this beverage the Japanese consider they have reduced to a fine art. It was only, however, in 1879, that the first coffee-berries were brought from the Sandwich Islands, and sown for trial in Ogasawara, and so well have they thriven and increased that great hopes are entertained for the commercial success of coffee-growing in Japan. The Cinchona-tree, from which quinine is made, was introduced from India in 1878; but the climate appears to be too cold for it, though from one of the districts more favourable reports of it have been received. During 1880 and subsequent years large importations of the seeds of useful trees were made from Europe and America, and planted in the experimental gardens belonging to the Forestry Department at Tokio. The number of species sown amounted to about 1,000. Some were failures, while others took favourably to the country, and of the latter class thirty specimens have been brought over for exhibition, the list including several firs, oaks, and maples, the birch, the hornbeam, the German larch, the lime, the ash, an Indian pine, and other trees, all of which will in time form an important addition to the timber supply of the country. Of these and other operations full information is contained in a series of reports,—1879-82,—of the Forestry Department of Japan, the forest literature and history shown embracing also treatises on botany and on the forest trees of the country, journals of the Japanese Forestry Society, and the Association for the Advancement of Forestry, and many instructive charts. There is also, it should be mentioned, an exhibit of trees which have been found useful for cultivation along sandy banks and the slopes of sandy hills, to prevent their destruction by denudation. At the present time the Japanese, in addition to supplying all their own wants, which are great, as the houses in town and country are chiefly built of wood,—from their forests, export a good deal of timber to China. A little timber was imported from America, but it never amounted to much, and is on the decrease.

**Swimming-baths at Dulwich College.**—An addition is about to be made to the buildings at the new Dulwich College by the erection of swimming-baths. The site upon which the structure will be erected is at the south-west end of the College grounds, in close proximity to the gymnasium, and the building will be designed so as to harmonise with the present College buildings. The designs have been prepared by Mr. Charles Barry, and Mr. Mitchell, of Dulwich, is the contractor. The works were commenced about a fortnight since. A sum of 2,500*l.*, including a contribution by the Governors, has been raised.

## DRAINAGE UNDER DWELLINGS.

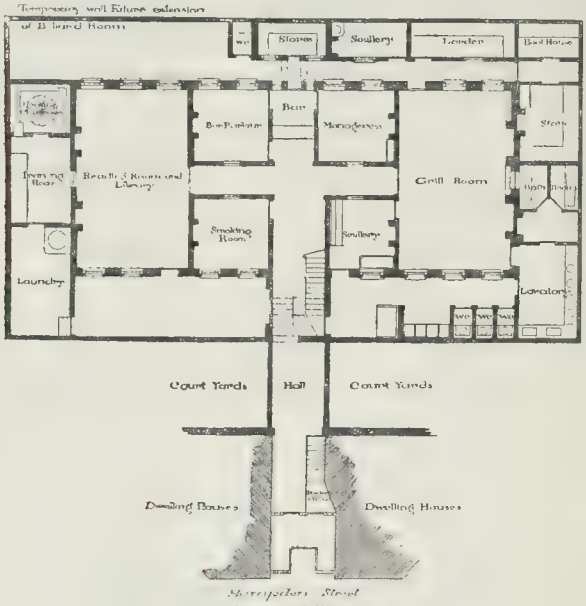
Referring to our remarks last week on the Sanitary and Insanitary Houses at the Health Exhibition, we may observe that the drainage of the Sanitary House is effected on the principles laid down in the paper on "Drainage under Dwellings," read by Mr. S. Flint Clarkson at one of the Conferences held at the Health Exhibition under the auspices of the Royal Institute of British Architects, and reported in the *Builder* at the time (see p. 109, *ante*). This paper was illustrated by a number of drawings showing the drainage of actual buildings. These drawings were lent to Mr. Clarkson by the following among other architects, viz., Messrs. Batterbury & Huxley, Mr. J. Sulman, Mr. Ernest Turner, Mr. W. Henman, Mr. A. Young, Mr. A. H. Kersey, Mr. A. Webb, Messrs. Hooker & Hemings, Mr. E. C. Robins, Mr. T. E. Mundy, and Mr. T. Blashill. The plan we have reproduced was lent by Mr. Ernest Turner, and shows new drainage arrangements in an old house in London, as carried out by him. This is a fair specimen of what is being done just now in the way of drainage under dwellings. Of course the plan of the house could not be remodelled, and it was only possible in the re-draining to make the best of things as they stood. Thus the scullery sink is not against an external wall, as it would be in a good new house.




## THE HAMPDEN HOUSE RESIDENTIAL CLUB.

This Club, situate in Hampden-street, Clarendon-square, has recently been opened by Lord Hampden, the president. The object of the club is to meet an admitted want by providing, at a moderate cost, but on a self-supporting basis, the advantages of a comfortable home combined with those of a club for young men engaged as students, or in professional or commercial pursuits. The building was specially designed for its present purpose by Mr. E. G. Salter, architect, and was commenced in the spring of 1882. The site is within a few minutes' walk of King's-cross, Euston, and St. Pancras Railway Stations, and the Railway Clearing-house. The main building consists of five floors, and the out-buildings of one story only. The accommodation provided includes sixty-eight bedrooms, reading-room, grill and dining room, coffee-room, smoke-room, refreshment-bar, manager's room, bath-rooms, laundry and other offices. There are lavatories and other arrangements specially for the ground-floor, and there are on each of the bedroom floors separate conveniences, which, for sanitary reasons, are detached from the main building. A separate wardrobe locker is assigned to each bedroom.

There is a hot and cold water supply on each floor, and in connexion therewith there is also a supply in case of fire. The house over the principal entrance is fitted up as bedrooms for the manager and servants. There is a large and cool cellarage. A site has been left for a billiard-room, should the tastes of the members of the club demand the addition hereafter. We append a ground-plan.




Ground Plan

*The Hampden House Residential Club.*

An advertisement relating to the Club appears in another column. The experiment is one which has our best wishes.

## Illustrations.

### LEEDS MUNICIPAL BUILDINGS.

WE are enabled this week to give a perspective view and plans of these buildings, together with a view of the interior of the News-room in connexion with the Free Library section of the buildings.

The buildings, which were opened three or four months ago, have been in progress for about five years, and are situate in the immediate neighbourhood of the Town-hall, having their principal frontage in Calverley-street. Without staying now to describe the exterior of the building (which is clearly shown in the view), we will give a few particulars as to the internal arrangements of the building. As will be seen by reference to the plans, the Library and Museum Department has been isolated from the business offices, and has its separate side-entrance (in Centenary-street). The News-room is 80 ft. long by 40 ft. wide, and is divided into a broad nave and aisles (we quote from a long description given in a Leeds paper) by arcades of six arches, carried upon polished granite pillars. Each column has a granite base and a carved stone capital,—no two capitals being alike. The construction of the ceiling of this apartment will be readily apparent by a reference to the illustration. It consists of a series of segmental vaults springing from transverse wrought-iron girders, the surface of the vaults being of a sort of mosaic-work in hexagon bricks,—red, buff, grey, and blue, with golden bosses. The walls are tiled throughout, and relieved with medallion portraits in relief of Homer, Shakspeare, Milton, Goethe, Burns, Scott, Horace, and Macaulay. These medallions have been executed by Mr. Creswick, sculptor, London. At night, light will be provided by means of incandescent electric lights. The Lending Library is situated on the first floor, over the news-room, and is similar as to size and plan, though terra-cotta takes the place of granite as the material for the columns and arches, while the ceiling is vaulted in concrete, finished with plaster, and divided into panels by moulded ribs, the whole being decorated in colour. What may be called the nave of this apartment is set apart for the public, while a continuous counter incloses the aisles, which contain the book-shelves. On the same level as the Lending Library is the Museum, 32 ft. square. On the second floor is the Reference Library, which extends over the lending library and museum, and has a height of 36 ft. from floor to ceiling, terra-cotta arcades dividing the room into nave and aisles. The roof is semicircular, and is divided into bays by wrought-iron principals carried on moulded stone corbels. Altogether, Leeds may be congratulated on its free library.

The main entrance to the Municipal Offices, in Calverley-street, gives access to a short flight of granite steps leading up to a vestibule, 23 ft. square, on either side of which are detached columns of Devonshire marble, with marble bases and capitals, carrying an entablature and cornice of Caen stone. The inner hall, reached through double swing-doors, rises through the whole series of floors, and culminates in a lantern light. The lettering on the plans sufficiently describes the purposes to which the various apartments are allotted, but as to the "Pay-office," we may mention that it is 78 ft. long by 38 ft. wide, having a counter 62 ft. long. The central portion of the counter is to be given over to the Water Department, that on the right to the Rate Department, and that on the left to the Gas. Beyond the counter are rows of double desks for the use of the clerks of these several departments. Here (as in almost every room in the building) tiles have been largely used for decorative purposes. On the second floor are the rooms of inspectors, collectors, and other officials.

Mr. George Corson, of Leeds, is the architect, the general contractor was Mr. James Wood, and the clerk of works was Mr. Osborne.

### LONG MELFORD CHURCH, SUFFOLK.

THE Church of the Holy Trinity, Long Melford, is one which is nearly always grouped with that at Lavenham, of which we gave a view last week; for they are kindred works in the same neighbourhood. This also was one of the churches visited by the Architectural Association on their excursion last week. Like Lavenham, this is a flint church, but depending for its decorative treatment to some extent on surface designs (arcading, &c.) worked out in stone and flints of different tones. The carved stone ornament is less prominent and less bold in character than that at Lavenham; and the total effect of the church is sadly spoiled externally by the bare and ugly eighteenth-century tower, which, however, we suppose, critics of a certain school would tell us ought to be regarded as of equal interest as an example of the taste of its day. It certainly is historically interesting to know that people in the eighteenth century knew no better architecture than this; but if they had left the damning fact recorded somewhere apart, instead of tacking it on to Long Melford Church, we could have better forgiven them.

Like Lavenham, Long Melford owed its foundation in great measure to the generosity or religious zeal of rich cloth-merchants, the Cloptons having been the family specially prominent as founders. The interior, as is well known, contains much fine and interesting work; the Lady-chapel being especially beautiful. A small bas-relief of the Offering of the Magi is on the north wall near the chancel. The church contains also a fine specimen of a Renaissance tomb, that of Sir W. Cadell, in the chancel. Lavenham and Long Melford were described at some length in the *Builder* a few years ago.

### THE "MILLER" MEMORIAL HOSPITAL, GREENWICH.

THIS little hospital has been erected on ground adjoining the Royal Kent Dispensary, as a memorial to the late Canon Miller, the founder of Hospital Sunday. Owing to the very confined nature of the site, it was thought desirable to adopt the circular form of ward, by which means more free access of air and light is obtained to the wards than could possibly be the case with a rectangular form. The hospital at present consists of an administrative building, and one ward pavilion of two stories. In the future it is intended to add a corresponding ward pavilion on the ground adjoining southwards, of which the freehold belongs to the committee. Each ward is for ten beds, and has attached, but separated by a cross-ventilated lobby, w.c. and slop sink, and broom cupboard. The warming is by means of three Boyd's hygiastic stoves, and to each ward are three extraction-flues, carried up side by side with the smoke-flues, from which they are separated by thin plates of iron. The floors are of iron and concrete, covered with wood blocks, and under every bed is one of Ellison's "radiator" ventilators.

The basement of the administrative building is occupied with stores and cellarage. The ground-floor contains a small operating-room, separation-ward for two beds, and ward, scullery, and bath-room. The first floor contains ward, scullery, bath-room, separation-ward, and bedroom and sitting-room for matron.

On the second floor are the kitchen offices, and two rooms for nurses; and on the top floor are a day-room for nurses, bath-room and w.c., and bed-rooms for nurses and servants.

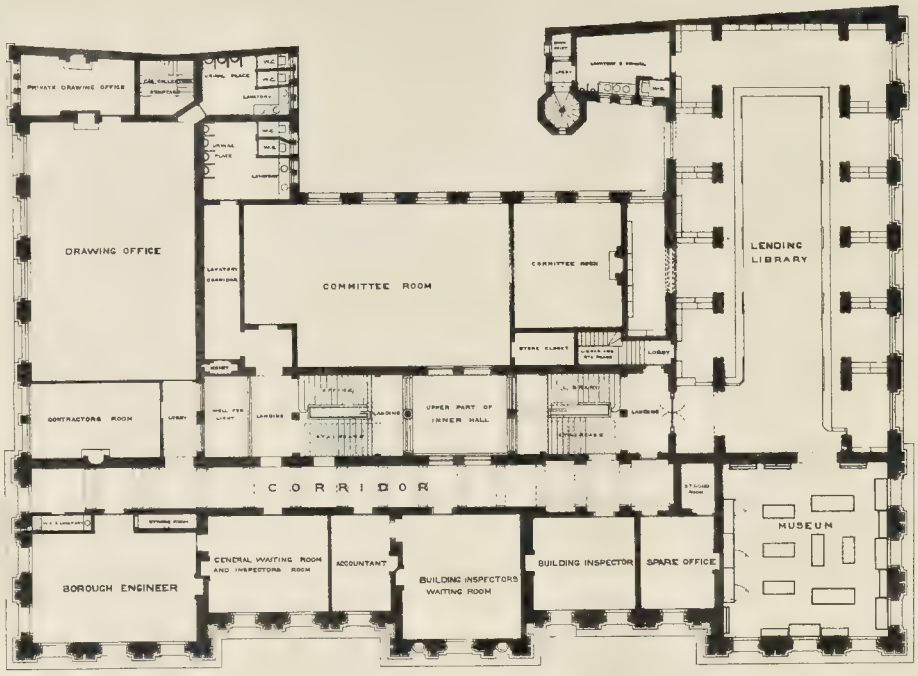
In one angle of the site is a small mortuary and *post-mortem* room.

The buildings have been well carried out by Mr. J. L. Holloway, of Queen's-row, Peckham, under the superintendence of the architects, Messrs. Young & Hall, of 17, Southampton-street, Holborn.

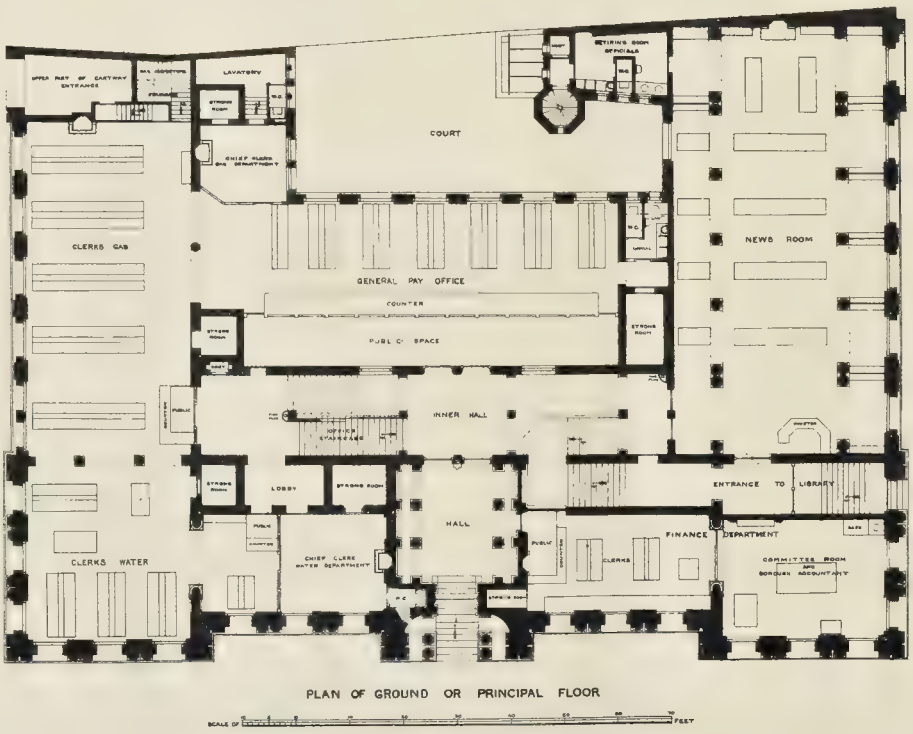
### SKETCHES AT PLACES VISITED BY THE ARCHITECTURAL ASSOCIATION.

SOME particulars of the buildings and details which form the subjects of these sketches will be found in our account of the Association's Excursion (see pp. 223, 252, *ante*).

**Organ Music at the International Health Exhibition.** — Arrangements have been made for extra Recitals on the Organ of the Royal Albert Hall in connexion with the International Health Exhibition. They will take place daily from twelve to one, so as to afford to all who visit the Exhibition an opportunity of hearing this organ. In many cases the country visitors have to leave early, and are thus unable to avail themselves of the usual recitals at three and seven p.m.




PLAN OF FIRST FLOOR




PLAN OF GROUND OR PRINCIPAL FLOOR

SCALE OF FEET

Wyman & Sons Photo Litho

C. Queen St. London W.C.

MUNICIPAL OFFICES, LEEDS.—Mr. Geo. Corson, Architect.——*Plans.*

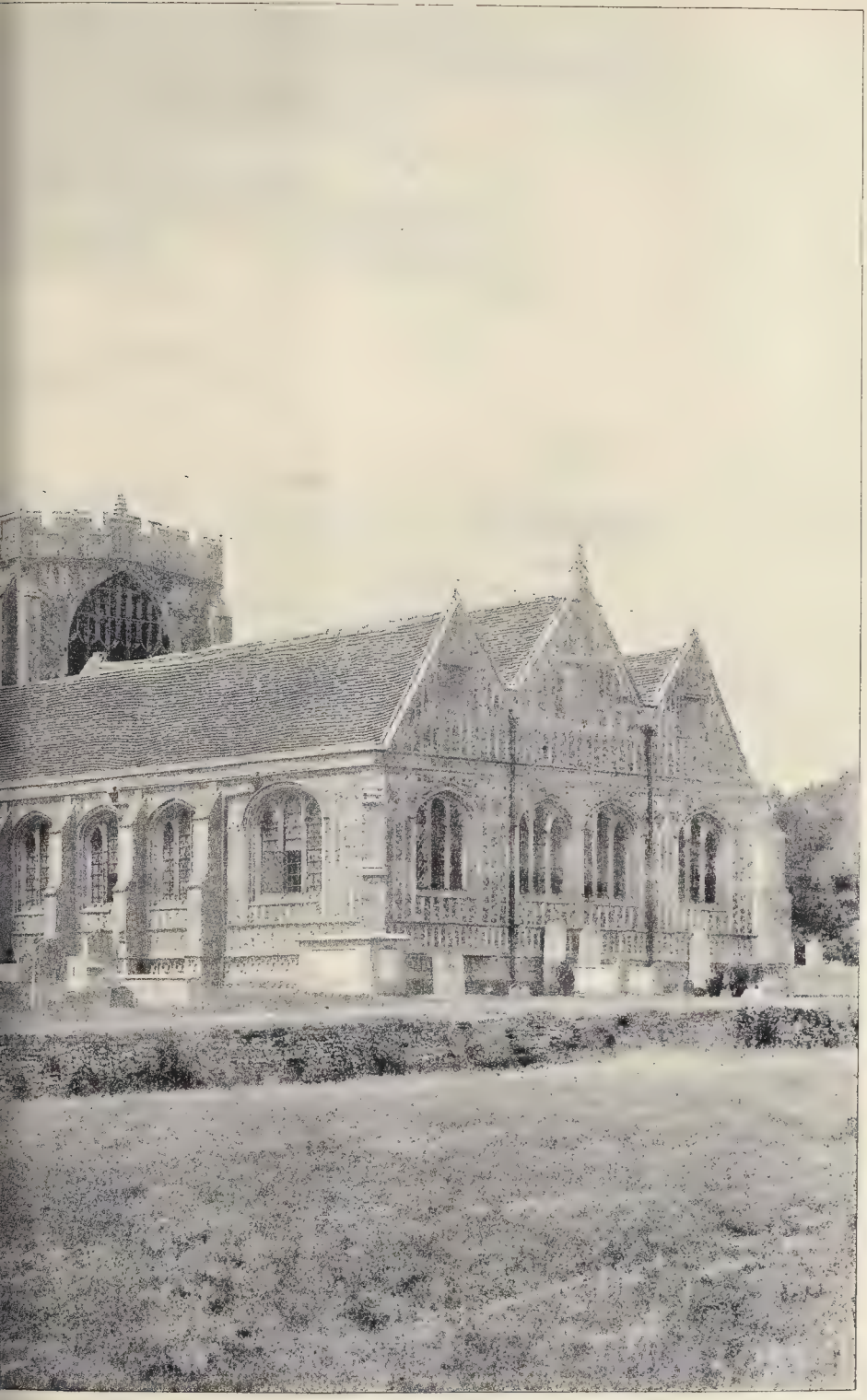


NK PHOTO SPRAGUE & Cº LONDON

LONG MELFO

VISITED BY THE ARCHITECTURAL ASSOCI

*From a Photograph*



CH, SUFFOLK,

EIR ANNUAL EXCURSION, AUGUST, 1884.

*ſbury St. Edmunds.*



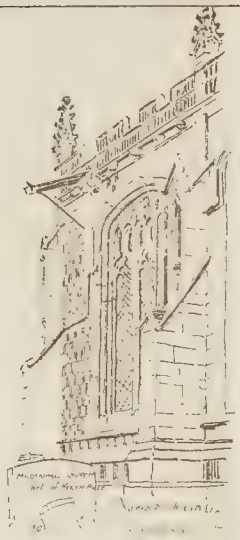


Reading Room of Free Library.

LEEDS MUNICIPAL OFFICES, Mr. Geo Corson, Architect.

*From Photographs by Mr. E. Wormald, Leeds.*













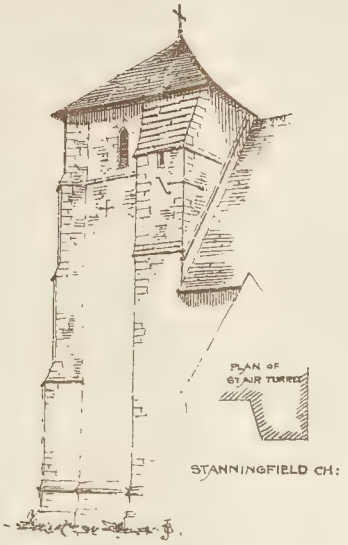





Wyman & Sons Photo Lith



East End Middenhall Church Suffolk




STANNINGFIELD CH:

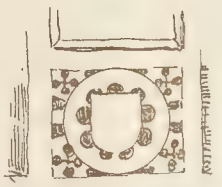


Pier to railing round moat
Rushbrooke Hall.

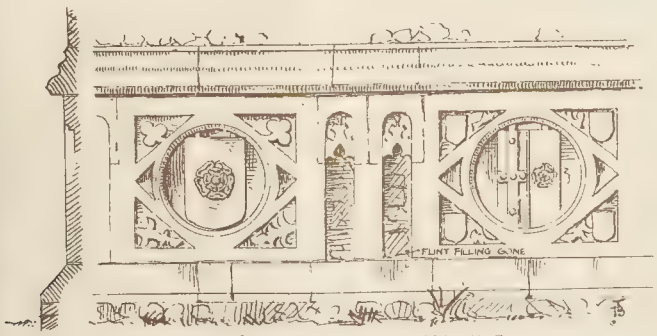


on Bench end
in Woolpit Church



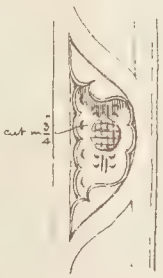


Parapet South Aisle
FORNHAM ALL SAINTS.




WETHERDEN CH: PLINTH TO SOUTH AISLE.

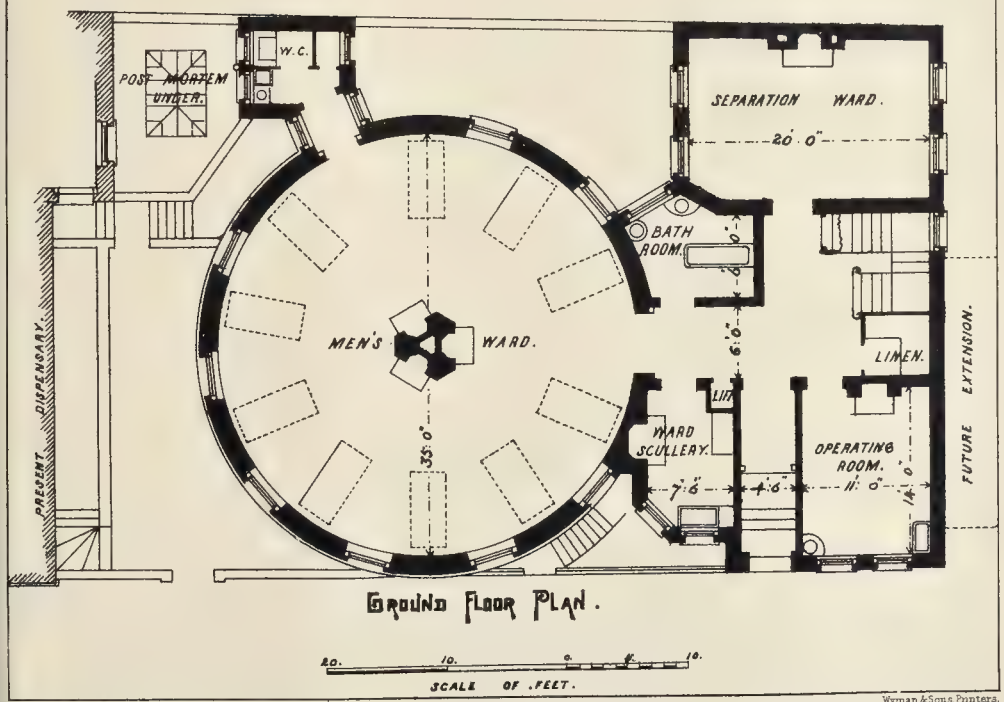
Ins 12 6 0 1 2 3 4 feet




on jamb of Door
West Stow Manor.



FRONT ELEVATION.




GROUND FLOOR PLAN.

Vincent Brooks, Day & Son, Lith. Wyman & Sons, Printers.

THE "MILLER" MEMORIAL HOSPITAL, GREENWICH.—MESSRS. KEITH D. YOUNG & HENRY HALL, ARCHITECTS.

## THE SUMMER MEETING OF THE INSTITUTION OF MECHANICAL ENGINEERS.

A most successful summer meeting of the above Institution has just taken place at Cardiff. The members having been formally received by the mayor of Cardiff (Mr. Robert Bird), the President of the Institution, Mr. I. Lowthian Bell, F.R.S., gave his inaugural address. Taking "Iron" as his subject, he gave a short historical sketch as to its development into the various forms in which it is now produced, remarking on the great service rendered by mechanical science to the art of iron-making. Referring to the Bessemer process, he said it had revolutionised the means of obtaining iron in its malleable form; the product was purer, and the cost of conversion was less than that obtained by means of the puddling process. In the manufacture of Bessemer steel it was found advantageous to blow the metal until the bath, so far as metalloids were concerned, became malleable iron. The addition of a substance containing a readily oxydisable metal, such as speigel-eisen or ferro-manganese, carried off the superabundant oxygen, at the same time that it restored sufficient carbon to give steel any desired degree of hardness or softness down to what, in the matter of carbon, must be regarded as malleable iron. The President next referred to the great superiority of iron over wood for shipbuilding, and to the introduction of steel into the construction of locomotives, and his interesting address was brought to a conclusion by some practical remarks on the subject of foreign competition and the labour question.

The Secretary then read a paper by Mr. J. M'Connochie "On Recent Extensions of Dock Accommodation and Coal-Shipping Machinery at the Bute Docks, Cardiff." These docks were visited by the members during the afternoon, and the various machines were seen in operation. First amongst these was the movable hydraulic crane for rapid coal-loading, constructed by Sir W. Armstrong, Mitchell, & Co. The chief novelty in this is Westmacott's coaling cradle, which may be described as a light platform suspended by chains, which takes its seat on an ordinary line of rails in any position. It is suspended on what may be called an anti-friction swivel, which enables a man to turn the cradle with a loaded wagon on it, thereby dispensing with turntables. Referring to the crane itself, the turning of the pillar and jib is effected by a pair of hydraulic cylinders, one on each side of the pillar, fixed to the base of the pedestal, which remains stationary. The chain from these cylinders passes round a drum at the foot of the pillar. All the motions are controlled by one man in a valve-house on the side of the pedestal. The pressure water is conveyed to the crane by movable and jointed pipes, which can be attached to hydrants placed at convenient distances on hydraulic mains along the quay walls. In actual work, it is found that with this crane a wagon of coal can be shipped in from two minutes and a half to three minutes; in fact, it must be held that, from an engineering point of view, the coal-shipping machinery is by far the most advanced and interesting thing to be seen in or near Cardiff.

The pumping machinery employed for discharging the water from the public graving dock consists of two centrifugal pumps, each working in a separate circular well and driven by a high-pressure horizontal engine and four lift-pumps, all fixed in one square well and driven by a direct-acting condensing engine.

On the second day the papers read were "Petroleum as a Fuel for Locomotives," by Mr. Thomas Urquhart, from Russia; and "Corrosion in Marine Boilers," by Mr. J. Harry Hallett, of Cardiff. Both of these were of a purely technical character, but we may add that for the prevention of corrosion Hannay's "Electrogen" was well spoken of. During the afternoon the members visited by special train some of the chief collieries in the neighbourhood, including the Great Western, Lewis's Merthyr, Cymmer, and Llwynypia. At the Great Western Colliery the underground haulage is done by means of compressed air, and steam is supplied to the air-compressor from the boilers, which are fired by the waste gases from fifty Coppée coke ovens. The pit is ventilated by means of a Guibal fan, 40 ft. diameter, and a Schiele fan is now being erected. The pit is 400 yards deep and equal to an output of about 1,200 tons per day. At the Lewis Merthyr Pit a Schiele fan is used for ventilation, and Sheppard's coal-washing machine and crushers are used.

On the third day an excursion was made to the great ironworks of Dowlais and Cyfarthfa, passing on the way Pwllypant Quarries, from which most of the walling stones of the Bute Docks have been obtained. The Dowlais works employ nearly 10,000 hands. At the steel works there are six Bessemer converters and two blowing-engines, capable of producing some 5,000 tons of steel per week. There are also six Siemens furnaces; two steel-rail mills, rolling about 2 500 tons per week; and a large number of furnaces, puddling-forges, and bar-mills. One of the chief features of interest was a recently-erected coal-washing machine (Luhrig's patent), capable of washing 1,000 tons of coal per day. The cost of this machine, we are informed, was over 20,000*l*.

A number of the members visited the Penarth Docks during the day, and the very fine masonry in them was the subject of general remark. The blasting and dredging operations were also witnessed.

A *conversazione* at the Cardiff Free Library took place in the evening, when the Menelaus pictures and a choice collection of books and engravings were inspected.

On the fourth day various tin-plate and iron and other works were visited, and on the last day a visit was paid to the Severn Tunnel works, Portskewett, when the system of boring pursued and other operations were fully explained.

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Some further particulars of the Dowlais and Ebbw Vale Works, which were visited during the week, as already mentioned, may be of interest.

*The Dowlais Works.*

The Dowlais Iron Works were founded in the middle of the last century, now very nearly 140 years ago. In the present day they present indications of their antiquity, although we believe all relics of their most primitive days have disappeared. Dowlais has always been energetically conducted, and, owing no doubt greatly to cheap labour and unlimited space, has been able to meet the competition of the more modern establishments further north. It is, perhaps, largely owing to the two economic features referred to that iron puddling is being still carried on here, apparently with fairly successful results. The Dowlais works can, however, claim an important place in the record of progress of the iron and steel industry, for it was here that the first steel rail was rolled, the plant by which it was produced being still in use. The works are divided into two parts, known as the old works or Dowlais proper, and the new or Ivor Works. On the occasion of the last visit of this Institution to Cardiff, just ten years ago, one of the Ivor furnaces had just been started, and was then getting into full blast. It was served by a Whitwell stove for heating the blast, an apparatus that was then looked on with more interest than at present, as fire-brick stoves, either on the Whitwell or Cowper principle, have become far more common during the last decade, and are now fast superseding the old pipe stoves, which will not heat the blast to a sufficient temperature for modern requirements. At the present time we believe four furnaces are in blast at the Ivor Works, whilst six are working in the older part of the establishment, which, however, contains the more modern appliances.

The Dowlais furnaces will not compare in size with the modern giants of the northern districts or with those of the United States, still a notable increase in height has taken place in South Wales since coke alone has been used as fuel. The largest furnaces at Dowlais at present in blast are between 65 ft. and 70 ft. high, and have boshes 17 ft. 6 in. in diameter. The hearths are 7 ft. 6 in. across, and the tops 12 ft. 6 in. These are cylindrical furnaces, and are bound with iron bands in place of having the outer casing of sheet iron, usual in cupola furnaces in other districts. Another furnace of the same description, but 10 ft. higher, is now all but completed, and will, no doubt, be shortly blown in. The blast for these furnaces is heated by either Whitwell or Cowper stoves, and it is indicative of the growing popularity of hotter blast that several cast-iron pipe stoves are rapidly being dismantled in this part of the work. Perhaps it is as well here to mention that the Cowper stoves are composed of a casing of sheet iron, which is lined with fire-brick. Within this is a chequer-work mass of fire-brick. The waste gases from the furnaces are carried to the bottom of the stoves by a suitable tube, and then pass to the top by means of an internal flue, at the bottom of which are inlet valves. Through these air is admitted in order to complete the combustion of the gases. The latter having passed to the top of the stove find their way down through the interstices of the chequer-work, and finally escape to the main chimney-shaft. When a stove has become sufficiently heated for the purpose the gases are shut off, and the blast from the blowing-engine, which is required to urge the combustion in the blast furnace, is caused to pass through the chequer work in an opposite direction to that taken by the flame, and will naturally become heated by contact with the perforated fire-brick mass. It will be seen that the stoves are intermittent in their action, at one time being heated and at another giving forth the heated blast. The Whitwell stove differs from that described, chiefly in the manner in which the heating surface of fire-brick is arranged, but both work on the regenerative principle above explained. With these appliances the blast is sometimes brought to a temperature of over 1,400 degrees Fahr., which it would be practically impossible to obtain with the old cast-iron stove. In the latter apparatus the waste gases are brought in contact with iron pipes through which the blast is urged, or else they are heated by special furnaces contained in them, in which coal is burned. The blowing-engines at the Dowlais works are mostly of the beam-engine type. The largest is a compound beam-engine with steam cylinders, 42 in. and 60 in. in diameter, and a stroke of 10 ft. The blowing-cylinder is 12 ft. in diameter. The boiler pressure is 50 lb., and the pressure of blast about 3½ lb. per square inch.

Steel is made at Dowlais both by the Bessemer and Siemens-Martin system. There are three Bessemer pits of the ordinary sunk type, each having two eight-ton converters. This plant has been laid down for some time, and does not call for any special notice. The six Siemens-Martin furnaces will work with from six to eight ton charges. There are two furnaces to a pit. The rolling-mills are placed conveniently to the furnaces. In this part of the works a fine pair of engines, to drive a new rail-mill, are being erected. These have been supplied by Messrs. Kitson & Co. This, we understand, is the first instalment of considerable changes that are about to be made at Dowlais, the management having determined to keep in the van of progress. There are the usual coke ovens, coal-washing machinery, and repairing-shops seen on works of this character, but which it would be useless for us to attempt to deal with in the space at our disposal.

*The Ebbw Vale Works.*

These works are also of large area, extending for some considerable distance up the valley of the Ebbw. They were founded late in the last century by a Staffordshire iron master. For many years members of the well-known family of Harford were proprietors, and in 1844, about a century after Dowlais was started, Mr. A. Darby purchased the works, which he enlarged considerably, and for many years he carried on a highly successful trade under the style of A. Darby & Co. Just twenty years ago the enterprise was converted into a limited company as it now exists.

The company are lessees of nearly eleven thousand acres of freehold and leasehold mineral property. During last year their output of coal from the various collieries connected with the establishment was close upon one and a half million tons. The coke made amounted to over a quarter of a million tons, whilst nearly six million bricks were manufactured on the premises of the company. The production of iron and steel during last year in pig-iron and speigel-eisen was 212,412 tons; and 131,780 tons of finished iron and steel, in the shape of rails, bars, angles, &c., were produced.

The Ebbw Vale blast furnaces are of the same type as those at Dowlais, being of cylindrical form, and hooped with iron bands. There are at present six in work, four are situated at the northern end of the works, and two others at the extreme south, or a distance of about a mile and a half apart. They have mostly Cowper stoves (three to each furnace), although there are one or two old pipe stoves still in use. The steel works are about half-way between the furnaces, and contain three Bessemer pits of the usual form, having two

eight-ton converters apiece placed on opposite sides. The metal, which is tapped from the blast furnaces is brought, in the case of the north furnaces, for about three-quarters of a mile. This seems a considerable distance to bring a ladle of molten iron, but is somewhat less than that at Barrow, where the furnaces are over a mile from the steel works. This distance, however, was far exceeded at the Ebbw Vale, when the Company had the Sirhowry furnaces at work. These are situated about seven miles from the steel works, and the ladle containing the charge of metal used to be brought that distance by railway, and the molten iron was then run into the converters. There are two fine pairs of blowing engines for these converters, one by Messrs. W. & J. Galloway & Sons, and the other by Messrs. D. Adamson & Co. The maximum pressure of blast used is 25 lb. to the square inch. There is also in the same engine-house a set consisting of three pairs of very fine hydraulic pumping engines, by Sir W. G. Armstrong & Co. These are used for the hydraulic cranes and hoists required in the Bessemer plant. The rolling-mills attached to these converters have eight Siemens gas-fired heating-furnaces, which are worked by hydraulic gear for withdrawing the ingots. The blooming rolls are 36 in. between centres, and are driven by a pair of 36-in. cylinder engines, geared 3 to 1. These are by Galloways, of Manchester. The mill-train has rolls with 30-in. centres, which are driven by a pair of vertical engines with 50-in. cylinders, geared 1½ to 1. The Victoria blast-furnaces, which are placed at the southern end of the works, are modern and well-designed erections. The blowing-engine house is a handsome and solidly-built structure, and contains two fine vertical engines, with blowing-cylinders 100 in. in diameter, by Messrs. Kitson, of Leeds. The gases from the furnaces are used for heating the steam-boilers supplying these engines. There are extensive ranges of coke-ovens on the high ground above the furnaces. The majority of these are on the Coppée principle, and are discharged by the charge being pushed out by steam machinery. The oven is simply a long straight tunnel with a door at each end. Both doors are opened and the "pusher-out" clears the whole contents. In the ordinary "drag-oven" the coke is dragged out by means of an iron bar which is placed on the floor of the oven before the charge is put in. In the latter the coke is watered in the oven, and this is said to have the effect of driving out a good deal of the sulphur; however this may be, the ordinary oven coke is a better colour than that of the Coppée ovens. The advocates of the latter affirm that the difference between the two cokes is mainly one of appearance, and that if Coppée coke be watered immediately it is pushed from the oven there is very little practical difference. It is perhaps worth notice that in the South Wales district, when coke is produced for immediate use, as at ironworks, and not for sale, the Coppée ovens are, as a rule, in strong favour. On the other hand, at the collieries, where the coke is made to be sold, drag ovens are the rule. At only one colliery did we notice Coppée ovens, and this was in a case where the bituminous vein had been exhausted and a coal only slightly bituminous was being worked. Coppée ovens are especially well adapted for coking harder coals. We believe that these ovens were first built on an extended scale at Ebbw Vale. There are two or three other rolling-mills at Ebbw Vale. A bar-mill, with a 12-in. train, is now being erected. This is to be driven by cotton rope, which is a new departure in rolling-mill practice. In the same building there is an 18-in. train. In another building a 36-in. train is in progress, in which some novelties are being introduced in the shape of hydraulic turning-over gear. There are extensive foundries, engine-fitting and erecting shops, smiths' shops, wood-working shops, and many other buildings of this description, the extent of which will be understood when we say that the Company make all their own rolling-mills and plant of this description, and many of the larger engines for working them. The thirty-two locomotives and 3,500 trucks owned by the Company are all kept in repair on the premises.

**Designs Competition, Dairy Show, 1884.** The Secretary asks us to remind our readers that entries for the above close on the 25th inst.

## FURTHER NOTES AS TO VENTILATING APPLIANCES AT THE HEALTH EXHIBITION.

In the Central Annexe, between the Central Gallery (Science and Art) and the gardens, a number of ventilating appliances and arrangements are shown, either full size, or by means of models and drawings. At Stand 687 Messrs. George Wright & Co., of Westminster Bridge-road, show a model of their "Eclipse" ventilator for billiard and smoking rooms, which is designed for carrying off not only the products of combustion from the gas-burners, but the foul air from all parts of the room. Stand 688 is occupied by Messrs. Sharp & Co., of Holborn-viaduct, with their "Crown Ejector" ventilators as applied, not only to buildings, but to yachts. The same firm are exhibitors of soil-pipe ventilators and air-inlet brackets, some of them in the form of capitals, so as to work in with the architectural features of interiors. They also show a new corona reflecting gas-burner. Messrs. Dick Radclyffe & Co., of Holborn, exhibit at Stand 690 some ventilated window-cases for ferns, flowers, &c. At Stand 691 is shown a model of a ventilating window-sash and frame, invented by Mr. Augustus Frere, F.R.I.B.A., with a view to the requirements of the dwellings of the poor, though it is capable of wider application. At Stand 692, Messrs. H. W. Cooper & Co. (Limited) have a very good display of their specialities in perforated, louvred, and sliding glass ventilators, with some excellent weather-tight metal casements of improved construction. The way in which both the perforated and the louvred ventilators are combined with coloured glass windows is worthy the attention of visitors. An improved hopper ventilator for skylights shown at this stand is especially worthy of note. Dr. P. W. Perkins Case, of Croydon, shows at the next stand (693) a sash-regulating ventilator, combined with a shelf which turns up or down as desired. Another method of billiard-room ventilation is shown by a model at Stand 694. It is exhibited by Mr. George W. Webb, A.R.I.B.A., of Reading, who claims to have achieved the task of automatically removing in the most direct manner the products of combustion, tobacco-smoke, &c., and of supplying fresh air without down-draught. Mr. George Fellows Harrington, of Ryde, I. W., exhibits (Stands 696 and 720) his system of sewer ventilation by means of shafts rising above the houses, the street ventilating gratings, such as those used in London and other towns, being abolished. Although there is much to be said in favour of such a system as that advocated by Mr. Harrington, its adoption would necessitate precautions which would not always be observed. There is considerable difference of opinion on this subject, but we are strongly inclined to think that the preponderance of the argument is in favour of the London method, properly carried out. Mr. B. Hainsworth (Stand 697) shows his "double-current syphon dormer ventilator," and other ventilators on the same principle Stand 699 is occupied by Messrs. John Smeaton & Sons, of Ludgate-circus, who show the "Kosmos" ventilators, of which a large one is exhibited in action. In this ventilator a small stream of water is made to impinge upon the periphery of a wheel, which is made in the form of a brush, and so sets in motion a series of revolving blades or fans. At Stand 700 Mr. Edward Wood, of Red Bank Works, Manchester, exhibits what are known as "Tobin's" tubes. Messrs. William Udal & Co. (Stand 701) exhibit Bruce's patent fanlight opener, a simple and effective apparatus which we believe we have noticed with commendation on some former occasion. Lieut.-Col. Thorneycroft, of Tettenhall, exhibits a model of his house, the sanitary arrangements of which were fully described and illustrated in the *Builder* a few years ago, under the title "A Notable House." Mr. W. W. Nicholls (Stand 703) is the exhibitor of a safety window-frame and sash of which we spoke favourably a few weeks ago (see *Builder* p. 82, *ante*). At Stand 706 Dr. R. Neal shows his chemical punkah and chemical "lung" for fixing in rooms for the purification of the air. The lung consists of an endless perforated webbing which is made to pass over top and bottom rollers,—the bottom roller being fixed in a trough containing a solution of caustic soda, through which solution the fabric passes, and thus is obtained a considerable surface charged with a material which absorbs and destroys noxious gases. At Stand 710 Messrs. Hayward Bros. & Eckstein, of Union-street, Borough, are exhibitors of Boyle's patent mica-flap outlet ventilators, and the Sheringham inlet ventilators, to be used in conjunction. These ventilators have been largely adopted for many years, and with the best results. The same exhibitors also show their "semi-prism" pavement-lights, the free use of which will bring daylight into corners to which it has not penetrated for years. Messrs. Josiah Moore & Sons, of St. James's-walk, Clerkenwell, exhibit (Stand 712) their improved glass louvre ventilators, as well as circular and sliding glass ventilators in various forms; they are too well known to need description or comment. Stand 713 is occupied by Messrs. Harcourt Thompson & Co., who show their ventilating ridge, and a new mercurial air-valve, which opens or closes according to the rise or fall of the temperature of the room in which it may be fixed. At Stand 714, Messrs. Meakin & Co., of Baker-street, show their self-acting sash-fastener and opener, which for security, efficiency, and ease of working, are unsurpassed. The "Standard Sliding-sash," shown by these exhibitors, allows of the outside of the glass being cleaned by a person standing on the floor of the room, and in case new sash-lines are required there is no necessity for removing any fixed parts. Mr. W. P. Buchan, of Glasgow (Stand 715), shows his patent ventilating cowls and a model of a house ventilated on his system, by which provision is made for removing the products of combustion from every gas-burner, and for supplying air direct from outside to assist the combustion in the fireplaces. Mr. J. E. Ellison, of Leeds (Stand 717), shows his conical perforated brick ventilator, his patent radiator ventilator, and Stevens's chimney-tops and soil-pipe cowls. We have on previous occasions spoken of the efficiency of Mr. Ellison's ventilators. Messrs. J. M. Lamb & Co. (Stand 719) show their "Triumph" centrifugal air-pump exhaust ventilators, and their patent "Outer-section" fixed cowls, together with other appliances, all of which appear to merit the careful attention and examination of visitors. Particularly worthy of mention is a noiseless fan, which is shown in action in the Machinery in Motion Department. Messrs. C. Kite & Co., of Christopher Works, Chalton-street, N.W., occupy Stand 721, and exhibit their exhaust and inlet ventilators, and a model showing their application. Some of these, we believe, have been used in the Sanitary House at the Exhibition. A model of a house illustrating Messrs. Kite's system is exhibited by them. Their roof ventilators have lately been used for new Board Schools at Warwick. Particularly worthy the attention of householders is Kite's noiseless chimney-breast outlet ventilator, which is easily fixed, and, apparently, judging by tests we have witnessed, very efficient. The wall-inlet ventilators shown at this stand also deserve attention. These, or some similar appliances (we refer both to the wall-inlet ventilators and to the chimney-breast ventilator), should be fitted in every dwelling-room, especially where gas is burned. Stand 723, that of Messrs. Ewart & Co., of Euston-road, contains specimens of the "Empress" ventilator (of which we have on previous occasions spoken favourably) and the "Prince" chimney-pot. Mr. W. Lord, of Middlesbrough (Stand 724), shows his patent "Incline" chimney-cowl, which is fixed, and consists of a number of cylinders, on each of which are fixed six or more inclined channels or passages, and it is claimed that the action of the wind on these creates a powerful centrifugal motion up the interior of the cowl, and so assists its extractive power and prevents down-draughts.

In the Western Gallery (Machinery in Motion) Messrs. A. W. Kershaw & Co., of Lancaster, exhibit, at Stand 1,181, their patent pneumatic exhaust ventilators as applied to buildings, ships, and yachts. These appliances are used in conjunction with down-cast ventilators, and the system of ventilation thus obtained appears to be very efficient, and devoid of down-draught. These ventilators have, we are informed, been adopted at the Manchester, Sheffield, and Lincolnshire Railway Company's new offices at Manchester.

**The New Burial-ground at New Brentford** was consecrated on the 13th inst. by the Bishop of London. The chapel and other works have been erected from the designs of Mr. Chas. J. Gladman, A.R.I.B.A.

## INTERNATIONAL INVENTIONS EXHIBITION, LONDON, 1885.

We acknowledged last week the receipt of the prospectus of this Exhibition, which is to be opened in May, 1885, in the buildings now devoted to "The Healtheries." We now give some further particulars.

Division I. (Inventions) will include groups of apparatus, appliances, processes, and products, invented or brought into use since 1862, relating to:—1, Agriculture, Horticulture, and Arboriculture; 2, Mining and Metallurgy; 3, Engineering Construction and Architecture; 4, Prime Movers, and Means of Distributing their Power; 5, Railway Plant; 6, Common Road Carriages, &c.; 7, Naval Architecture; 8, Aëronautics; 9, Manufacture of Textile Fabrics; 10, Machine Tools and Machinery; 11, Hydraulic Machines, Presses, Machines for Raising Heavy Weights, Weighing, &c.; 12, Elements of Machines; 13, Electricity; 14, Apparatus, Processes, and Appliances connected with Applied Chemistry and Physics; 15, Gas and other Illuminants; 16, Fuel, Furnaces, &c.; 17, Food, Cookery, and Stimulants; 18, Clothing; 19, Jewellery; 20, Leather, &c.; 21, India-rubber and Guttapercha, &c.; 22, Furniture and Accessories,—Fancy Goods; 23, Pottery and Glass; 24, Cutlery, Ironmongery, &c.; 25, Fire-arms: Military Weapons and Equipment, Explosives; 26, Paper, Printing, Bookbinding, Stationery, &c.; 27, Clocks, Watches, and other Time-keepers; 28, Philosophical Instruments and Apparatus; 29, Photography; 30, Educational Apparatus; 31, Toys, Sports, &c.

We give the detailed classification of one or two of the Groups:—

*Group III.—Engineering Construction and Architecture.*

Class 13. Roads.—Methods and materials for constructing and paving roads; cleansing roads and pavements; road-sweeping machines; rollers; apparatus for the removal of mud, snow, &c.; water-carts and other means of watering.

Class 14. Railways and Tramways.—Construction; excavators and appliances used for earth-work and tunnelling. Permanent way: rails, chairs, sleepers.

Class 15. Bridges and Viaducts.—Models, plans, and designs for arched, girder, suspension, trestle, and other bridges; apparatus used in construction.

*Class 16. Docks and Harbours.—Models, plans, and designs for docks, harbours, piers, breakwaters, &c.; submarine constructions; diving apparatus; dredging machines; pile-drivers, screw piles; coffer-dams; graving docks, "patent" slips, caissons, pontoons, floating docks, hydraulic apparatus for working dock-gates, &c., gridirons. Buoys.

*Class 17. Lighthouses.—Method of construction; appliances used in lighthouses and in lightships, fixed and flashing light apparatus, lamps, sound signalling apparatus.

Class 18. Rivers and Canals.—Conservation and improvement of rivers; construction of canals; locks, lifts and inclines, weirs.

*Class 19. Water Supply and Sewerage.—Methods of collecting, pumping, storing, filtering, and distributing water; appliances for detecting and preventing waste of water, water-meters; water fittings, filters; sewers, sewage disposal and utilisation.

Class 20. Reclamation, Irrigation and Drainage of Land. Drainage (natural and artificial) of low-lying districts; embanking and warping land; irrigation works.

Class 2. Testing Apparatus. Apparatus and instruments used in testing iron, stone, brick, concrete, cement, &c.

Class 22. Military Engineering and Fortification.—Military topography.

*Class 23. Materials used in Building.—Bricks and tiles, machines for making them; concrete, artificial stone, cement, materials and appliances used in their production; asphalt; roofing felt, and other roofing materials; columns, girders, and other applications of metal in building; application of terra-cotta to buildings; preservative and fire-resisting materials, paints, &c., for application to stone, wood, iron, &c.; methods of applying the same.

*Class 24. Building Construction.—Models and plans showing methods of construction; non-combustible constructions; labour-saving and other machines and appliances used in building, scaffolds, elevators; fittings and appliances used in buildings, shutters, blinds, lifts, bells, speaking-tubes, &c.

*Class 25. Heating, Ventilation, House-drainage, &c.—Sanitary appliances; ventilators; cowls for chimneys, chimney-sweeping apparatus; apparatus for heating by steam, water, air, &c.; means of cooling air.*

*Group XXIII.—Pottery and Glass.*

Class 119. Kilns and Furnaces.

Class 120. Bricks, Tiles, Earthenware, &c.—Terra-cotta; architectural pottery; fire-clay goods; crucibles, drain-pipes; chemical and similar stoneware; materials, machinery, and apparatus.

Class 121. Porcelain, Majolica, and Artistic Pottery.—Biscuit-ware, faience; Parian; materials, machinery, and apparatus.

Class 122. Crown, Sheet, and Plate Glass.—Window glass, mirrors, stained glass; glass mosaic; materials, machinery, and apparatus.

Class 123. Bottles, Table Glass, Toughened Glass, &c.—Materials, machinery, and apparatus.

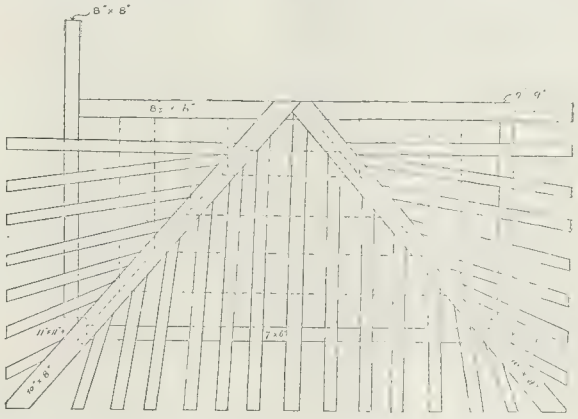
Division II. (Music), is intended to include three groups, viz., XXXII., Instruments and Appliances constructed or in use since 1800; XXXIII., Music Engraving and Printing; and XXXIV., Historic Collections. But, as we suggested last week, and as will be seen by the foregoing details, the first division, Inventions, includes such a plethora of subjects, that it appears to be questionable whether adequate justice can be done to Music,—a large subject in itself, but which is not even mentioned in the title of the Exhibition.

Applications for space must be sent to the Secretary (from whom further particulars may be had) not later than the 1st of October. Applications from foreign countries and the colonies will be received up to the 1st of November.

* Having in view the wide range of this International Exhibition, and the limited nature of the total available area, it will be necessary to restrict as much as possible the amount of space which can be allotted even to the most important classes; and only under exceptional circumstances can applications be entertained for space for objects which have been shown in the Smoke Abatement Exhibition, 1881; the Fisheries Exhibition, 1883; or the Exhibition of Health and Education of the present year. The classes including such objects are marked in the classification with an asterisk.

## CURIOUS FLOOR CONSTRUCTION.

Sir,—I enclose herewith a sketch of the construction of a floor, which I think is peculiar and unusual. It occurs in a very old house situate in King-street, in this town. As the sketch shows, the joists are laid so that they almost appear to radiate from a common centre, and they are mortised into two large beams which cross the house diagonally, from the



angle of the wall to the centre of the partition-wall against the next house. The method of laying the floor-boards is also peculiar; they are of great width, and mitred over the line of the last-named beams. The first floor overhangs from the girders supporting the joists. The dotted lines represent the floor-boards.

There is one other house with a similar construction within a few yards of this one, and evidently of the same date.

R. G. Carpenter.

*Duppas House, Croydon*, Aug. 7th, 1884.

## THE GUEST-CHAPEL, CROXDEN ABBEY, STAFFORDSHIRE.

Sir,—May I ask you to help those who are striving to obtain the preservation of the thirteenth century Guest-chapel of the Cistercian Abbey of Croxden? I learn on the best local authority and from Mr. Loftus Brock that it is proposed, with the consent of the owner of the Abbey lands, Lord Macclesfield, to remove this chapel and to erect on its site a new church, and that already its roof is removed and that its total disappearance rests on the decision of his lordship.

I must explain that in the middle of the eighteenth century the chapel was altered and repaired and re-roofed to do duty as the church of the little village grown up amongst and around the Abbey ruins. This beautiful thirteenth century ruin seems to be but little known, although not more than three or four miles from the railway stations of Rocester and Uttoxeter. The late Mr. Street knew and much admired it, and I have frequently visited it and sketched and measured its pure and beautiful detail.

I need not point out to those who have studied the Cistercian plan, such as Viollet-le-Duc gives, that a Guest-chapel formed an essential part of it, as it did, too, in the earlier Benedictine foundations.

We have not many examples of guest-chapels. The well-known one at Canterbury, now the chapel of St. Augustine's College, will occur to most of us, so beautifully reclaimed from the most degrading uses and restored for Mr. Beresford-Hope by Butterfield. Croxden Chapel never sank to this depth. Surely the old chapel might be retained, even as a ruin, as it was left by the Reformers, and the new church erected near it; or the chapel might be re-roofed and used as a parish room. Anything rather than destruction! It is true that the interior and the arrangements are squalid and mean, just as so many of our rescued churches were not many years ago, and that a new and proper church is required, but surely not at such a sacrifice.

The chapel is an oblong, with three south and one east lancet, and remains of south and west doorways. The lofty narrow lancets have bold chamfers and internal arches just as the rear western and southern windows of the Abbey Church close by. Its walls are built with red and grey sandstone blocks, as the church. In fact, it is part of one design by the original Cistercian architect. The interior walls have several coats of painted or tempera decoration, the first being on the stone.

Although there is no detail of such beauty as in the chapter-house entrance, the chapels, and other portions of the church and buildings, this chapel, in its harmonious simplicity, is characteristic of one well-thought-out design. Mr. Loftus Brock has in his possession a beautiful set of drawings of the chapel executed by a friend, which he would, I am sure, be happy to show to those interested, and who would be willing to help.

I cannot believe that the advocates of the destruction of the chapel do appreciate its architectural and archæological interest (for there is a tradition that the building is comparatively modern, using up old stones). Many of those in the neighbourhood value it, however, and its destruction would be a grievous loss to them and to many of us.

H. Herbert Carpenter.

*August* 19, 1884.

## THAMES COMMUNICATIONS.

Sir,—Your issue of the 9th inst. contained a paragraph on this subject, in which my name is mentioned as having voted at the last Court of Common Council against a proposed addition to the Bridge House Estates Committee's recommendation, which addition was to the effect that the Corporation should publicly advertise for designs for the new bridge, whilst three other architects who were present and took part in the proceedings voted with him. This statement, sir, scarcely does me justice.

The facts are as follow:—The Bridge House Estates Committee recommended that a new low-level bridge be constructed across the Thames at the Tower, whilst a strong feeling in favour of a subway existed.

The debate was continued at a special court convened for the purpose, the result of the division being 83 for the bridge and 58 for the subway, two

or three of the architects named voting in the minority.

Mr. Peebles then proposed his amendment to the Committee's recommendation, which gave a general impression to the majority that the object was a postponement for another year, and as I was, like Mr. Peebles, strongly in favour of a bridge, I represented to him the possibility of his amendment achieving the object of the minority at the same time adding that the chairman of the Committee had pledged his word to me that there would be an open competition for designs.

This assurance of the chairman I plainly saw would also have satisfied Mr. Peebles, as it did myself, but for a division having been called for by other members of the Court. Having such a pledge from the chairman, I considered I could confidently stand by the Committee's recommendation to the end, not knowing, of course, how other architects were going to vote. I must, therefore, not be judged as unfavourable to an open competition for so important a matter as a bridge across the Thames within the City of London; but I am afraid, without this explanation, a wrong interpretation will be given to my vote. Whilst on this question of Thames communication, I would add that, although I consider a bridge to be far preferable to a subway, I do not for a moment think that a low-level bridge will meet all the requirements of the case.

The proposed new street from King William-street *viâ* the Monument to Thames-street, about to be constructed by the Commissioners of Sewers at a cost of 300,000*l.*, points to the absolute necessity of an outlet across the river for the low-level traffic; still, I am satisfied it will be a great mistake to altogether overlook the high-level traffic in and about the newly-constructed Eastcheap, the Tower, and the district eastward, which is manifestly increasing daily, and which for the most part, if a low-level bridge only be constructed, will still have to go round by London Bridge. I, therefore, suggested to the Court the desirability of providing a high and low level bridge combined in one structure, say of iron, the high-level bridge to accommodate the traffic just referred to, whilst the low-level bridge could have openings for shipping, and at the same time provide for all the increasing traffic along the banks of the Thames both above and below London Bridge.

H. H. Bridgman.

42, *Poultry, E.C.*, 14th August, 1884.

## THE SANITARY AND INSANITARY HOUSES AT THE HEALTH EXHIBITION.

Sir,—May I, through your columns, call the attention of the committee who arranged the "sanitary" house at the Health Exhibition to what, in my opinion, is a defect in the plumber's work, viz., the carrying of the overflows from washing basins into the waste-pipes over the traps? My experience is that in nine cases out of ten the stoppage occurs in the trap itself, which, of course, renders the overflow useless at once. It appears to me that the proper course to pursue would be to run the overflow-pipe quite independently of the waste, in which case it would scarcely fail to act when wanted.

A. Rowe.

## A PARTY-WALL QUESTION.

THE DISTRICT SURVEYOR OF ST. GEORGE'S, HANOVER-SQUARE NORTH *v.* MESSRS. CUBITT AND CO.

On the 13th inst. Messrs. Cubitt & Co. were summoned before Mr. Newton at the Marlborough-street Police-court, at the suit of the District Surveyor, for not having complied with a requisition to carry up the east party-wall of No. 95, Piccadilly 15 in. above the gutter of that building (it being the highest building adjoining the wall, No. 94, Piccadilly being a lower building), and also to carry up the wall above any part of the roof of No. 95, opposite thereto, and within 4 ft. of it. It appeared that the defendants were carrying up the wall solid to the level of the underside of the gutter, at which level it was surmounted by an open balustrade, with plinth and capping, the plinth being solid to 7 in. above the gutter, with a thickness of only 6 in.

Mr Redwar, barrister, appeared for the District Surveyor, and Mr. Lewis Coward, barrister, for the defendants.

Mr. Redwar submitted that the whole of the wall in question was a party-wall, although the buildings on either side were not of the same height, and for this reason, that while by Section 3 of the Metropolitan Building Act, 1855, the separation of buildings in different occupations might at first sight seem to be the one essential characteristic of a party-wall, Section 17 imposed the additional rule that every party-wall should be carried above the roof, flat, or gutter of the highest building adjoining the wall. If it were contended that there was an inconsistency between the definition in Section 3 and the rule of construction in Section 17, he would meet that by saying that Section 3 expressly provided that the definitions therein given must yield to the meaning of the context, which in this case was that every wall, which by dividing buildings of unequal height became a party-wall, was, by force of Section 17, made a party-wall from its base to its top, since a party-wall must be carried above the *highest* building adjoining thereto. This view was supported by the circumstance that "external wall" was defined in Section 3 as "an outer wall or vertical enclosure, *not being a party-wall*"; these last words clearly pointed to the contingency of some "outer walls" or "vertical enclosures" being "party-walls." He contended that Weston *v.* Arnold (L.R., 9 Ch. App. 1,084), which decided that a wall was a party-wall for such portion of its height as it actually separated buildings, and was an external wall for the remainder of its height, did not govern the Metropolitan Building Act, as it was decided on the Bristol Improvement Acts, 1840, 1847, which contained rules as to party-walls different to those in the London Act. In the case of Knight *v.* Pursell, (L.R., 11 Ch. D., 412), in which Mr. Justice Fry treated Weston *v.* Arnold as an authority on the London Act, it was not necessery to decide the point of the *vertical* extension of a party-wall, as the case related to *lateral* extension, which stood on a different footing, being governed by the definition alone in which separation was made the test, while in considering *vertical* extension it was necessary to read Section 17, with the definition.

Mr. Newton, without calling on Mr. Coward, decided that the wall was an external wall originally, and that it had been made a party-wall by the addition of a low building on the side of No. 94, but only to the point at which it separated the adjoining buildings; above that point it was an external wall. He accordingly dismissed the summons.

Mr. Coward applied for costs, but Mr. Newton said that he would not allow costs as against a public officer who was endeavouring to do his duty under an Act of Parliament.

## AN ARCHITECT'S CLAIM FOR PROFESSIONAL SERVICES.

CHORLEY *v.* CROSSLEY.

This case was tried at the Leeds Assizes, before Justice Manisty and a special jury. By it, the plaintiff, an architect practising in Leeds, sought to recover the sum of 86*l.* 5s. 6d., balance of account for services rendered in connexion with two arbitration cases, in which he had appeared in the defendant's behalf.

The contention on behalf of the defence was that the charges were excessive, and that they were greater than the plaintiff had agreed to make.

After hearing the opening statements of counsel and the plaintiff's evidence, and before any other witnesses had been examined, the judge said that there was no answer to the claim, and a verdict was given for the sum of 50*l.*, in addition to the amount which the defendant had paid into court. His lordship certified for costs against the defendant, including those of a special jury.

## CONTRACTORS' LIABILITIES.

JONES *v.* HUGHES AND ANOTHER.

An action of considerable interest to contractors was tried at the Liverpool Assizes a few days ago, before Mr. Justice Day and a common jury. The plaintiff was the widow of one Owen Jones, a labourer, and she claimed damages under Lord Campbell's Act against Messrs. Hughes & Stirling, contractors, of Liverpool, on the ground that her husband had lost his life through their negligence.

The circumstances out of which the action arose were as follow: The defendants had taken a contract to pull down and rebuild a Roman Catholic Church, called St. Mary's Church, in Liverpool. The church was built in 1844, and had to be removed to another site in consequence of the land being required for the extension of the Lancashire and Yorkshire Station. At one end of the church was a tower 18 ft. square, the walls of which were over 5 ft. thick. At the height of about 40 ft. in this tower was a floor with a trap door 6 ft. square in the middle of it. The deceased man was at work on the 27th of May with four others, demolishing the walls of this tower, which were at that time about 44 ft. high. The stones of which the tower was composed, as they were loosened, were lowered by means of a steam-crane working from the ground, and the greater portion of the mortar and other rubbish was also lowered in skips. In the course of the work, however, a considerable quantity of *débris* accumulated on the floor. The deceased stepped on this floor in order to work with greater ease in prizing away one of the stones, and after he had been standing there some few minutes the floor gave way without any warming, and the man was precipitated to the ground and killed.

At the trial it was admitted on both sides that the floor was weak, the ends in the walls being rotten, and the notching of the floor-beams at the intersections being deeper than it should have been, and, in fact, the whole construction faulty. The plaintiff contended that the defendants could have, and ought to have, discovered the weakness; while the defendants contended that the weakness was a latent one which could not have been foreseen. Evidence was gone into at considerable length upon this point, but in the result it became immaterial.

From the evidence of Mr. Edward Hughes, one of the defendants, it appeared that he did not authorise the rubbish being put on the floor, and did not know of its being put there, and further that the men themselves ought to have lowered the *débris* by the crane instead of allowing it to accumulate on the floor.

As the plaintiff's witnesses were unable to contradict this evidence, the learned judge non-suited the plaintiff, remarking that the action ought to have been brought under the Employers' Liability Act in the County-court, and that he wished he had the power to make the plaintiff's solicitor pay the costs of the defendants.

## CHURCH BUILDING NEWS.

*Bengeo.*—Several improvements have just been effected in Holy Trinity Church, Bengeo, near Hertford, which was built more than twenty-five years since from the designs of the late Mr. Benjamin Ferrey, F.S.A. The funds at disposal then only sufficed for fittings, &c., of the simplest character to the chancel. The Holy-table has been raised on a platform and a credence-table of Corsehill stone put. An elaborate polished brass altar-rail and standards have been added, and the whole of the chancel pavement and steps re-arranged and laid with Godwin's tiles from the architect's design. New English oak choir-seats, clergy-stalls, and prayer-desks have been supplied; also a handsome pulpit, with ornamental oak superstructure and moulded Corsehill stone base. The opportunity has been taken to give more space at the easternmost part of the nave. A choir vestry has been attached to the present vestry. In the churchyard handsome oak gates and brick and stone piers have been executed to the two entrances, with an arrangement for suspended lamps over them. The contractors for the building and other works have been Messrs. Geo. Ekins & Son, Hertford; for the oak fittings to the chancel, the pulpit, and the credence-table, Messrs. White & Sons, of Vauxhall Bridge-road; for the metalwork, Mr. Gawthorp, of Long Acre. Mr. Edmund B. Ferrey, F.S.A., was the architect.

*South Muskham.*—The chancel of South Muskham Church, Newark, has lately been enriched by the addition of a reredos, consisting principally of coloured alabaster, divided into three canopied panels by columns of green serpentine marble. The central panel contains a cross of Irish red marble, upon pure white alabaster, the sides enclosing the "Agnus Dei" and Pelican, in white marble, upon the richly-coloured substructure. The additions to the church furniture include a handsome embroidered altar-cover, carved holy table, and tapestry side hangings. The whole of the work has been carried out by Messrs. Jones & Willis.

## SCHOOL-BUILDING NEWS.

*Lincoln.*—The foundation-stone of the new Church schools in Bargate, St. Botolph's, Lincoln, was laid on the 19th ult. by the Rev. W. S. White, of Potterhanworth, in place of the Bishop of Lincoln, who was indisposed. The school is being erected to accommodate about 300 children. The work is being carried out by Mr. W. Wright, builder, Park-street, from designs by Mr. W. Scorer, architect, Bank-street-chambers, Lincoln.

*Temple Cowley.*—The Education Department having required additional accommodation for 200 children, the architect (Mr. A. Mardon Mowbray, Eastbourne) of the present school chapel was instructed to prepare the necessary plans, &c. The work has been commenced by adding on the west end of the present girls' school an infants' school, 40 ft. by 20 ft. 3 in.; an entrance porch, cloak-room, and lavatories for infants and girls; book-room, and offices. The style of the present building, Gothic of the early part of the thirteenth century, has been followed in the new part, the walling being of red brick, with blue Staffordshire brick bands and stone dressings, the roofs being slated, with red roll-ridge tiles on the top. The two school-rooms can be thrown into one for Divine service, penny readings, teas, &c., by the removal of folding-doors, which can be converted into tables, the school desks being convertible into seats, and the infants' gallery into a platform. The flooring will be formed of wood blocks on a concrete bed. Mr. A. W. Collett, of Oxford, has undertaken the contract. The chancel portion will be added later on, also the school-house.

**Cambrian Archæological Society.**—This Society commenced its thirty-ninth session at Bala on Monday.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—VIII.

### SARACENIC.

AT the beginning of these articles allusion was made to certain threads of bright colour darting all over the architectural web instead of coming gradually into existence like others. Such a thread is that of Saracenic or Mahometan art, which suddenly begins, at the period to which we have now arrived, to invade the web in various directions. Being such an invasive thread, it has seemed best to become acquainted, first of all, with those styles that were invaded by it, and that is why the present arrangement has been adopted in preference to Fergusson's, who puts Byzantine at the end of his Handbook.

He classifies Saracenic architecture under the following divisions:—1. The Syrian, the earliest and most like the Byzantine of all the Mahometan styles, but of which few early specimens now remain. 2. The Egyptian, which may be called the typical style of the group, commencing at the same time and from the same originals as the Syrian, but, being practised without foreign admixture for ten or eleven centuries, it acquired a completeness, and, at the same time, an elegance greater than what is found in any of the others. 3. The Persian, a style who e origin it is difficult now to trace, but which, at its culminating point, rivalled that of Egypt in splendour, but never in elegance nor in true architectural propriety. 4. The Indian styles naturally form the next chapter. Their origin and history being perfectly well known, no difficulty can exist in tracing them to their source or marking their gradations, or in appreciating their beauties, which, in some respects, are nearly unrivalled. 5. After completing this survey of the Eastern styles, we return to that of Spain, a style differing so much from the others as to constitute a subject very complete in itself. 6. The last distinctive style is that of Constantinople, comprising merely those edifices which were erected by the Turks in imitation of Santa Sophia and other Christian churches of that city (Fergusson's Handbook, p. 379). There must be some very strong reason to account for such an extensive diffusion of a new religion started only 622 years after the birth of Christ, whose religion one would have thought to be sufficient for a much longer period, if not for ever. The human mind, however, seems to be insatiable, and the present day in England is not without its feverish want of change in religious matters: so we must hope that our clergy will, at all events, do their best to maintain our respect for their holy office.

According to Ramée, the seed sown by Mahomet,—or Mohammed, as his name is also spelt,—at the time of his mission in 622 A.D., called the Hejira, fell on very receptive soil in the minds of the Arabs, a Semitic race, who were persuaded that he was descended in the direct line from Ishmael the son of Abraham, and that he was sent by Allah, and that his God bore a complete resemblance to the God of the Jews.

The one temple of the faith thus founded, says Fergusson on page 383 of his Handbook, was the Kaabah at Mecca, towards which all believers were instructed to turn when they prayed. Consequently we shall find that in all the mosques,—or places of worship used by the Mahometans, Saracens, or Moslems, as they are variously called,—there is a special arrangement of space allotted for praying in the direction of Mecca. The chief object in this space is the Kibleh, a niche or recess in which the Koran (corresponding with our Bible) is kept, adjoining which is a mimbar or pulpit. There are some excellent plans to a large scale illustrating this in a paper read at the Institute by Mr. H. Carpenter in February, 1883. Indeed, this paper is specially interesting as it is about mosques which have been subsequently changed into Christian churches; just as Christian churches have been changed into mosques,—for example, our acquaintance Sta. Sophia at Constantinople,—with the usual addition, required by the Saracens, of several minarets or high towers, from the top of which the call to prayer is given, and which are an indispensable adjunct to any mosque.

Beginning with Syria, we find at Jerusalem two famous mosques, one built by the Caliph Omar, in the fifteenth year of the Hejira, and which forms part of a larger one called El Aksah, built by Abd el Malek fifty-four years later; this is illustrated by Fergusson on pages 384 and 385. The other famous mosque, the Dome of the Rock, illustrated on pages 261 and 262 of Smith and Slater's book, is, they say, the subject of keen debate as to whether this is a nearly unaltered Christian building of the fourth century or a construction of Abd el Malek (above mentioned) in the year 688 A.D. The section shows a domical building erected over a rocky cavern, the entrance to which is guarded by tents supported,—not from the ground,—but by ropes attached to the capitals of the arcade.

There is a large mosque at Damascus; it was formerly the Church of St. John, and remained for some time the joint property of Christians and Moslems, both praying together in it, or, at least, on the east and west sides of a partition run through it.

The Syrian mosques are interesting to Englishmen from their connexion with the Crusades, or wars fought against the Saracens on behalf of the Christian cross (*crux, crucis*).

Taking the next country, Egypt, we find something more distinct and characteristic in the arrangement of the mosques. Some of these consist of a large open court-yard surrounded by arcades somewhat resembling our cloisters, but that the arcades are several rows deep instead of one, while on the side nearest Mecca these rows are further increased in number, so as to afford additional accommodation for praying in that direction. Such is the mosque of Amrou at Old Cairo, the plan of which is illustrated by Fergusson on page 388. Such also is that of Ebn Touloun, of which he gives a view on page 390, while Rosengarten gives, on page 201, a plan, section, and details of it. The section shows the cupola raised over the well that is usually provided for ablutions in the centre of the courtyard. Wooden tie-beams at the springing of the arches are a common feature in these mosques. The plan and section of the mosque and tombs of Sultan Barkook, on page 392 of Fergusson, introduce us to the Egyptian form of dome raised over these great sepulchral chambers "betraying the existence of a strong affinity to the tomb-building races in the rulers of Egypt at that time." The next example given by him is the Mosque of Hassan at Cairo, in which the court-yard is reduced to comparatively small dimensions, but has four gigantic niches opening out of it, almost like the nave, transept, and choir of a church, and, beyond the Kibleh, the huge tomb of the founder flanked by minarets, a very grand composition. He next mentions the Mosque El Moyed, erected in 1415 A.D. Smith & Slater give on page 259 an internal view of this mosque looking along the arcade nearest Mecca, and showing the Kibleh with its adjoining mimbar on the right side of the view, and thus explaining the liturgical arrangements very clearly. A mimbar may be seen at the South Kensington Museum. This also introduces us to the horse-shoe arch, a form which we shall find often repeated in Spain.

Lastly, Fergusson gives a plan, on p. 398, of the Great Mosque at Mecca, of which, of course, the principal object is the Kaabah, a small tower nearly but not quite square in plan, and the upper part covered with a black cloth, which is annually renewed. Next in importance to this is the Zemzem, or holy spring, which is said to have gushed out on this spot to the succour of Ishmael and his mother when perishing of thirst. Coste's "Architecture Arabe; ou, Monuments de Kaire," 1839., fol., illustrates this branch of the style.

Turning to Persia, no Saracenic building is to be found dating from the first six centuries of the Hegira. One of the earliest, says Fergusson, of which anything like correct illustrations have been published, is the Imaret or Hospital of Oulou Jami, at Erzeroum, a pointed arcade of two stories, surrounding on three sides a courtyard, the whole bearing some resemblance to a Christian Church. Tall arches facing the open air,—in fact, gigantic niches,—are characteristic of Persian Saracenic work, as are also the surface decorations of glazed bricks of the most brilliant colours, the Persians having always been remarkable for their excellence in polychromy. The form of arch affected by these people is slightly ogeed, or, more correctly speaking, resembles an arch which starts with the respectable intention of being a four-centred or straight-sided Tudor arch, and changes its mind at the apex by curving upwards. We now come also to the bulbous domes, such as that over the Madrissa, or College of Sultan Husein at Ispahan. Flandrin et Coste's "Voyage en Perse," 1850, 2 vols., 8vo., is a good work to study on this subject.

India was invaded by the Mahometans in 975 A.D., but Fergusson says, on p. 413, from sources different from those which introduced the religion into other countries, and resulting in a combination of Tartar and Hindu architecture. He illustrates the ruins in old Delhi, around the tall column of Victory, erected by Kootub. Many parts of this building are, more correctly speaking, Hindu work, but the central range of arches which he illustrates, on p. 419, are Saracenic, and they are mentioned here in order to refer the student to an enormous sgrafito representation of them in the India Museum at South Kensington. The Minars in India differ from what we have hitherto seen in having sloping sides, and in their peculiar form of plan. Bulbous domes are not uncommon, and we find a mushroom bed of them in some places, such as the mosque at Mandoo, which are suggestive of the native Indian examples alluded to in a former article.

Of course, we must bear in mind that, in following out this Saracenic style in various parts of the world we are, chronologically speaking, stepping far ahead of our Lombard and Early Rhenish friends, this mosque at Mandoo having been built between 1305 and 1432 A.D. The next example given by Fergusson,—the mosque at Ahmedabad,—is very interesting as re-introducing the old Jaina construction of slabs supported on columns; on page 430 he illustrates a comparatively modern example,—the Great Mosque at Delhi, built by Shah Jehan in 1628 A.D. "It explains all the parts by which a mosque of this age was usually characterised,—the western part with its lofty centre, three domes, and two minarets, and the courtyard with its open colonnades, its towers at the angles, and three gateways, the eastern one being always more splendid than those on the north and south." An elevation of this mosque, called the Jumna Mosque, is given by Rosengarten on page 224, and it differs somewhat from Fergusson's view, being taken through the courtyard.

There are many fine examples of Saracenic tombs in India, the most important and beautiful of which was built by the same Shah Jehan to contain the remains of his favourite wife, Moomtaza Mehal (see page 437 of Fergusson), and also a paper on the subject read at the Institute by Mr. Emerson in May, 1870. It is said that descriptions utterly fail to convey a true idea of this fairylike and yet most substantial building. It is covered by a bulbous dome, which, however, sinks into insignificance in point of size when compared with that built at Beejapore over the tomb of Mahomet, who reigned from 1626 to 1660; that is to say, a few years before our St. Paul's was built. This dome is 124 ft. in internal diameter, and the thrust is most ingeniously counteracted by an inner overhanging gallery.

The Eastern Saracenic architecture having been examined, Fergusson brings us westward to Spain, invaded by the Moors in 711 A.D., and this branch of the style, besides being near home, is interesting from its mixture with Western Christian art. The first important building that was commenced by the Moors is the mosque at Cordoba, 786 to 796 A.D. This portion, built by Abd el Rahman and his son Haschem, is not unlike the Aksah at Jerusalem, which the Caliph is said to have been anxious to surpass, and consists of eleven aisles divided by arcades, and facing a courtyard. This arrangement was supplemented by eight more aisles added by El Mansour, 976 to 1001 A.D., so that there is a very forest of columns. In the middle of all this the Christians built a cathedral, and erected altars in various directions. The entire plan is given in Mr. Carpenter's paper, read at the Institute, with the various dates indicated by different colours.

The Moorish architecture consists of a peculiar arrangement of columns supporting an upper range of columns, whose height is occupied by intersecting cusped arches, but which are themselves surmounted by horse-shoe arches. The cusped arches are in other cases also repeated above, so that a great degree of richness is obtained. It should be remarked that the pointed arch appears nowhere in these Moorish examples at an age when its employ-

ment was universal in the East, thus showing, according to Fergusson, "how completely the Saracenic architects followed the traditions of the country in which they found themselves. At Cordoba they never threw off the influence of the Roman arch, though further north the pointed arch is by no means uncommon. Giraud de Prangey's "Monuments Arabes et Moresques de Cordone, Seville, et Grenade," 1839, fol., is the work to consult on this subject. At Seville there was another example of a mosque converted into a Christian cathedral; but the chief Moorish object of interest is the tower called the Giralda (from its weathercock), which is justly world-renowned. The present top story is of Renaissance date, and will not be confused with the Saracenic style of the rest. Gwilt gives illustrations from Laborde's "Spain."

In Granada we come to another famous example, the Citadel and Palace of the Alhambra. Here we find the Moorish style carried to the very extreme of lightness and elegance. There is none of the cuspy confusion of Cordoba, while we get the wonderful intricacies of honeycombed arches and vaults which were, no doubt, a development of the system of pendentives common to most Saracenic styles, and here carried out to their fullest extent. The reproduction of the Court of Lions in the Alhambra at the Crystal Palace will give a very good notion of this marvellous building, with its gorgeous coloured decoration on floor, walls, and roof.

The last country that we have to consider is Turkey. Constantinople was not conquered by the Mahometans till 1453 A.D., who here, as usual, adopted and suited to their purpose the style of the country in which they located themselves, and this they did by going to the fountain-head, namely, to Sta. Sophia, and founding their buildings upon the great creation of Justinian. The Mosque of Soliman, 1550—1555 A.D., is avowedly a copy of this church, not only in plan and form, but also in size, as will be seen from the plan given by Fergusson on p. 466. This is, therefore, a very forcible instance of the history of this "cuckoo" style, as it may be called; for it not only invaded the nests of the Christians and others in various parts of the world, but calmly assimilated the food which had been prepared for their beaks. It has turned out to be a bird of fine plumage wherever it has settled, and we shall now recognise the colour of its feathers when we come across them in pursuing the thread of Christian architecture from the point at which we left it in the last article.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*Aug.* 8.—11,050, R. Schomburg, London, Iron Bars for Fireplaces.—11,054, J. Rickard, St. Columb Major, Corrugated Iron Roofing.—11,058, J. Jackson, London, Spring Clip to Fasten Stair and Curtain Rods.

*Aug.* 9.—11,096, S. Cowan, Dalbeattie, Grease Traps.—11,097, C. H. Ellis, Exeter, Consolidating Granular Substances into Bricks, Artificial Stone, &c.—11,108, F. Bosshardt, London, Asphalte Paving, &c. Com. by E. Dietrich, Berlin.—11,110, G. T. Cleaton, London, Bolts for Doors or Windows, &c.—11,113, J. Rosenthal and C. M. Rosenthal, Vienna, Fireproof Armoured Curtains for Theatres and Buildings.—11,116, D. Wilson, London, Construction of Fire Backs and Baskets of Portable Cooking Ranges.

*Aug.* 11.—11,125, J. Suter, J. Whittaker, and J. Sheldon, Manchester, Fans for Ventilating, &c.—11,130, S. H. Sharp, Halifax, Imitating Stained-Glass Windows.—11,151, J. Miller, London, Manufacture of Bricks from Slag or Scoriæ from Blast Furnaces.—11,155, S. P. Wilding, London, Mastic or Cement. Com. by J. Aubrey and Count G. de Vaussay, Paris.

*Aug.* 12.—11,173, T. Horton, Birmingham, Roller-Blind Furniture.—11,176, F. J. Kellow and J. C. Rodger, Southampton, Walls.—11,186, E. Burton, London, Storing Dust and House Refuse, &c.

*Aug.* 13.—11,224, H. A. Williams, Stratford, Fastening Window Sashes.—11,237, L. A. Groth, London, Warming Stove. Com. by G. Boretti, Ardenza.

*Aug.* 14.—11,251, T. Garforth and W. Garforth, Mirfield, Tieing Bricks or Stones together.—11,252, H. C. Board, Bristol, Heating Apparatus.—11,273, M. Underwood, Devonport, Double Dovetailing in Metal, Wood, Stone, &c., without Rivets.—11,276, W. Ayres, London, Weights for Cords of Sashes, &c.—11,289, W. H. Sleep, London, Sliding Sashes.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

### SPECIFICATIONS ACCEPTED.*

*Aug.* 12.—799, E. H. Harling, London, Window Fastener.—1041, W. R. Lake, London, Gates and Gratebars. Com. by L. Bannister, Philadelphia, U.S.A.—5,994, W. H. Bates, G. Bidlake, and H. Faulkner, Leicester, Door-mats, &c.—8,395, W. G. Cannon, London, Hot-water Coils for Heating Purposes.—9,246, F. W. Coons, London, Engraving Marble and Granite.—10,049, A. Besson, Paris, Stoves.

*Aug.* 15.—9,308, G. W. Chambers, Rotherham, Stove Grates.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending August* 16, 1884.

5,825, J. Shanks, Barrhead, Water-closets, &c. (Dec. 21, 1883, price 4d.)

The closet basin and trap are formed of earthenware, and in addition to the usual outlet at the bottom of the trap, another one is made on the outer side of the bend. In trough-closets the flushing-cistern is formed inside the closet, at one side thereof.

5,870, W. Ross, Glasgow, Automatic Drain-flushing Apparatus. (Dec. 27, '83, 6d.)

Inside the tank is a beam lever, on one end being an inverted cup-shaped sucker and valve fitting over the outlet opening. The other end is weighted to over-balance the valve, and a spindle is connected thereto, on which is a sucker, above being a weight on a hollow spindle surrounding the central spindle, on which hollow spindle is a float-ball. The water is supplied to the tank at a certain determined speed, and the ball rises therewith, until it touches a bracket above, when a small spring valve is opened, by which air is admitted to the pan down the hollow spindle to the sucker, and as the vacuum is thereby destroyed the lever falls and the flush is effected.

5,940, J. C. Mewburn, London, Water-closets. Com. by J. E. Boyle and H. Huber, New York, U.S.A. (Dec. 31, '83, 6d.)

This is an improvement on Patent No. 880 of 1882 in making the descent of the flushing water create a vacuum in the top of the trap of the basin, thereby syphoning the bowl. This is effected by leading the air-pipe from the trap up through the flushing-tank, and covering it with a bell, from which the air is exhausted by the descent of the water, and a vacuum caused therein until the bottom of the bell is uncovered by the tank being emptied.

5,949, F. Walton, Twickenham, Manufacture of Wall Decoration in Ornamental Relief. (Dec. 31, '83, 6d.)

The relief ornament of such surfaces as "Lincrusta-Walton" is coloured by being passed between two rollers, very accurately adjusted, one of which is covered by rubber, and the colour is applied to this rubber, which only touches the elevated portions. Colour is also applied to the whole surface and then rubbed off the higher parts by this roller, when another colour is applied thereto as before.

* Open to public inspection for two months from the dates named.

## Miscellanea.

**Extensions at Herne Hill Railway Station.**—In anticipation of increased traffic, and to meet present demands, the directors of the London, Chatham, and Dover Company are carrying out a very extensive enlargement of their important junction station at Herne Hill. The whole of the land belonging to the company on the east side of the station, which for several years past has been occupied as coal depôts, and which is upwards of 600 ft. in length, and about 80 ft. in width, is being absorbed into the station area. This land is considerably below the railway level, and the enlarged station area is carried on a series of arches, twenty-five in number,—which will afford room for three additional lines of rails, and also provide space for a new central platform, upwards of 300 ft. in length. This platform will be reached by a flight of steps from a new underground approach on the east side. This approach is continued under the station area to the west side near the present booking offices, and the steps leading up to the existing central platform are being entirely reconstructed and much widened, whilst the platform itself has been considerably extended in length. Several new waiting-rooms and other offices are in course of erection. The line is carried over Half Moon-lane by two iron girder bridges upwards of 60 ft. in width. When the works now in progress are completed the station will be almost double its former area. The contractors for the works are Messrs. Ball & Gammon.

**The Royal Cornwall Polytechnic Society.** At the fifty-second annual exhibition of this Society at Falmouth last week, the first bronze medal was awarded to Mr. W. E. Hill, of Stokes Croft, Bristol, for architectural designs, this being the highest award in architecture. The drawings exhibited by Mr. Hill consisted of designs for artisans' dwellings, entrance lodges, and for cottages especially adapted for miners, the latter attracting a large amount of attention.

**Ventilation of Coal Cargoes.** The co mittee of Lloyd's have received from the Boa of Trade a report concerning the surfa ventilation of the cargo of 2,050 tons of co carried in the *Sutherlandshire*, from Hull San Francisco, last year, from which it appea that advantages arise from the fitting of tub for enabling the master to ascertain the ter perature of the body of the cargo, as recor mended by the report of the Royal Commissi appointed to inquire into the spontaneous cor bustion of coal in ships. This ship has no again left Hull for San Francisco with so coal as before, and with the same fitting Her commander, Captain Inglis, highly approv of them, and will continue testing the temper ture. It is stated that, while the *Sutherlan shire* was at San Francisco, three vessels arrive coal-laden on fire, and that one of them, a American ship, had been on fire fifty-thre days. When detained, the *Sutherlandshire* wa fitted with a box ventilator on each hatch, viz fore, main, and aft, passing down through th body of the coals. There was also one 14-i iron cowl ventilator passing through the fore castle and main decks, one trunk ventilator wit skylight top leading through midship house an main deck, one 18-in. iron cowl abaft mainmas leading to the water tanks, and two 12-in. cowl through poop and main decks to store-roo right aft. The alterations made were as fol low:—The two aft ventilators were boxed, an continued through the store-room deck to th cargo. The tank ventilator was opened out t the cargo at the main deck, and the trunk an forecastle ventilators were accepted (bein suitable for surface ventilation). The thre wood box ventilators in the hatchways wer removed, and testing pipes put in their places A record was kept of the temperature of th cargo, and the figures may be seen at Lloyd's in the secretary's office.—*Iron.*

**Improved Ambulance Vans.**—With th view of avoiding risk of contagion in the con veyance of patients suffering from small-pox o contagious fevers to hospitals, Dr. Gayton senior medical officer of the Metropolita Asylums Board, has constructed an ambulanc van of new and improved form. Instead o having open glass and wooden louvre shutters its apertures consist of a double layer o perforated metal, inclosing an absorbent mate rial saturated with an acknowledged germi cide or destroyer of the minute microscopica particles which tend to propagate disease Fresh air is admitted through modified anc improved "Tobin" ventilators of a horn-shape with the larger end opening externally, whilst inside the van the smaller extremity of thi air-tube is provided with a disinfecting air chamber, constructed like those attached to the other apertures or windows. The Metropolitan Asylums Board use these ambulances for con veying small-pox convalescents from Hampstead to their river wharf, *en route* to the hospita ships off Purfleet.—*Daily Telegraph.*

**Liverpool and the Manchester Ship Canal.**—At the meeting of the Liverpool City Council on Wednesday, Sir William B. Forwood referred to the Manchester Ship Canal Scheme and said the total expense of the Corporation in opposing it in Parliament was about 8,000*l.* The defeat of the Bill had saved the estuary of the Mersey, and averted a great calamity from Lancashire. He urged Manchester to abandon the scheme for a ship canal, and to go instead for a barge canal for vessels up to 600 tons. He recommended the purchase and deepening of the present Bridgwater Canal. Sir William then referred in strong terms to the excessive charges levied by the railway companies for carriages of goods between Liverpool and Manchester. This was the real cause of all the dissatisfaction that existed. He asserted that the railway companies could afford to reduce the charges 30 per cent. without taking a penny from the pockets of the shareholders. He urged co-operation between Liverpool and Manchester to upset the railway combination and monopoly.

**Civil and Mechanical Engineers' Society.** The members of this Society had a most enjoyable excursion on the 14th instant to the East and West India Company's new docks at Tilbury. The party were conducted over the docks by the resident engineer, Mr. Donald Baynes. After these works had been inspected the party proceeded to the Clarendon Hotel for luncheon, and afterwards by special boat to Thames Haven to inspect the petroleum stores, over which they were conducted by the engineer, Mr. Wm. C. Street.

**Sanitary Institute of Great Britain.**—The Autumn Congress is arranged to be held at Dublin, from September 30th to October 4th, 1884, and an Exhibition of Sanitary Apparatus and Appliances in connexion with the Congress will be held in the Royal Dublin Society's Buildings, Balls Bridge, from September 30th to October 18th. Sir Robert Rawlinson, C.B., will be the President of the Congress, which will include three sections, viz., I.—"Sanitary Science and Preventive Medicine," presided over by Dr. Thomas W. Grimshaw, Registrar-General for Ireland. II.—"Engineering and Architecture," presided over by Mr. Charles D. Cotton, C.E. III.—"Chemistry, Meteorology, and Geology," presided over by Dr. Charles A. Cameron, Superintendent Medical Officer of Health for Dublin.

**Proposed Art and Sanitary Exhibition at Eastbourne.**—We have received the programme of the "Eastbourne Arts, Science, and Sanitary Association and Exhibition of Fine Arts," [comprising "new decorative fine art for modern dwellings, tapestry, paperhangings, lace, furniture, clocks, improved scientific instruments, pottery, china, terra-cotta and glass, silver and electro goods, English and foreign carvings and paintings, metal-work, musical instruments, photography, electric lighting, and kindred inventions." The exhibition is to be held in the Devonshire Park Pavilion, commencing 4th September, and to continue to the 13th, inclusive. The object of this Exhibition is to advance decorative art in modern dwellings, and to popularise recent scientific improvements.

**Enlargement of the Dulwich Picture Gallery.**—The picture gallery attached to the old College at Dulwich is at present undergoing enlargement by the conversion of the south wing of the gallery buildings, which has hitherto been occupied as the Women's Almshouses. The added exhibition-room will be 19 ft. by 28 ft., and 25 ft. in height, with a lantern light in the centre. The works are being carried out from the designs of Mr. Charles Barry, architect to the College estate. The contractors are Messrs. J. & C. Bowyer, of Upper Norwood.

**Public Works at Newcastle-on-Tyne.**—The Prince and Princess of Wales visited Newcastle-upon-Tyne on Wednesday, and opened an addition to the public park, where the Princess planted a tree, and they afterwards opened the new Natural History Museum and a Free Library. On Thursday they opened the new Coble Dene Dock.

## TENDERS.

For the erection of the Paragon Theatre of Varieties, Mile End-road, for Messrs. Crowder & Payne. Mr. Frank Matcham, architect, Rugby-chambers, Bedford-row, W.C. Quantities supplied by Mr. Frederick Thomson, 20, York-buildings, Adelphi:—

| | | A.* |
|---|---|---|
| Kirk & Randall | £22,680 | £227 |
| Perry & Co. | 22,320 | 280 |
| Wall Bros. | 22,171 | 300 |
| Toms | 22,000 | 297 |
| Patman & Fotheringham | 20,150 | 270 |
| Wm. Brass | 20,140 | 265 |
| McCormick & Sons | 19,987 | 250 |
| Dove Bros. | 19,954 | 255 |
| Morter | 19,940 | 265 |
| Shurmur | 19,782 | 252 |
| Roach | 18,760 | 400 |
| Lusk | 16,600 | 280 |
| F. & F. J. Wood | 15,983 | 430 |
| Jackson & Todd | 14,895 | 277 |

* Reduction if zinc be used in lieu of lead.

For additions, Royal Masonic Institution for Boys, Wood Green. Messrs. Hovenden, Heath, & Berridge, architects:—

| | |
|---|---|
| King & Son | £13,335 |
| Ashby & Horner | 13,224 |
| Humphreys & Son | 13,150 |
| Patrick & Son | 12,950 |
| Bangs & Co. | 12,934 |
| Grimwood & Sons | 12,899 |
| W. & T. Denne | 12,811 |
| Lawrence & Sons | 12,793 |
| Ashby Bros. | 12,777 |
| Peto Bros. | 12,678 |
| Perry & Co. | 12,604 |
| Martin, Wells, & Co. | 12,510 |
| E. Conder | 12,327 |
| Fish, Prestige, & Co. (accepted) | 12,312 |

For the repairing of Westbere Church, near Canterbury, for the rector and churchwardens. Mr. E. P. Loftus Brock, F.S.A., architect:—

| | |
|---|---|
| J. E. Wiltshier, Canterbury | £715 |
| H. Stiff, Dover | 710 |
| W. J. Adcock, Dover | 673 |
| H. B. Wilson, Canterbury | 652 |

For alterations and additions to stables, Aubert Park, Highbury. Mr. Chas. Bell, architect. Quantities by Mr. H. Lovegrove:—

| | |
|---|---|
| Chas. Warr | £830 |
| John Anley | 745 |
| George Green | 730 |
| J. Allen & Sons (accepted) | 618 |

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| New School | Redruth School Board | £50 | Sept. 13th | ii. |
| Laying-out Plot of Land in Cheetham | Corporation of Manchester | £60 | Sept. 15th | ii. |
| Municipal Hall and Offices, Bombay | Municipal Commissnrs. | Rs. 5,000, 3,000, 2,000 | Nov. 6th | ii. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| County School at Dowlting | Hugh Sexey's Hospital | G. J. Skipper | August 30th | ii. |
| Wrought-Iron Roofs | Huddersfield Corporation | *Official* | do. | ii. |
| Re-paving Wellington-st. with Cemut Concrete | Aldershot Local Board | W. L. Coulson | Sept. 1st | ii. |
| Engine-house and Coal Store, &c., at Patcham | Brighton Corporation | E. Easton & Co. | do. | ii. |
| Sinking a Well at Patcham | do. | do. | do. | ii. |
| Making Roads | Wandsworth B. of Wks. | *Official* | Sept. 2nd | ii. |
| Sewerage Works, &c. | Westminster B. of Wks. | do. | Sept. 3rd | ii. |
| School Buildings | Guildford School Bd. | Wm. G. Lower | do. | ii. |
| Pipe-Sewers, &c. | Claines Local Board | A. H. Parker | Sept. 4th | ii. |
| Schools, and Master's Residence | Stanwix School Board | C. J. Ferguson | Sept. 5th | ii. |
| Brick, Stoneware, and Cast-Iron Sewers | Stroud R. S. A. | J. P. Lofthouse | Sept. 8th | ii. |
| Reservoir, &c. | Stratford-on-Avon T. C. | Ed. Pritchard | Sept. 9th | ii. |
| Sewerage Works at Presteigne | Knighton Un. R. S. A. | Chas. Slagg | Sept. 15th | xxvi. |
| Cooking Apparatus, Kitchen and Bakery Fittings, &c. | Corporation of Exeter | R. Stark Wilkinson | Sept. 25th | xxvi. |
| Re-building of superstructure & strengthening of Hammersmith Bridge | Met. Board of Works | *Official* | October 2nd | ii. |
| Laying Pipe-Sewer, and forming Road at Penge | Not stated | W. Adams Murphy | Not stated | ii. |
| Roads and Paths, South Streatham Estate | do. | Wheeler & Hollands | do. | xxvi. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Assistant to Surveyor's Office of Works | Civil Service Com. | Sept. 5th | Not stated | xvi. |
| Clerk of Works | Willesden Local Board | Not stated | 3*l.* 10*s.* per week | xvi. |

For the erection of a villa residence on the Mersea-road (Meyrick-crescent), for Mr. J. E. Roff. Mr. J. W. Start, architect, Head-street, Colchester. Quantities supplied:—

| | |
|---|---|
| G. Bowles | £525 0 0 |
| E. Eade | 526 0 0 |
| H. Ambrose | 517 2 9 |
| A. Diss | 498 0 0 |
| C. Shepherd | 470 0 0 |
| A. Chambers | 465 0 0 |
| F. Dupont | 456 0 0 |
| C. H. Oldridge (accepted) | 427 0 0 |

[All of Colchester.]

For alterations at the Falcon public-house, Bedford-road, Clapham, for Mr. H. Nobes. Mr. H. I. Newton, architect, 17, Queen Anne's Gate:—

| | |
|---|---|
| Lamble | £479 0 0 |
| Royal | 470 0 0 |
| Burmna & Sons | 430 6 0 |
| Pack Bros. | 428 0 0 |
| Cook Bros (accepted) | 369 0 0 |

For new concrete gas-holder tank at Wellingborough:—

| | |
|---|---|
| J. Jevons, Dudley | £2,351 13 0 |
| F. C. Bugbird, Enfield | 2,303 8 0 |
| W. J. Botterill, London | 2,098 0 0 |
| E. Brown, Wellingborough | 2,025 0 0 |
| F. Barlow, Rothwell | 1,725 0 0 |
| G. Henson, Wellingborough | 1,680 0 0 |
| B. Cook & Co., London | 1,540 0 0 |
| C. J. Corrie, Lichfield (accepted) | 1,500 0 0 |

For new town-hall, additions and alterations to market, &c., at Wellington, Somerset, for the Wellington Town-hall and Market Company, Limited. Mr. E. T. Howard, architect, Wellington:—

| | |
|---|---|
| J. Morse | £2,768 10 0 |
| Grates & Pyle | 2,745 0 0 |
| Stephens & Bastow | 2,500 0 0 |
| Chas. Fox | 2,450 0 0 |
| Dunham & Verrier | 2,380 0 0 |
| H. J. Spiller | 2,235 0 0 |
| A. Poole, Ilminster (accepted) | 2,085 0 0 |

For three cottages at Wellington, Somerset, for the Misses Elworthy. Mr. E. T. Howard, architect:—

| | |
|---|---|
| Templeman | £360 0 0 |
| Morse | 374 10 0 |
| Twyford, Wellington (accepted) | 345 0 0 |

For alterations to Backways Farm, Wellington, Somerset, for Mr. W. Searle. Mr. E. T. Howard, architect:—

| | |
|---|---|
| Jones | £167 0 0 |
| Follett | 147 0 0 |
| Morse | 139 10 0 |
| Chanter & Brook, Crediton, Devon (accepted) | 108 14 0 |

For additions to Board Schools, Wellington, Somerset, for the Wellington School Board. Mr. E. T. Howard, architect:—

| | |
|---|---|
| J. Morse, Taunton (accepted) | £176 10 0 |

For the erection of a new wing to Manress House, Roehampton, Surrey. Mr. Frederick A. Walters, architect, 4, Great Queen-street, Westminster. Quantities supplied by Mr. W. H. Brayshaw:—

| | |
|---|---|
| Boyce | £5,543 0 0 |
| Carless | 5,483 0 0 |
| Parmenter | 5,460 0 0 |
| Shaw | 5,452 0 0 |
| Sanders | 4,980 0 0 |

For alterations and additions to Wesleyan chapel, Irchester, Northants. Mr. Arthur Wells, architect:—

| | |
|---|---|
| Abbott, Little Harrowden | £318 0 0 |
| Underwood, Wellingborough | 275 0 0 |
| West, Irchester | 270 0 0 |
| Hardwick, Irchester (accepted) | 259 0 0 |

For the erection of school buildings at Stoughton, for the Guildford School Board. Messrs. Welman & Street, architects:—

| | |
|---|---|
| G. Stallard, Havant | £4,560 0 0 |
| C. Claridge, Banbury | 4,252 0 0 |
| H. Banham, Stoughton | 4,250 17 10 |
| G. & R. Smith, Guildford | 4,140 0 0 |
| Stephens & Bastow, Bristol | 4,100 0 0 |
| Harris & Son, Woking | 3,918 0 0 |
| Martin, Wells, & Co., Aldershot | 3,900 0 0 |
| Aldridge & Jenvey, Camberwell | 3,854 0 0 |
| Bull, Sons, & Co., Southampton | 3,847 0 0 |
| W. G. Butt, Woking | 3,818 17 0 |
| Mower, Hackney | 3,799 10 0 |
| T. B. Kingerlee, Oxford | 3,790 0 0 |
| H. Ingram, Woking | 3,773 0 0 |
| W. Holt, Croydon | 3,720 0 0 |
| W. Tribe, Stoughton | 3,717 0 0 |
| S. Woods, Weybridge | 3,630 0 0 |
| J. Botterill, Reading | 3,629 0 0 |
| Peter Peters, Horsham | 3,616 0 0 |
| J. Woolgar, Horsham | 3,496 0 0 |
| Redford & Potter, Horsham | 3,162 0 0 |

For shop and warehouse, Nos. 199 and 201, Lewisham High-road, for Mr. G. E. Haycraft. Messrs. Romaine-Walker & Tanner, architects. Quantities by Mr. D. J. Brown:—

| | |
|---|---|
| G. Hall | £3,049 0 0 |
| Burman & Son | 2,667 0 0 |
| H. L. Holloway | 2,560 0 0 |
| A. & F. Smith | 2,535 0 0 |
| S. J. Jerrard | 2,490 0 0 |
| M. Redman | 2,197 0 0 |

For enlargement of George-street Chapel, Bromley-by-Bow. Mr. R. H. Hill, architect, 8, Clement's-lane, Lombard-street:—

| | |
|---|---|
| J. Hiland | £993 0 0 |
| Morter | 921 0 0 |
| Perry & Co. | 914 0 0 |
| Bangs & Co. | 898 0 0 |
| Gregar | 895 0 0 |
| Harris & Wardrop | 884 0 0 |
| Jelly & Sons | 844 0 0 |
| Allen & Sons | 790 0 0 |

For making and draining, with sewer and surface-water drains, certain roads on the Crouch Hall Estate, Crouch End, for the Imperial Property Investment Company, Limited. Mr. G. H. L. Stephenson, surveyor, 57, Moorgate-street:—

| | |
|---|---|
| McKenzie & Co. | £6,505 0 0 |
| Cook & Co. | 6,400 0 0 |
| T. Adams | 6,149 0 0 |
| T. G. Dunmore | 5,999 0 0 |
| A. Walker | 5,587 0 0 |
| E. Wilson (accepted) | 5,498 0 0 |

For pulling down and rebuilding Nos 36 and 37, Chalk Farm-road, for Mr. G. P. Thompson. Messrs. Alexander & Gibson, architects, 9, Great James-street. Quantities supplied by Mr. H. Burton:—

| | |
|---|---|
| Gould & Brand | £4,578 0 0 |
| Priestley & Gurney | 4,493 0 0 |
| Green | 4,257 0 0 |
| Patman & Fotheringham | 4,256 0 0 |
| Smith | 4,227 0 0 |
| Beale (accepted) | 3,870 0 0 |

For alterations and improvements at 69, Folkestone-road, Dover. Mr. Arthur Wells, architect, 27, Chancery-lane, London:—

| | |
|---|---|
| Lewis (accepted) | £147 10 0 |

[No competition.]

*Hot-water Apparatus.*

| | |
|---|---|
| M. Pepper | 26 0 0 |

For Fire Brigade Station, Bishopsgate-street, E.C., for the Metropolitan Board of Works. Mr. Geo. Vulliamy, architect —

| | | | |
|---|---|---|---|
| Porter | £17,751 | 0 | 0 |
| Webster | 16,098 | 0 | 0 |
| Richardson | 15,300 | 0 | 0 |
| W. Shurmur | 14,940 | 0 | 0 |
| Wood | 14,434 | 0 | 0 |
| Hobbs | 14,199 | 0 | 0 |
| Holliday & Greenwood | 14,177 | 0 | 0 |
| Stephens & Bastow | 14,000 | 0 | 0 |
| E. C. Howell & Son | 13,967 | 0 | 0 |
| Garrud & Tinks | 13,943 | 0 | 0 |
| Oldrey | 13,600 | 0 | 0 |
| Reading | 13,510 | 0 | 0 |
| Hook | 13,504 | 0 | 0 |
| Mowlem & Co. | 13,500 | 0 | 0 |
| J. & J. Greenwood | 13,278 | 0 | 0 |
| Stimpson & Co. (accepted) | 13,210 | 0 | 0 |

For new Wesleyan chapel, Herne Bay. Mr. Charles Bell, architect. Quantities by Mr. H. Lovegrove —

| | | | |
|---|---|---|---|
| T. W. Hickinbotham | £4,260 | 0 | 0 |
| T. Cornelius | 4,124 | 0 | 0 |
| G. T. Adams | 4,097 | 0 | 0 |
| J. Smith & Sons | 4,051 | 0 | 0 |
| H. Brown | 4,000 | 0 | 0 |
| L. Shrubsole | 3,998 | 0 | 0 |
| Amos & Ford | 3,922 | 0 | 0 |
| C. W. Welby | 3,895 | 0 | 0 |
| H. Hill | 3,885 | 0 | 0 |
| W. Cozens | 3,796 | 0 | 0 |
| J. Holloway | 3,773 | 0 | 0 |
| W. A. Grubb | 3,750 | 0 | 0 |
| G. H. Denne & Son | 3,700 | 0 | 0 |
| J. Allen & Son | 3,685 | 0 | 0 |

For alterations at the Rising Sun public-house, Deptford, for Mr. J. W. Dibbs. Mr. Henry Roberts, architect —

| | | | |
|---|---|---|---|
| Taylor | £668 | 0 | 0 |
| Hubble & Trot | 163 | 0 | 0 |
| Holloway | 649 | 0 | 0 |
| Mower | 642 | 0 | 0 |
| Meager | 407 | 0 | 0 |
| Leng | 393 | 0 | 0 |
| *Painting and Gasfitting.* | | | |
| Ruse | 111 | 0 | 0 |
| Banks (accepted) | 109 | 0 | 0 |

For alterations to the White Hart Tavern, King's road, Chelsea, for Mr. J. J. Pope. Mr. Miller, architect. Quantities supplied.—

| | | | | | F. | |
|---|---|---|---|---|---|---|
| Speake | £560 | 0 | 0 | ... | £587 | 0 |
| Mark | 444 | 0 | 0 | ... | 472 | 0 |
| Adams | 413 | 0 | 0 | ... | 437 | 0 |
| Pack | 412 | 0 | 0 | ... | 431 | 0 |
| Kirk | 337 | 0 | 0 | ... | 417 | 0 |
| Ansell | 365 | 0 | 0 | ... | 390 | 0 |
| King | 336 | 0 | 0 | ... | 399 | 0 |

* Including new floors.

For various works at the Church of St. Mary, Spital-square. Mr. D. R. Dale, architect —

| | | | |
|---|---|---|---|
| Walther Smith | £579 | 0 | 0 |
| Brady | 518 | 0 | 0 |
| Pritchard | 500 | 0 | 0 |
| Koldle | 455 | 0 | 0 |
| Hoare & Sons | 431 | 0 | 0 |

For the erection of thirty-five cottages on the Shaklewell Estate. Mr. D. R. Dale, architect —
G. Dale, Thornton Heath (accepted) £7,525 0 0

For detached villa on the First Portion of Stone Hall Estate, Oxted, Surrey. Mr. D. R. Dale, architect. —
G. Dale, Thornton-heath (accepted) £2,200 0 0

For rebuilding warehouse, Charterhouse-square. Mr. G. Perry, architect :—
W. Shurmur (accepted) £522 0 0

For alterations, &c., at the Cripplegate Bank, Whitecross-street, E.C. Messrs. Woodthorpe & Hammond, architects —

| | | | |
|---|---|---|---|
| G. Green | £814 | 0 | 0 |
| W. Shurmur | 693 | 0 | 0 |
| J. W. Heeps | 640 | 0 | 0 |
| W. G. Larke | 614 | 0 | 0 |

For alterations, &c., to the George and Dragon public-house, Hackney-road. Messrs. Bird & Walters, architects —

| | | | |
|---|---|---|---|
| G. Mower | £225 | 10 | 0 |
| W. Shurmur | 222 | 0 | 0 |
| Jackson & Todd | 220 | 0 | 0 |
| J. Anley | 215 | 0 | 0 |

For alterations, &c., at St. Andrew's Church, Bethnal-green. Messrs. Dollman & Allen, architects :—

| | | | |
|---|---|---|---|
| B. E. Nightingale | £1,180 | 0 | 0 |
| W. Shurmur | 1,152 | 0 | 0 |

For extension of sewers, Brentford Drainage, Contract No. 5. Messrs. Gotto & Beesley, engineers; Mr. F. W. Lacey, surveyor :—

| | | | |
|---|---|---|---|
| Cardus & Prowse | £1,970 | 0 | 0 |
| Mears | 1,695 | 0 | 0 |
| Bottoms Bros | 1,684 | 0 | 0 |
| Trueman | 1,649 | 0 | 0 |
| B. Cooke & Co. | 1,589 | 0 | 0 |
| Nicholls | 1,377 | 0 | 0 |
| Brunton | 1,336 | 0 | 0 |
| Owen & Brown | 1,331 | 0 | 0 |
| Everett | 1,315 | 0 | 0 |
| Watt & Lovedale | 1,288 | 0 | 0 |
| G. Bell | 1,272 | 0 | 0 |
| Catley | 1,225 | 0 | 0 |
| W. Williams, Wimbledon (accepted) | 1,162 | 0 | 0 |

[Engineers' estimate, £1,350.]

For alterations at the Lord Lyndhurst public-house, Lyndhurst-road, Peckham, for Mr. Burney. Mr. Henry Roberts, architect. —

| | | | |
|---|---|---|---|
| Sly | £737 | 0 | 0 |
| Taylor | 734 | 0 | 0 |
| Holloway | 719 | 0 | 0 |
| Hubble & Trott | 690 | 0 | 0 |
| Meager | 672 | 0 | 0 |
| Mower (accepted) | 626 | 0 | 0 |
| *Pewterer's Work.* | | | |
| Banks (accepted) | 54 | 10 | 0 |
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| *Excavating and Draining.* | | | | | | |
|---|---|---|---|---|---|---|
| J. Kellett, Marple (accepted) | | | | | £30 | 10 9 |
| | Houses. | | | Walling. | | |
| E. Simpson, Hyde | £1,231 | 0 | 0 | ... | £67 | 0 0 |
| J. Bowden, Marple | 1,180 | 0 | 0 | ... | 72 | 10 0 |
| Froggatt & Briggs, Stockport | 1,096 | 0 | 0 | | 89 | 0 0 |
| S. Robinson, Hyde* | 1,060 | 0 | 0 | ... | 73 | 0 0 |

* Accepted.

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# The Builder.

VOL. XLVII. No. 2169. SATURDAY, AUGUST 30, 1884.


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### *Archæological News from Rome.*

ARCHÆOLOGISTS who visit Rome for business or for pleasure know most surely, and if they be Englishmen, most sadly, that if they want the latest and most reliable archæological news they must mount the Capitoline Hill and seek it at the Prussian Imperial Archæological Institute. Archæologists who stay at home wait year by year with impatience for the Report issued by that Institute. This Report for the past year, 1883, now lies before us. It appears as usual in triple form,—a "Bullettino," containing the business of the Institute, and a detailed account of the excavations undertaken,—in this instance at Palestrina, Vulci, Pompeii, Corneto, and Orvieto. The importance of this "Bulletino," dry though it may appear to the uninitiated, can scarcely be over-estimated; in it are recorded with the most minute precision month by month the *circumstances* of discoveries, just those details of place, surroundings, condition, and juxtaposition, for want of which so many of the objects in our old-established museum lose full half their scientific value. Next we have the "Annali" of the Institute, an illustrated issue devoted to the discussion of selected objects. It contains the best archæological opinion in Europe on the facts registered in the "Bullettino." These two issues are made complete each year by the appearance of the "Monumenti," a magnificent folio atlas, containing, in engraving, in phototype, in chromo-lithographs of remarkable accuracy and beauty, reproductions of the most important monuments discovered.

The field covered by this splendid publication is very wide. It embraces topography, architecture, sculpture, bronzes, terra-cottas, vase paintings. The Monumenti of 1883 contain plans and sections of the Rostra of Augustus, recently brought to light in the Forum, two painted sarcophagi from Clazomenæ, terra-cottas from Tarentum, two sarcophagi from Tarquinii, adorned with reliefs representing contests of Amazons and Centaurs with Greeks; a number of curious Sardinian antiquities of Egyptian style; fragments of inscriptions from Capena; a vase from Orvieto, with a curious representation of Heracles and Silenus; and lastly, the beautiful statue of Bacchus recently discovered in Hadrian's villa.

To some of these subjects we hope to return, but for the present it is this statue of Bacchus which claims our attention. The statue was found in a hollow place beneath a staircase in the part of the villa commonly known as the library. It is singularly well preserved, only the right hand missing. Its great beauty and merit were recognised at once, and casts were promptly made, of which one is at Berlin, a second at Strasbourg, and, as we had occasion to notice some months ago, a third in the new cast museum at Cambridge.* We spoke then of the diversity of opinion among archæologists as to the style and date of the statue. No one had as yet spoken with authority; indeed, such opinion as was expressed was expressed with the utmost timidity; all felt they had to face a difficult problem. In the present number of the "Annali" Professor Michaelis devotes a long and very interesting article to the analysis of the statue, and if he has not spoken the last word on the subject he has, at least, said all that can be said in the present state of our information. The statue itself is reproduced in two heliographic plates, giving four views, two front and two back. It represents a youth standing with the weight of the body thrown on the right leg, the left hanging behind in the Polycleitean attitude. The right hand is raised, and held, no doubt, some attribute; the left hangs down. Over the right shoulder is thrown a nebris, tied by the two paws of the fawn, and falls, back and front, with studied symmetry. This nebris, of course, marks the figure as belonging to the Bacchic cycle. The ideal beauty of the head, the total absence of any beast-element, pointed ears, snub nose, shaggy hair, prevent the supposition that the youth is a satyr. There remains no doubt that he is the god Bacchus himself, represented in his later aspect as a beautiful, effeminate youth. A number of problems arise, which Professor Michaelis raises and solves one by one. What did the god hold in his right hand, now broken? Probably, judging from certain marks remaining on the marble,—a two-handled wine-cup or kantharos, a frequent attribute of Bacchus. From the direction of arm and eyes, it is further probable that he was in the act of pouring out the wine. This supposition is further borne out by the fact that a statue of Bacchus in this very attitude was executed by the ancient sculptor Calamis, and its general pose and motive are preserved for us on a coin of Tanagra. Next arises the question, Have we before us an original or a copy? If a copy, was the original of marble or bronze? The practised eye can detect by certain peculiarities of technique a copy from a bronze; and Prof. Michaelis thinks we have here such a copy. He calls attention to the stump of a tree introduced to support the figure, and greatly spoiling the beauty of line of the lower limbs. Some such support frequently is added to marble copies of bronze originals, the more tenacious bronze needing no such aid. Similar meretricious supports are given to the long pendent folds of the nebris. Had the original been of marble, it would have been quite easy to avoid any such necessity. Further, in the chiselling of the nebris there is a sharpness peculiar to bronze technique.

Last and most important comes the question to what date and school the work is to be assigned. At first sight, as Prof. Michaelis owns, the statue strikes one as an echo of the manner of Polycleitus. The position on one leg, the delicate balance of half the body at rest and half in motion, the right hand lifted and the left leg drooping, the so-called chiasmus scheme, the slightly-inclined head, all recall Polycleitus. But, rigidly examined, the proportions of the limbs do not correspond to the Polycleitean canon, as we know it in the Doryphoros,—the legs especially are too slender and graceful, the foot too short. Still less,—excepting for the softness and grace inseparable from the conception of the youthful Bacchus,—has it the true Praxitelean ease and flow and charm. Place the statue by the side of the Praxitelean Hermes, and we feel the difference at once. We cannot follow Prof. Michaelis through the details of his argument; it must suffice us to state his conclusion. He believes the statue to be a work of the eclectic school, the post-Alexandrian manner which selected and combined and advisedly imitated the style of bygone manners, which sought to revive the manner of the best Attic and Argive work. This eclectic tendency is discernible by a sense of unreality, of effort, of restraint; its archaisms are conscious instead of naïve. It is also marked by a want of harmony which creates uneasiness in the spectator, — an uneasiness felt by every trained eye in looking at this statue of Bacchus. This want of harmony Professor Michaelis discerns in three respects:—first, the mingling of the masculine and feminine elements necessary in an effeminate type, is inharmonious,—opposite characteristics are harshly juxtaposed rather than naturally blended; second, in the actual anatomy there is a good deal that is incom-

* The statue is seen in our No. III. view of the Sculpture Museum at Cambridge (*Builder*, May 24 of this year), a figure on the right in the background, next to the sculptured drum of the column from Ephesus.

patible, —*e.g.*, the strength and size of the thorax is incompatible with the slender legs; third, as regards the face, the severity and fixedness of the expression, and the artificial archaism of the hand, are out of harmony with general modernness of the figure and the *morbidezza* of the skin. The elaborate treatment of the hair deserves further notice,—it has no parallel in male statues, only one in female,—that is in the hair of Elektra of the well-known group of the so-called Orestes and Elektra of the Naples Museum. That group, on grounds which are beyond dispute, is attributed to the eclectic school of Pasiteles. Prof. Michaelis does not go so far as to attribute the new Bacchus to the school of Pasiteles; but the analogy of the hair is a definite point for a very interesting comparison. The cast of the Bacchus in the museum at Berlin stands near the group of Praxitelean statues. It would be instructive to see it placed in Pasitelean surroundings. Though the verdict of archæologists in general will in all probability agree with that of Prof. Michaelis, in stamping the Bacchus as eclectic, its extraordinary beauty will not be denied; indeed, the slight touch of delicate consciousness under severe restraint will to some eyes only enhance its charm.

## THE METROPOLITAN BOARD OF WORKS AND LONDON THEATRES.*

THE Board has now dealt with the whole of the London theatres, with the exception of the theatre at the Crystal Palace, as well as most of the principal music-halls. In some instances the theatre has been closed by the action of the Board, in others it has been rebuilt, in others alterations have been effected at a cost varying from a comparatively insignificant to a very large sum, and in no single instance has it been found that some alteration was not required. In the case of one theatre, the Strand, a sum of nearly 15,000*l.* was expended in remodelling the interior, and providing additional exits, including the purchase of adjoining property for the purpose of providing the necessary accommodation. A portion of this sum will probably be recouped by re-sale of the ground, but the money had to be expended in order to rebuild the theatre, and the recoupment is more a matter of calculation than of certainty.

The theatres which were considered by the Board to be unfitted for the reception of the public were the Prince of Wales's Theatre, the Royalty Theatre, Hengler's Cirque, Clapton Park Theatre, and the Criterion, and an intimation was sent by the Board to that effect to the Lord Chamberlain, who thereupon declined to renew the licences in respect of these places. With regard to the Criterion Theatre, very strong representations were made to the Board, and the owners, having expended a very large sum in carrying out certain alterations to the building, the Board advised the Lord Chamberlain that, in their opinion, the licence of this theatre might be renewed, and the licence was renewed accordingly. The cost of the alterations to this theatre, in order to meet the views of the Board, was about 10,000*l.*, exclusive of the installation of the electric light, which cost about 2,500*l.* in addition.

The Royalty Theatre, which was originally built for performances by Miss Kelly's pupils, on the site of a garden in the rear of her house in Dean-street, Soho, was rebuilt in 1882-3, from designs by Mr. Thomas Verity, and was reopened in the spring of 1883. The Prince of Wales's Theatre and Hengler's Cirque are closed, and the Clapton Park Theatre is only opened occasionally, being chiefly used for amateur performances.

One of the earliest theatres dealt with by the Board under the powers conferred by the 11th section of the Metropolis Management and Building Act Amendment Act, 1878, was the Lyceum Theatre. This theatre was built for Mr. Arnold, in 1834, from the designs of Mr. Chas. Beazeley, an eminent architect and prolific dramatic author. The theatre occupies an extensive site, with a considerable frontage upon Wellington-street, Strand, and extends back to Burleigh-street. The pit entrance is in the Strand, and the gallery entrance and the stage entrance are in Exeter-street, on the north side of the theatre. The premises have been enlarged from time to time since they were first built, and recently received considerable additions by the absorption of the rooms formerly occupied by the Beef Steak Club, which now form part of the premises of the theatre. The gallery staircase was narrow and inconvenient, and it was a standing joke that the architect forgot the staircase, and that it was added after the completion of the building. This is inconceivable, and there being a similar story told of several other buildings, it may be safely relegated to the realm of legendary lore, together with the story of the body of the boy who was murdered by the Jews, which floated up against the stream to Bacarach,* of which story there are numerous variants. The explanation of the narrowness of the old gallery staircase is that the owner of the theatre intended to purchase additional property in order to construct the staircase, but that being disappointed in his intention, he was reduced to construct it in the inconvenient form in which it remained from the completion of the theatre until the year 1882.

The Board served a notice upon the owner of the theatre requiring the gallery staircase to be reconstructed; the proscenium wall to be carried up to a height of at least 3 ft. above the roof, and be carried down through the cellar in order to effectually divide the stage from the audience portion of the theatre; that the carpenter's shop in the roof, which extends over the auditorium, should be separated from the auditorium by a fire-resisting floor; that additional means of exit should be provided from the pit and the dressing-rooms on the north side of the theatre premises.

The only means of egress from the pit of this theatre was by a passage-way, a portion of which runs under the first floor of a public house fronting upon the Strand. The pit will accommodate about 800 persons, and, in the event of a fire occurring in any of the houses abutting upon the passage-way out of the Strand, the only means of escape for the audience would have been by climbing over the barrier between the pit and stalls, and making their way into Wellington-street by the stalls corridor, or by passing over the stage. The importance of providing sufficient means of exit for the persons employed behind the scenes may be estimated from the fact that during Mr. Irving's management as many as 600 persons have been engaged upon the stage, or in connexion therewith. During the run of "Romeo and Juliet" it was stated that, excluding the acting company and the persons employed in the front of the house and the dressing-rooms, there were forty musicians, sixty carpenters, sixty men employed in the working of the gas and lime light, 250 extras and supers., and forty artists and artisans employed in the painting-rooms and property-shops.

The cost of the alterations suggested by the Board was estimated at about 1,200*l.*, exclusive of the cost of reinstating fittings and decoration.

The owner of the theatre appealed against the notice served by the Board, and the First Commissioner of her Majesty's Works and Buildings having appointed Sir Henry Hunt, C.B., to act as abitrator, the appeal was heard at the Surveyors' Institution, Westminster, in July, 1882; Mr. Meadows White, Q.C., and Mr. F. G. M. Freeman, representing the Metropolitan Board of Works; and Mr. Merewether appearing for the owner of the theatre. The arbitrator, after hearing the evidence adduced upon both sides, and making two inspections of the theatre, made an award confirming in effect the requisitions made by the Board, certain modifications being allowed in the manner of execution of the works, chiefly with a view to the convenience of the owners. The works ordered by the arbitrator's award were carried out within the time specified, without occasioning interruption to the performance.

The award of the arbitrator in this case settled the question of the proscenium wall, as to which there was some uncertainty, and this precaution was insisted upon by the Board in the case of other theatres dealt with under the Act. The owners of Drury Lane Theatre appealed against the Board's notice, mainly on account of the requirement with regard to the proscenium wall, but this requirement was confirmed on appeal.

It is a singular fact that in no single instance was an old theatre found to be provided with a proper proscenium wall to divide the audience from the stage. In some cases,—as, for example, at Covent Garden, Drury Lane, and the St. James's,—there was no wall, but merely a partition of wood, to which slabs of concrete had been added by the recommendation of the Lord Chamberlain; in others, the wall was carried up to the underside of the roof, but not through the roof, as at the Gaiety; in others, as in the case of the Lyceum, the Adelphi, &c., the wall had been carried up to the top of the proscenium opening, but had not been continued down under the stage so as to effectually separate the audience portion from the working part of the theatre. Covent Garden Theatre was rebuilt as late as 1858, under the superintendence of the late Mr. Edward Barry, at a cost of about 70,000*l.*, and it is surprising to find that the necessity for this separation was not recognised at that date. It is now agreed, by those most capable of forming an opinion on the subject, that by the erection of a proscenium wall carried up above the roof, and carried down to the foundations of the theatre, the risk to the public, in the case of an outbreak of fire in a theatre, is greatly diminished. This was insisted upon by Mr. Phipps, in his evidence before the Fire Brigade Committee in 1877, and the construction of a proper proscenium wall forms part of the regulations as regards construction imposed by the municipal authorities of all the capitals and large cities of the Continent.*

It may here be remarked that it is a mistake to suppose that Continental cities are in a better position than London as regards the regulation and supervision of theatres and places of public amusement. In Paris, the supervision of theatres was until recently governed by rules framed in the year 1828, slightly enlarged in 1864 and 1868, and it was not until May, 1881, that the present regulations were promulgated. The Berlin regulations with regard to theatres at present in force are dated June 29th, 1881. The Vienna regulations were made in the same year. The Hamburg Theatre Regulations are dated 1877; the Russian Regulations are dated as late as March, 1883, but it is not known if they have been made obligatory. In all countries, even the most despotic, the difficulty has been experienced of reconciling the alterations necessary for securing the safety of the public, with a proper regard for the vested interests of the proprietors of places of public

* See p. 248, *ante*.

* "And that's the town of Oberwesel, where the boy was murder'd by the Jews,
Whose body floated up the stream to Bacarach, tho' some refuse
To credit the tradition, as a different edition
Is extant in nearly all the towns you pass upon the Rhine." ALBERT SMITH.

* In a note to a paper read by Mr. E. M. Barry before the Royal Institute of British Architects, February 6th, 1860, on the "Construction and Rebuilding of the Royal Italian Opera-house, Covent-garden," the author, referring to the destruction of the old house in March, 1856, remarks that it had been stated that the entire removal of a cross division wall, and arch over the proscenium at some period, probably long subsequent to the original construction of the building, allowed the fire to spread through the roof of Sir Robert Smirke's Covent Garden Theatre; certainly he adds, "had such a fireproof division across and above the roof remained, a check might have been given to the flames, so that the firemen on duty at the house might possibly have subdued them at the first outbreak." If was sought to guard against the possibility of fire being communicated to the auditory from the roof by constructing the roof and its external covering of incombustible materials, but it never seems to have occurred to Mr. Barry to revert to Smirke's expedient and separate the roofs by a brick wall,—the only effectual mode of separation. It has been a ground of complaint that since the erection of the proscenium wall draughts are occasioned in the auditorium when the curtain is raised, in consequence of the cold air accumulating in the upper part of the stage, and not finding any outlet into the space over the ceiling of the auditorium, the cold air falls through the warm air in the body of the house, and causes inconvenience to the audience. The remedy for this defect would be to properly warm the stage to the same temperature as the auditory, and to provide proper outlets in the roof of the stage, protected by cowls.

amusement, and this problem appears to have been found very little less difficult of solution in St. Petersburg than in Paris and London. It will be observed that the St. Petersburg regulations with regard to site are not retrospective, and only apply to new theatres.

The latest regulations with regard to theatres are those drawn up by a Commission appointed by the St. Petersburg Municipal Council. This Commission, which consisted of two engineers, one architect, and the chief of the St. Petersburg Fire Brigade, was appointed in 1881, shortly after the catastrophe at the Ring Theatre at Vienna, and their report is dated March, 1883. All new theatres must be isolated, and must have windows and doors upon all the four sides; the walls, ceilings, and roofs must be of incombustible materials; the staircases and landings must be spacious, nowhere less than a stride across, and single steps are not permitted; all doors must open outwards; dwelling-rooms are not allowed in any part of a theatre; not more than four tiers are allowed above the pit level; central passages,—not less than 4 ft. 8 in. wide, and side passages 3 ft. wide,—are to be provided in every part of a theatre; the widths of the corridors and vestibules are strictly regulated; cloak-rooms are to be provided near the entrance vestibules; pass staircases are not allowed; the proscenium is to be fitted with a fire-resisting curtain, and an opening, with a superficial area of at least 50 ft., provided in the roof of the stage; every theatre must have a lightning-conductor. The lighting and heating arrangements are minutely regulated. The scenery and the light dresses of performers are to be rendered uninflammable. Every theatre must be placed under the control of a responsible person, who shall have the requisite number of assistants, who must be present during every performance, as well as one hour before and one hour after the same. Every new theatre upon its completion must be certified by the executive Commission specially appointed by the Municipal Council for the control of theatres.

The greater part of these regulations are applicable to existing theatres, either at once or at the expiration of terms varying from six months to twelve months from their confirmation, with the exception of the regulation with regard to the site and the construction of the walls, ceilings, and roofs of incombustible materials, which are not obligatory on existing theatres.

It is an important distinction that the cost of any structural works required by the Board under the Act of 1877, giving the Board control over certain places of public entertainment, falls upon the owner and not upon the lessee or occupier. The term "owner" is defined by the 250th section of the 18th and 19th Victoria, c. 120 (The Metropolis Local Management Act, 1855), to mean the person for the time being receiving the rack rent of the premises in connexion with which the word is used, whether on his own account or as agent or trustee, or who would so receive the same if such premises were let at a rack rent.

As regards Covent Garden Theatre, the Board's requirements included the building of a proscenium wall; the covering of the floors in the roof of the theatre with fire-resisting materials; the construction of an additional staircase on the south side of the theatre; the closing of the doorways between the theatre and the Floral Hall adjoining with iron doors; fixing handrails on both sides of all staircases, and making all doors to open outwards. The Board's notice in this case was not appealed against, and the works were carried out during the recess at a cost of about 4,500*l*. This sum is, perhaps, the largest sum that has been expended upon a theatre on structural alterations alone at the instance of the Metropolitan Board.

The alterations considered necessary by the Board in respect of Drury Lane Theatre comprised the building of a proscenium wall; the complete separation of the carpenter's shop over the stage from the space under the roof over the auditorium; the provision of handrails on both sides of certain of the staircases, and the strengthening of certain of the existing handrails; the alteration of certain doors, and the formation of an additional exit from the upper gallery. The notice was appealed against by the owners, the chief contention being with regard to the proscenium wall, and the arbitrator (Sir H. A. Hunt) confirmed the notice, with some unimportant modifications.

The proceedings with regard to these three theatres will give some idea of the course of action taken by the Board with regard to the other London theatres, the requirements of the Board being in other cases of a similar character, but varied, of course, by the circumstances of each case.

The total amount expended by the Board in the carrying-out of the Act of Parliament up to the present date is about 3,700*l*. This must be considered to be a moderate amount, looking to the number of buildings that have been surveyed and the extent of the alterations which have been effected under the Act. The estimated amount of the expenses of the Board for the current year is 1,000*l*. The official cost of the Act is thus about 100*l*. for each theatre, which will, probably, be viewed by the public as not being an excessive amount for securing their comfort and safety. Great apprehensions were expressed by several of the witnesses who were examined by the Fire Brigade Committee in 1877 as to the cost of a proper supervision of the Metropolitan Theatres, and it was generally agreed that it would be impossible to obtain an efficient control over all theatres without the creation of a new department, and that the cost of such an establishment would be very great. It has now been shown that the apprehensions expressed with regard to the cost to the country of the superintendence of theatres was unfounded, and that an existing municipal body has been able, by a slight increase in its staff and with a very small amount of inconvenience to the managers of theatres, to carry out some very important alterations, the value of which will be felt by the public in the event of the occurrence of a fire or panic. These alterations have been effected in an unobtrusive manner, the public having been, for the most part, unaware that any changes had been made, and attention not having been called to the subject no unnecessary alarm has been created.

It is to be hoped that the action of the Board will silence those alarmists who are continually declaiming against the dangerous condition of London theatres, and that Mr. Dixon-Hartland and those Members of Parliament who think with him, will be satisfied that all that is possible to be done under the existing law has been done. It may well be that some further legislation on the subject is necessary, and, in particular, that the dual jurisdiction of the Lord Chamberlain and the Metropolitan Board of Works should be abolished, and one central independent authority substituted; but, until public opinion pronounces distinctly in favour of this alteration, it is useless to expect any reform in this respect.

## LONDON WATER.*

THIS pamphlet, which is the latest contribution to the literature of the much-discussed subject of the London water supply, is an attempt "to compress within reasonable limits the chief facts,—historical, physical, and scientific,—bearing on the question at issue," with a view to facilitate the comprehension of the principal points involved therein by the parties most interested. Though there is but little new matter imported, yet the results of the various scientific investigations hitherto carried out have been succinctly collated, so that any intelligent consumer of London water may, if he is able to reconcile satisfactorily to himself the widely different conclusions which have been drawn from those investigations, arrive at some idea of the quality of the article for which he is called upon half-yearly, without option, to pay. In the Parliamentary history of the water companies with which the author introduces his subject, a summary is given of the items which made up the amount of thirty-three millions sterling with which it was proposed in 1880 to buy up their interests, but which failed, together with the subsequent attempt of the Metropolitan Board of Works to pass a Bill for enforcing the sale of water by meter. Doubtless the proposed purchase-money seemed at the time an exorbitant valuation of the water companies' property, and totally disproportioned to the capital cost of their works. If viewed only in the light of the existing and future profits derivable by the shareholders, it was, perhaps, a not inequitable valuation on the part of a Legislature whose loose ruling empowered the companies to increase the value of their property by arbitrarily raising their customers' rates without any obligation to afford a corresponding equivalent in the quantity or quality of the article they supplied. If that ruling is still to hold good for all time, then a fatal mistake was made when the original proposal was thrown over; but if it is in the power of the Legislature, and there is any intention to exercise that power, to relieve the population of London from a burden to which there is seemingly no limit, then no further time should be allowed to elapse before action takes the place of profitless discussion which promises to be interminable.

In the chapter on "The Theory of the Physiological Effects of Polluted Water," the author enters into the arguments of the two contending parties who respectively advocate and oppose the use of the Thames and Lea as sources of supply for the metropolis. These arguments have more than once been presented to the readers of the *Builder*, and only lately the lectures read at the Society of Arts Conference held at the Health Exhibition contained the most recent contributions to the subject, some of which, notably the important paper by Professor Sorby, are, however, not to be found in General Scott's pamphlet, which gives a fairly impartial summary of the results of experiments and investigations made by the most distinguished chemists of the day in the detection of chemical impurities, and how far they fail by chemical means at arriving at safe conclusions, although the author seems to have been unaware of, or to have overlooked, the help that can be secured in any modern laboratory fitted up for biological research. No chemist can detect the bacteria or bacilli, or other septic or disease germs with which the scientific world is so much occupying itself; whereas, with the aid of a test tube, containing sterilised gelatine solution, a proper needle to inoculate it with any germ that water may contain, the presence of such microscopic organisms is at once revealed, even without the aid of a microscope. It is evident, then, that the discoveries made by the biologists are destined to play a most important part in the solution of the vexed question of water purity, for while the chemist is only able to pronounce on the presence of purely chemical matter, the biological investigator detects the living organism, though at present it is doubtful how far its connexion with any specific disease has been accurately defined.

Too little importance seems to be ascribed to the process of oxygenation, or, more popularly, of aëration. It is a well-ascertained fact that a tumbler of water impregnated with disease germs will, after a certain moderate degree of exposure to air and light, become innocuous; and, therefore, before pronouncing definitely on the unfitness of the Thames as a source of supply, surely it is not beyond the resources of engineering science to devise some means by which a sufficiency of aëration may be given to river water so as to render it perfectly wholesome. The statement so often brought forward as to the impurity of the Thames above the intakes of the water companies, and repeated in General Scott's pamphlet, was stoutly denied by one of the Thames Conservators at the late Conference. We can ourselves, from recent personal expe-

* "A Review of the Present Condition and Suggested Improvements of the Metropolitan Water Supply." By A. De C. Scott, Major-General Royal Engineers. London: Chapman & Hall. 1884.

rience, testify to the absolute clearness of the water at Chertsey; and if, in a year of extreme drought like the present, when the volume of the Thames is less than it has been for many years, the water for potable purposes is so good, it can scarcely be questioned that in average years, when the volume is considerably greater, its quality cannot be inferior. Doubts are expressed, based on experiments made on the Irwell, Mersey, and Darwen, as to the degree of purification exercised in sewage-contaminated water, after running a course of eleven to thirteen miles; but, as pointed out by General Scott, various sources of error must always operate in such experiments. Water flowing with a sluggish current over a smooth river bed will not receive the amount of aëration which a mountain stream bubbling over a pebbly or rocky bed does; but place a weir across the same river, and let the same water be passed in a moderately thin film over its crest and be broken up afterwards on the rubble apron below, and the amount of aëration it will have received will at once be seen; so, mere distance of flow does not afford a sufficient criterion to determine the question at issue. If, therefore, the water companies would introduce some artificial expedient for aërating the water pumped from the river before discharging it either into their subsiding reservoirs or their mains, the quality of their water would be still further improved. The great practical test, however, remains, as we lately observed, in the fact that as long as the death-rate of a great city like London remains as low as it is at present, there cannot be much the matter with its water supply, especially when there are so many other causes operating for the spread of disease; and so long as this holds good, it seems inexpedient to search for our supply from more distant sources.

While, however, we cannot hold with the conclusion at which General Scott has arrived as to the necessity or even advisability of drawing a supply for the metropolis from the mountain districts or from the lakes, we have no hesitation in pronouncing on its engineering feasibility. Any works of the kind that may have to be undertaken are as nothing in comparison with the scale on which the grand water projects of India and America, not to mention those of neighbouring Continental States, have been carried out. There is one consideration, however, with reference to the Thames supply which is not noticed in the pamphlet, viz., that if,—as in all probability it will be,—a further volume has to be taken from it for the supply not only of the metropolis, but of the principal towns in the river basin, the Conservators should insist on the supply being first stored in the upper feeders, otherwise the lower reaches of the river will be most injuriously affected, especially in regard to navigation. The sites of such storage works would afford the best opportunity possible for effecting the requisite degree of aëration, and so supply, were it necessary, an additional argument for the construction of such works. Unquestionably, it would, if possible, be better to avoid altogether, the discharge of sewage, pumped or otherwise, into the Thames, especially in its lower reaches; and, therefore, if possible within any practical limit as to cost, the sewage of the Thames Valley would be best disposed of by conveyance direct to the sea, as that of the metropolis itself must inevitably be eventually carried thither.

Most persons will heartily endorse the remarks that General Scott makes as to the necessity for the constitution of a representative authority for the whole metropolis, including its suburbs, having plenary power to deal with the question of water supply, and as to the inadvisability of postponing the settlement of this question until the passing of the London Government Bill, which has already been shelved to the Greek kalends. We would, however, be disposed to go still further and to again insist on the necessity for the constitution of a central water authority, not for the metropolis only, but for the regulation of the waters of the entire United Kingdom.

## NOTES.

LORD RAYLEIGH'S address at the opening of the British Association at Montreal on the 27th was one of the specialist, not one of the comprehensive or all-round types of presidential address which have usually been most favoured, and which perhaps best answer the real end of a general inaugural address on such an occasion. But to survey even the outlines of all science so as to give a comprehensive sketch of the position attained and the progress made since the preceding year of meeting, is given to few indeed, and is likely to be the gift of fewer still as each department of scientific study increases in significance and complexity. Lord Rayleigh only did, therefore, what most future presidents will probably be obliged to do, in confining himself to the subjects (mathematics and physics) which he has made his special study; and he succeeded in bringing out the practical relation of recent discoveries to actual and every-day life in a manner calculated to interest even the more unscientific among his hearers, though some parts of the address can have been hardly "understanded of the people." We shall probably have more special remarks to make in regard to the bearing of some of the sectional papers and discussions on our own subjects, when letters can have crossed the Atlantic, and we shall be no longer dependent on telegraphic summaries, which will probably be all that our hard-worked "dailies" will be able to give us of the majority of the papers read in the various sections.

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FROM the German School at Athens comes the following *resumé* of the excavating work of the year. In the Piræus the foundations of a large building of Hellenistic date have been laid bare. Inscriptions found on the spot make it probable that the excavators have lighted on the local shrine of a Thiasos of Dionysiasts. Full details are to be given by M. Dragatsis in the next issue of the modern Greek publication, the *Archæological Ephemeris*. It seems a pity that important discoveries should be discussed in this but-little-known tongue. In the same periodical will appear a dissertation on the last excavations made at Olympia by H. Dimitriadis since the site was handed over to the Greeks. Some new fragments of the pediment groups have been discovered. The Athenian Archæological Society has been conducting excavations at Epidaurus under the supervision of M. Kabbadias. This rising Greek archæologist was trained in Germany; let us hope his report will appear in German, the common tongue of archæologists. The French School has recommenced its work at Elateia, where a shrine of Athene Kranaia is being laid bare. Dr. Schliemann's excavations at Tirynth have come to an end. The results will appear in a special volume.

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THE *Irish Builder* hopes that the construction of the new museum will be made an opportunity for utilising native stone and other materials. Portland stone has answered well in the Dublin atmosphere, it is true, but "in the ruins of Moyne Abbey there is native oolite which has stood the test of several centuries, and there is still a remarkable sharpness in the carving and cutting." And in the matter of granite and marbles there is, as we all know, a great variety of tone, surface, and colour obtainable. Our contemporary observes that the facing of Leinster House, to which the new building will be contiguous, is native granite, procured at Dalkey or at Wicklow, and obviously means to suggest the employment of this material in the new building. The question of the use of granite for an enduring building is thus being mooted in Dublin, as it has been mooted in London (for more directly practical reasons) in regard to the New War Offices. It must not be forgotten, however, that granite requires a special architectural treatment, in regard to which no systematic attempt seems to have been made, unless it be in some of the street architecture of Aberdeen; and a building designed for freestone would have to be entirely remodelled in style and detail for granite. But the idea expressed by our contemporary should not be lost sight of. The great wish of many patriotic Irishmen for the employment of native art and native materials has been sometimes shown in a manner at variance with true artistic and political economy,—*e.g.*, in the various attempts to create an artificial market for Irish lace; but the use of the building stone of the country for the buildings erected on its soil is, in general, both commercially and architecturally advantageous. There is a certain harmony between a building stone and the aspect of the country in which it has grown; and the employment of local materials conduces also to character in architecture.

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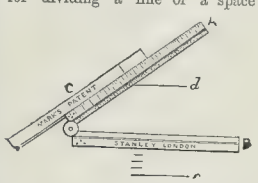
THE lack of water, or the fear that this element will become very scarce, has found in this hot summer a prominent place in the mind of dwellers of the country. It is, therefore, a fitting time to point out how shamefully the supply of water is wasted in the country. We by no means wish to assert that throughout many weeks of dry weather, even the most bountiful store of rain-water may not run short. But one thing is quite certain, that many dwelling-houses and farms have absolutely no store of rain-water except such as is to be found in some small cisterns and old-fashioned wooden barrels. Every dwelling-house and farm should, on the contrary, be supplied with a large slate cistern (we do not, however, insist on the special material) capable of holding many gallons of water, and it should be placed below the surface, and all roof water should flow into it. When such water stores exist they enable farmers and householders to have, at any rate, a long-continuing supply, and where there is a considerable expanse of roof even a single thunderstorm will produce much water. It is unnecessary to dilate on the saving of labour and the enormous advantages of these underground stores; but it is remarkable that innumerable houses and farms throughout England are without them. We unhesitatingly say that they should be found at every residence and homestead in the country.

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IN regard to the subject of ballooning, and the recent French experiment in steering a balloon, it may be noted that the analogies of nature are adverse to the attainment of artificial flight by means of a balloon. We do not mean by way of detail, but by way of principle. The theory of a balloon is that of levitation, that is to say, of counterpoising gravity by the displacing a given bulk of atmospheric air by a lighter gas. That the latter method involves the exposure of so large a surface to atmospheric currents as to require great force to overcome the resistance of a rapid breeze by fans, screws, or other mechanical means, is well known. But the point to which we refer is this. In the flight of every bird or insect the weight of the animal is directly utilised for maintaining it in the air. At the will of the bird the feathered surface that it exposes to the wind can be so inclined to the movement of the latter as to make the creature rise or fall at will, by the direct action of the wind, without any visible motion of the wings. From the deck of a vessel a gull may be watched hovering, for many minutes together, without one flap of its wings. The bird, at such times, is a living kite, its power of self-balance producing the effect of the string of the kite in maintaining a certain inclined position relative to the wind. And although some birds of the swiftest flight have an extraordinary area of wing surface in proportion to their weight, others, of equal or even superior power of flight, have very little wing surface in proportion to their weight. Thus the problem of flight has been solved by nature in many ways, but in all of them the gravity of the living creature, far from being destroyed or counterpoised, is an essential element of its mechanical action. The inference that we draw from this is that the opposite principle, that of levitation, is not likely to be followed with mechanical success, except on rare occasions.

THE Executive Committee of the Annual Liverpool Picture Exhibition have taken a step this year which is equally spirited and admirable. The opening of the exhibition, of which the private view takes place to-day (Saturday), inaugurates the new rooms gained by the extension of the "Walker Art Gallery," and the committee have started the idea of having representative exhibitions of the works of the leading art societies of the kingdom, each in a room allotted to it. The exhibitions which will thus be represented over again in Liverpool by a selection from the works of the year in the Grosvenor Gallery, the Royal Society of Painters in Water-Colours, the Royal Institute of Painters in Water-Colours, the Royal Hibernian Academy, the Institute of Painters in Oil Colours, the Dudley Gallery Art Society, and the Society of Painter-Etchers, and the Liverpool Academy of Fine Arts. All this is in addition to the general exhibition (which we presume will include a fair proportion of the Royal Academy works of the year); and there is a special room besides for architectural designs. Each room has been under the arrangement of two or three members of the Society concerned, and the architectural room is under the charge of three Liverpool architects, Messrs. E. Kirby, Charles Aldridge, and A. Culshaw. As far as we are aware, nothing so comprehensive has ever been attempted at an annual provincial exhibition; and the experiment deserves special note, not only on account of its immediate interest, but also as one out of other signs of the growing tendency to break through the barriers of centralisation, and to establish new centres in the provinces. This is a kind of movement which we expect to see progress. Birmingham has become a political centre; Manchester has been for some time a musical centre, giving concerts equal to any in London, chiefly owing to the talent and energy of one man; and now Liverpool seems bent on becoming an art centre, and has certainly made an important step in that direction by the comprehensive scheme for this year's Exhibition.

WE have had sent to us by Mr. Stanley, the well-known optician, the ingenious and theoretically correct instrument figured here, for dividing a line or a space into




equal parts without measuring off. Supposing the space between the lines *e* and *d* is to be divided into thirteen parts, the lower limb, B, of the folding rule is adjusted to the lower line, and the upper limb opened till the division marked 13 cuts the upper line: the sliding portion, C, is then moved along till the mark on it coincides with the "13" mark, and by means of small pin-points on the lower side C is fixed in its position. A is then slid along it so that each division on it coincides successively with the cross-mark on C, and at each such position the limb B presents its edge in the correct place to draw the dividing line. The instrument is the invention of a lady, Miss Marks, an ex-student of Girton College. In a non-professional paper in which it was mentioned we observed that it was thought necessary to make a sort of "point" of the fact that a lady was the inventor. We know better than to pay Girton so poor a compliment; but, at the same time, we may point out that in saying the instrument is "theoretically" correct we mean to imply a certain question as to its practical value. It is a scientific way of getting what is wanted, and dividing out with a pair of hair-dividers is a rule-of-thumb way; but, practically, Miss Marks's instrument requires a certain care in the using to ensure accuracy. It has a liability to practical error which increases with the decrease of the angle at which it is used; and we venture to think that a practised draughtsman would divide out scales and other similar measurements with a pair of dividers as correctly (more correctly in small distances) and twice as rapidly as he would do it with the "line-divider" to adjust.

"CASSELL'S Technical Educator" is, as all the world knows, and as is indeed stated on its title-page, the technical series of "Cassell's Popular Educator," and contains a great deal of useful information, sometimes scientific, sometimes more or less empirical. But what demon whispered to the director of the publication to go out of his proper "technical" line in Part VII., and to "have a taste" in decoration? The excuse seems to have been the presence in the same number of some articles on colour by that eminent authority, Professor Church. But it is one thing to theorise correctly about colour, another thing to give examples of coloured decoration, which is done in a fearful and wonderful chromo-lithograph frontispiece, illustrating three specimens of "cornice, ceiling, and wall colouring." The colours of dado and wall, as mere colours, are far too strong for surfaces unbroken by ornament,—they would be simply violent in themselves, and irrespective of design; and as to the design, and the details of colouring of the cornice and ceiling, they are too ludicrously dreadful to speak of. *Ne sutor ultra crepidam*; which, freely translated, means, "The Technical Educator had better not meddle with art."

MAJOR MARINDIN has reported to the Board of Trade on the Penistone accident, to the effect that it was due to the breaking of the web of the crank-axle, and that in his opinion the accident was one that could not have been foreseen or provided against. In the letter of this judgment we believe all competent persons will concur; but as since that accident we have had more than one breakage of a crank-axle while running, it certainly seems time that the question should be positively asked whether crank-axles and inside cylinders are desirable for fast-running engines, and whether the recorded facts of the breakage of crank-axles do not justify legislative regulation in this matter. Major Marindin also states that the lamentable consequences of the accident might have been mitigated by a quickly-acting and powerful continuous break; but this we think more open to question.

THE Rector of St. John's, Clerkenwell, calls attention to the desirability of saving the disused burial-ground attached to St. John's Church, Clerkenwell, as an oasis in that crowded part of London, where trees and shrubs may be planted and kept up for the pleasure of those living in a very poor neighbourhood, and a place of repose and refreshment to the eye and mind thus provided. He has offered the ground to the Holborn Board of Works, but they "do not want it"; he has sought help from the Metropolitan Boulevard Society (who, from their title, should be the right body to apply to), but has only received "good advice." 500*l.* would do what is wanted. Such a sum for such a truly philanthropic purpose ought to be forthcoming.

IT may interest some of our readers who believe in Art for the People, to hear that the fine sculptural group of "Isaac and Esau," by Mr. E. R. Mullins, which formed the last of our illustrations of the sculpture in this year's Academy, has since the close of the Academy been on loan at an East-end church (St. Jude's, Whitechapel), where it stands at the east end of one of the aisles, and has not only attracted considerable interest on the part of the congregation, but became also the "text" for a sermon.

A BRIDGE over the ornamental water in Regent's Park has been commenced, Mr. Killingback being the contractor for the masonry, and Messrs. Hill & Smith for the ironwork. In the paragraph communicated to the *Times* nothing is said about the designer of the bridge, so we presume this is to be evolved from the artistic minds at the Office of Works. It might have been thought that in what are specially ornamental grounds some effort might be made to obtain a design from an artist-architect such as would add to the attraction of the place. The new bridge may turn out to be an ornament, but we cannot feel very sanguine about it. The bridge is described as "to be constructed with ornamental latticed girders, with moulded Portland stone pilasters at each end"; and we know pretty well what sort of commonplace that means.

## BURY ST. EDMUND.

WHEN Mr. Evelyn went to stay with my Lord Chamberlain at Euston, in 1677, he was fetched from Bury in my lord's coach-and-six; and a day or two afterwards, hearing that a friend of his, Lord Crofts, lay dying at that town, he went over to visit him. When he had done his duty by his noble friend, he took a stroll "to see this ancient towne, and the remaines of that famous monasterie and abby." He records his impressions in a very few words:—"There is little standing intire save the gate-house; it has been a vast and magnificent Gotic structure, and of greate extent. The gates are wood, but quite plated over with iron. There are also two stately churches, one especially." What Mr. Evelyn saw two centuries ago, may still be seen to-day; but we, who live in an age of investigation, can probably tell more of the history of the ruins than could that gentleman, though he had lived two centuries nearer than we do to the time when they still had a history.

We quoted a fortnight ago Fuller's testimony to the magnificence of the abbey, how "the sun shined not on a fairer," and we then gave a very brief account of how the establishment gained its position as the premier abbey of England, from the extreme sanctity of the remains of St. Edmund and the wonderful miracles they brought. The royal saint quite overshadowed his predecessor, Beodric, who gave his name to the first collection of dwellings on the site,—Beodric's Worth,—and the mansion of the Saxon lord, as Jocelyn of Brakelond relates, became the dwelling of the Infirmarer of the abbey, a subordinate official, whose duty it was to look after the sick monks.

The first temple enshrining the sacred remains was of wood,—a large church, built more than 150 years before Harold died at Hastings, pierced with foreign arrows, as St. Edmund had been before him; but so soon as William the Norman was seated on the English throne he gave what help he could to the abbot, who was then building a vaster structure over the Saxon saint. Towards the end of the eleventh century the great church was finished, and fragments of it remain to this day,—not much, indeed, by which any date can be assigned to the work, but the curious in such matters may still see a moulded base to one of the great columns by the tower, whose flat and clumsy profile proclaims it to be of very early work.

This church was, indeed, an enormous affair. It was 472 ft. long inside, exclusive of the chapels at the east end,—longer than St. Alban's by 22 ft.; longer than Durham Cathedral by 58 ft.; only 2 ft. shorter than Salisbury, and 17 ft. shorter than Westminster Abbey. The neighbouring cathedral of Norwich could have been placed bodily inside it, with several feet to spare all round. Peterborough was only 8 ft. longer; Ely was 45 ft. The interior was of massive, heavy, Early Norman,—a barbarous style, strong, stern, and unrelenting, like those who used it. The sorrow experienced in beholding the ruins of so large a church is much mitigated on reflecting how grim the lines were of which they are the reminiscence. At the crossing of the nave and transepts was a large central tower. At the west end were five others. Truly, a magnificent group for the eyes of Abbot Sampson to rest on. The west front must have been one of the finest in Europe. It was a more magnificent Lincoln, a worthy companion of a complete Ely. When Abbot Sampson had finished the two flanking octagonal towers, he must, indeed, have felt proud to be the lord of such a fabric. He was a fortunate man, this Abbot Sampson, to whom it was permitted to build towers, and stables, and brewhouses to his heart's content, in the

crisp, clean, vigorous Early English, as simple, supple, and healthy as the bare limbs of little children. But all trace of his work is gone, except the concrete masses of the west wall, which might be of any date, and against which a modern house has leaned itself in a picturesque but unsanctified manner.

The site of most of the church can be identified with the aid of a plan, but without it the task would be one of hopeless conjecture. As it is, however, a little patience will enable you to traverse the length of the nave to the great central tower, and even to stand on the spot where the most sacred bones of the martyr rested for many centuries. By way of the north transept you may reach the chapter-house, whence the Lord Abbots issued their fiats; and the great cloister, which lent its name to the high-caste cloister monks, in contradistinction to the common herd of *obedientarii*, or officials. Further on the kitchen chimney-corner may be traced, and the porch and angle staircase of the cellarer's house. Fragments of the abbot's own house are also to be identified, and perhaps the piers of the infirmary cloister. But it all looks like masses of concrete. The line of a wall now forms but a bank, the floors are deeply covered over with turf. Well might one exclaim with the German students in one of their Gesellige Lieder,

"O jerum, jerum, jerum!
O quæ mutatio rerum!"

From the fields once devoted to silence and meditation now sometimes soars the rocket; instead of the shrine of St. Edmund, one may behold the fiery wheel of St. Catherine; the ancient tapers of the altar would pale their ineffectual fires before the modern Roman candle; and over the spot where cowled monks were wont to pace, fleet-footed, heavy-handed lads and lasses play a game called "kiss-in-the-ring." But, indeed, all those who care for antiquities may be glad that this is so. For had not the precincts of the ruined abbey been turned into public gardens, the ruins would hardly have been so well preserved.

All is not in ruin, however. The great gateway that was built at the same time as the circumscribing wall, early in the twelfth century, still remains; as also does another gateway built to defend the abbey against the burgesses. To realise the relations existing between the abbot and the townspeople, it is necessary to consider how great a man the abbot was. He was a peer of the realm. He owned no jurisdiction less than that of Rome itself. Were all the kingdom under an interdict, he had power, with closed doors indeed, "without ringing bells, and with a low voice, to celebrate divine offices." When King John was excommunicated, and the whole kingdom lay as dead beneath the blasting interdict, one small spark of life remained at Bury, where the abbot, with a low voice, still celebrated divine offices. Within a mile of the abbey every way the abbot was supreme,—he owned everything. Outside his stone walls were little besides wood or mud huts. A few stone houses there were, but not many. The townspeople were harassed by every species of toll and tithe and fine that the mind can conceive. The very refuse that lay in heaps before every door of that insanitary age was claimed by the abbot or his cellarer. At length, in the year 1327, for some reasons not recorded, but, like Antolycus's pretended stripes, they were no doubt "mighty ones and millions," the townspeople rose *en masse*, both men and women; from every village came large contingents; and at length about 20,000 persons hurled themselves against the abbey walls, led on, among others, by one Alicia Lickdish. They broke down the gates; burned Abbot Sampson's Early English stables and brew-house; beat and wounded the monks; seized the abbot, who was away at one of his manors; robbed him; nay, positively shaved him, and carried him over seas till he was ransomed by his friends. One result of this outbreak was greater freedom for the townspeople. Another was the beautiful gateway of the abbey, built with all manner of niches for peaceful saints, and loop-holes for warlike arrows. Built first and foremost for defence, and secondarily in honour of the saints, but withal so beautiful that no one has had the heart to destroy it.

Besides the two gate-houses there remains a stretch of wall along the north side, built about 1230. It leads to one of the most interesting features in Bury,—the Abbot's Bridge,—of about the same date. This bridge is a double or even triple erection. An inner series of arches carries a footway, an outer series carries the wall itself, while without this are flying buttresses, between which and the wall there is room to walk. It is said, not without reason, that planks were stretched from pier to pier, thus affording a footway outside the walls; but the structure, as now existing, throws no decided light on the matter. What with the double set of arches and the flying buttresses, however, the Abbot's Bridge is singularly picturesque.

The best preserved of all the remains of the former glory of Bury, however, are the two churches of St. Mary and St. James, the last built and longest lived. There was a third church, but all traces of it have disappeared, and had so long ago as Thomas Fuller's time. Both St. Mary's and St. James's are long churches, but, if one is to speak the thought of one's heart and defy the public opinion of Bury, they are not of the first order. The nave of St. Mary's is poor in detail, and even its length is against it; for, had it been shorter, there would have been less poverty. Its roof, however, is extremely good,—quiet and dignified. The nave of St. James's is not quite so long as St. Mary's, and has one arch less; its detail is decidedly better, and the whole effect, though it be heresy to say so, is more pleasing than that of its sister church.

St. Mary's, however, is the more interesting of the two, historically. It has some large tombs to Sir William Carew and Sir Robert Drury; but after the monument to Elizabeth Drury in Hawstead Church, or the Cordell monument at Melford, or the Kytson tombs at Hengrave, these tombs are Rabelaisian in their coarseness. An interesting tablet marks the last resting-place of Mary Tudor, daughter of Henry VII., widow of Louis XII. of France, and wife of Charles Brandon, Duke of Suffolk. Her history is a pleasant romance. Loved from infancy by the gallant and accomplished duke, she was married unwillingly, and for state reasons, to the aged King of France. Death came, but, like him in Schubert's song of "Death and the Maiden," he came "*nicht zu strafen*"; for luckily he spared the girl and took her aged husband, and forthwith she returned to her native land and married her first love. Her arms still adorn the entrance-gateway of West Stow Manor House, where they were placed by a devoted adherent, Sir John Crofts. This royal lady was originally buried in the abbey church, but on the destruction of that building, her body was removed to St. Mary's, being one of the few things that survived amid the universal desolation.

It is interesting to observe that neither of these churches had a fine tower. St. Mary's has a small one, but St. James's has none at all. This is hardly a matter of surprise, seeing that immediately behind it rose the five great towers of the west end of the abbey church. Indeed, it is somewhat curious that St. James's should have been built so close in front of the grand façade, which it must have half concealed.

Of the town of Bury itself not much need be said. Its architectural interest hardly extends beyond the precincts of the abbey. There are a few remains of Mediæval work; among them a house said to have been a Jew's house before the time of Abbot Sampson, who had all the Jews expelled. There could never have been much beside wood houses, and few of these survived the great fire of 1608. Fuller says the town "is sweetly seated and finely built," and, *mutatis mutandis*, the same may be said now. But the great glory of Bury must always be the memory of its abbey. Through five centuries it had but few rivals in dignity. The very name of its patron saint struck terror into guilty consciences and stayed the hand of the spoiler. Its abbot held the fate of thousands in his hand. Now, of all the names on its proud roll scarcely one is remembered. Abbot Sampson, indeed, lives in the pages of one of his obscure monks; but the others,—who knows or cares anything about them?

"But yesterday the word of Cæsar might
Have stood against the world; now lies he there
And none so poor to do him reverence."

But, though a man's name dies, his work, if worthy, will live; and if one might but leave behind one anything so excellent as the Gate-house or the Abbot's Bridge, one might well suffer one's personality to evaporate with equanimity.

## THE ANCIENT AQUEDUCT AT SAMOS.

At the close of his charming account of the tyrant Polycrates, Herodotus tells us (book iii., cap. 39–60) that he had lingered over the story of the Samians because in their island were three of the most wonderful works he had ever seen. First and foremost of the three was a tunnel bored through a mountain 150 fathoms high. The length of the tunnel, he goes on to say, was seven stadia, the height and the breadth 8 ft. each way. Through the whole length of this tunnel there went a second tunnel 20 cubits deep and 3 ft. wide, through which the water is carried along in tiled pipes and conveyed to the city from a great spring. The architect of this tunnel was a Megarean, Eupalinos by name, son of Nanstrophos.

It has been the fashion of late to regard the father of history as the wildest of romancers, but the fact of the execution of this tunnel, surprising though it seems as a work of the sixth century B.C., has been placed beyond doubt by recent excavations. Travellers since the beginning of the present century have known of its existence; a short notice of some of the obvious points in its construction appeared in the *Academy*, Nov., 1882, p. 335, and finally, during the spring of the present year, it has been thoroughly investigated by a member of the German School at Athens, Dr. Ernst Fabricius. He finds, as we might expect, that except for a few trifling errors in measurement, the actual remains tally closely with the account of Herodotus. His account is as follows:—

The aqueduct falls naturally into four divisions. (1) The spring itself, with the building over and about it. (2) The portion of the aqueduct leading from the spring to the intervening hill. (3) The tunnel proper through the hill. (4) The aqueduct from the hill to the town.

Fortunately, about the spring itself there had never been any difficulty. There is only one spring of any considerable size that did correspond to the "Great Spring" (*ἀπὸ μεγάλης πηγῆς*) of Herodotus. This spring is marked by three chapels to St. John, known among the natives of the island as the "Hagiades." There is no doubt, therefore, whence the aqueduct started. It is between this spring and the port of Samos, the modern Tigani, that the mountain ridge intervenes. Never was a town worse situated with respect to its water supply. Either the mountain must be tunnelled or the water led round the base by a long awkward circuit. Portions of the well-house structure still remain, and are, in fact, still used by the natives. It consisted of a building in the shape of a right-angled triangle, with a slightly rounded hypotenuse, the roof supported by fifteen pillars. Second comes the portion of the aqueduct between the well and the tunnel proper. Here the conduit was about the height of a man, partly hewn out of the solid rock, partly built up out of masonry. It is about 853 mètres in length. Lying about in this part have been found large quantities of cylindrical tiles, no doubt either the brick pipes (*σωλήνων*) mentioned by Herodotus, or at least their modern successors.

Third, we come to the tunnel proper. The merit of having discovered the actual mouth of the tunnel belongs to the present abbot of the neighbouring monastery of the Hagia Trias. For five months he and a fellow abbot of the Monastery of Stauros superintended the labour of fifty workmen, and laid bare the entrance and a part of the tunnel itself. It would be much to the advantage of the inhabitants of the modern Tigani if the work could be completed and they could be supplied with good drinking-water after the same fashion as their ancestors of the time of Polycrates. Unfortunately the investigation of the actual tunnel is still in part, owing to the insufficiency of the props, a matter of considerable danger. On the south side it is accessible for 500 mètres, on the north for 100 mètres. Except at the entrance and the exit, where it is supported by masonry, the tunnel is bored through the solid rock. Abundant marks of hammer and chisel still remain, the work never having been finely finished. Along the walls niches are frequently found, and in some the very lamps remain which served to light the workmen. A little to the south of midway an interesting fact comes out. About 425 mètres from the mouth, in a southerly direction, the tunnel ends in blank rock. It is clear that the boring was begun

from the two sides of the mountain. A slight error was made, and hence one of the bores comes to this blank end. The error was rectified by digging down till the lower bore was struck, and, just as we should expect, we find that at the meeting-point the tunnel is, instead of being just large enough for a man to stand upright, as high as 4 to 5 mètres. At either end of the tunnel proper the walls are, as we said before, supported by masonry. On the north side much more masonry is needed for support than on the south. There is evidence that at first the supports were of wood, ultimately replaced by solid stone.

It is this third portion of the conduit, *i.e.*, the tunnel proper, that alone aroused the admiration of Herodotus. We remember he says that within the tunnel there is a second tunnel or dyke 20 cubits deep. Such is in reality the case. The water does not flow through the tunnel, but in a deep ditch dug beneath it. It is at the bottom of this ditch that the brick pipes are laid. Unhappily, Herodotus gives us no clue to the reason of this curious and complicated arrangement. Dr. E. Fabricius conjectures that this second arrangement was made after the first tunnelling, and in order to correct some error in the necessary level of the water supply. The tunnel seems to have been in use in Roman times, small chambers hewn in the rock seem to be Roman work. They supplemented the aqueduct, however, by a second supply of water brought round the mountain. We have also traces of early Christian influence. About 20 in. from the central meeting-point of the two bores we come upon a small rock-hewn chamber, in which are a number of white marble pillars and some marble slabs, all much incrusted with stalactites. On one of these, when cleaned, were found unmistakable traces of a Byzantine style of ornament. No doubt the little chamber was used as a shrine. Last, we come to the fourth section of the aqueduct, the portion that leads from the tunnel-exit to the town. The end of the main conduit has never been found, probably it came out near the shore, where good drinking-water would be specially needed. Close to the harbour lay the ancient Agora, and according to an inscription found built into the walls of the modern Tigani, there was in this Agora a stoa which contained two elaborate klepsydræ, or water-clocks, which told the water-drawers month, day, and hour. As there is no spring in the neighbourhood of Tigani which runs the whole year round, we may reasonably suppose that these marvellous klepsydræ were worked by the water that came through the tunnel of Eupalinos. Possibly the tyrant Polycrates had a taste for the marvellous in water-clocks as well as rings.

## THE WARMING AND VENTILATION OF FRENCH SCHOOLS.

The determination to render education compulsory throughout France, which was unanimously approved after the establishment of the Republic, has helped to develope considerably those sciences that contribute to preserve the health of those who live in large institutions. The educational movement was in reality a political, we might almost say a military, movement. It was based on the hope that the day might arrive when France would regain her military ascendancy; but it was felt that a successful war could only be waged by an educated people. Yet, on the other hand, physical education was recognised to be as necessary as mental training, and, therefore, unprecedented attention was given to the hygiene as well as to the curriculum of schools. Good light, a plentiful supply of air, constant exercise, abundant food, sufficient warmth, and even improved drainage, were all recognised as forming the fundamental conditions of a national regeneration. And now that some years have elapsed since this movement originated, work has been done, and new schools have been built, that redound greatly to the credit of the French nation, and must infallibly contribute to the improvement of the rising generation. We have just visited some of these modern institutions, and they merit the attention of English architects. Apart from the general adoption of the unilateral light in most schools, the system of warming is based on a rational conception which has given the best results.

At the instigation of Professor Emile Trélat, the distinguished architect, and with the assistance of Messrs. Genest and Herscher, the well-known engineers, the Society of Public Medicine and Professional Hygiene drew up a report and propounded the general principles that should govern the warming and ventilating of schools, &c. These principles, which we are about to describe, have left the domain of theory, for they are applied on a large scale throughout France. Of course the first stipulation is that schoolrooms should have windows on both sides, so that a through-draught may be created as soon as the class is over. But, apart from this, the great object is to create as many inlets of pure air as possible with corresponding outlets. This end is attained by admitting large volumes of air slightly warmed, instead of a small quantity at a high temperature. Further a condition is imposed to the effect that each class-room should be independent of its neighbour, and capable of being warmed or not as circumstances may arise. How this programme has been carried out we were able to see for ourselves by visiting two typical schools in Paris; the first, in the Avenue Rapp, frequented for the most part by the children of the workpeople employed at the Government tobacco factory, and the second a middle class school in the Rue d'Amsterdam, known as the Lycée Condorcet. In both cases, the disposition of the rooms was very similar and the unilateral light secured. To the left of the pupils the wall had large bay-windows overlooking a wide court or the street. On the right-hand side was the entrance-door and smaller windows carefully closed with wooden shutters, so that no conflicting rays of light should enter during class time. In all cases, the door gave upon a verandah or open passage, protecting the wall from the sun, but at the same time offering none of the inconveniences of a corridor. The warming and ventilating had been installed by Messrs. Genest and Herscher, in keeping with the principles accepted by the Society of Public Medicine. In the Avenue Rapp each class-room had a stove placed in the corner nearest to the outer wall and the master's desk. The chimney, instead of being taken up to the ceiling, ran horizontally along the outer wall, immediately below the window-sill. Being enveloped by a metallic casing, it is impossible to touch the chimney. A sort of elongated heat-box is thus created, fed with fresh air brought in directly from the outside by intakes made through the wall. The casing is, of course, perforated throughout, and the air, warmed by passing over the outside of the stove-flue, enters the room. It does not suffice to warm a room, but it tends to the even diffusion of the warmth. In old schools it often happened that while one pupil near to the fire was scorched another at the other end of the class was almost frozen. To prevent this, the pure air admitted should be at as low a temperature as possible. If it is warmed too much it will rise up to the ceiling before the pupils have had time to breathe it. Even if the air be chemically pure, we know that it has an unpleasant, often an unhealthy, effect, when warmed too much; therefore to avoid the necessity of over-heating the air, the idea of protecting the walls against the refrigerating action of the external temperature was suggested. If the wall is warm, colder air may be introduced within the room. Again, a cold wall will determine a down-current of the vitiated air that has collected in the upper portion of the apartment. When, however, the flue from the stove runs horizontally along the outer wall, it counteracts this influence, it neutralises the chilling effect of the large windows. Further, the heat of the smoke and the products of combustion being utilised, a great economy in fuel is attained. The chimney or flues, after travelling horizontally along the outer wall of the room, is conducted upwards to the roof; but it passes in the centre of an air-shaft, and the remaining heat of the flue is further utilised to extract the foul air from the school. For this purpose the shaft has an opening near the ceiling of the room, and gas-burners placed within are sometimes employed to increase the suction. This system is very economical, is easily carried out, and well suited to small rural establishments. At the Avenue Rapp it is applied on a large scale, but the elementary character of the school increased the necessity of economy.

Counting fifty pupils for each class-room, the installation of the heating and ventilation amounts in cost to 18 or 20 francs per pupil. It must be borne in mind that the material employed is very dear and heavily taxed in Paris, and that the workmen's wages are higher than in any other part of France. The outlay would not be so great in rural districts. As for working expenses, these need not be taken into consideration, for there are no attendants, the master himself adding coal to the fire whenever necessary. A coal yielding very little smoke is used. It is extracted from the Charleroi or Pas-de-Calais Mines, and is commonly called *gailleterie*, and might be compared to our Cardiff coal. In Paris it is sold at 1*l.* 12*s.* to 1*l.* 16*s.* the ton. Nevertheless, in spite of the high price for fuel, the cost for warming and ventilating the primary schools installed in Paris in the manner we have described, only amounts to two centimes per head per day. This is equal, in other words, to a penny per day for five pupils. These figures will compare most favourably with what has been done in England; and, though we have not had an opportunity of testing whether the warmth given in winter is sufficient, we found a plentiful supply of fresh air in the many class-rooms we entered during the great heat of July.

More perfect, but more expensive and elaborate, the warming and ventilating of the Lycée Condorcet is a good illustration of the modern system and of the newest improvements. The class-rooms, so far as light and ventilation are concerned, are disposed in the same manner; but they are warmed by steam under slight pressure. The steam is generated within a multitubular boiler of the Naeyer de Willebroeck type, so as to avoid all risk of explosion. From the basement, where the boiler stands, the steam goes straight up to the attic, where it passes through a reducing valve. This apparatus is round in shape, and divided by a copper disc or plate, which becomes either convex or concave as the pressure or expansion pushes one way or the other. By the movement of this plate the steam supply is so regulated as to be always at a very low pressure. This has the advantage of insuring an even distribution; otherwise the steam, if at high pressure, would rush into the first opening instead of travelling slowly but surely over the whole building.

In the place of the chimney from the stove we have two steam coils passing along the wall of the class-room. The upper and larger coil gives off a considerable quantity of heat. It is placed as near as possible to the bottom of the window to counteract the chilling influence of the large surface of glass. The fresh air from the outside is admitted at a height of only a few inches from the floor, and here it is only slightly warmed by passing over the second and much smaller steam coil. The air is really not warmed, the chill only is taken off. The side walls are also warmed by a steam coil; thus no down-draught can occur, and the pupils are enveloped all round with heat that radiates upon them, and that is distributed in proportion with the causes of cold. Thus the same temperature is noted in every part of the room. The fresh air entering almost on a level with the floor is warmed and vitiated as it rises and comes in contact with the pupils. But then it continues to travel upwards till it reaches the ceiling, where it is drawn off by shafts communicating with lanterns in the roof containing gas-burners or other contrivances to accelerate the up-current.

Further it should be noted that the whole of this system is regulated from the outside without in any way disturbing the pupils during their studies. An attendant goes the round periodically of each class. A small opening in the wall, protected by glass, enables him to see a thermometer placed within the class-room; and, according to the degree of heat recorded, he turns the steam on or off. The fact that the supply of heat for each room is in this manner absolutely independent is a most important consideration. One class-room, crowded with pupils, may require ventilating rather than warming. At the same time the next room may be differently situated, and, exposed to colder winds and with fewer pupils, would want very much more artificial heat. These exigencies are met by the use of a steam trap, invented for this express purpose and applied to each warming apparatus. This trap allows the escape of water and air into the main return pipes, but retains the steam. There is, consequently, no counter pressure from the return main pipe, and, therefore, the supply given to any one room can be entirely stopped or resumed at will. Such modification in no wise affects the neighbouring rooms. Now that these

facilities have been created, the greatest severity is displayed in the matter of maintaining even temperature. For the winter months this is fixed at 15 degrees to 16 degrees centigrade (58 to 60 F.), and, if a variation occurs exceeding one degree centigrade either way a reprimand, and even punishment, is inflicted.

The Lycée Condorcet is a superior school, built in a very crowded district, with places for 600 pupils. The impossibility of obtaining sufficient land rendered it necessary to build to the height of four stories. The installation of the apparatus, &c., for warming and ventilating amounted to 4,080*l.*, or a little over six guineas per head. The working expenses for coal, the stoker, the attendant, &c., amount to 340*l.* per annum, but, of course, the results attained are far more reliable than in the primary schools, where a mere stove alone is employed.

## THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.

The annual congress of this association was held last week, when Sir Watkin Williams Wynn took the chair, as president, and opened the proceedings of the thirty-ninth annual meeting.

On Tuesday an excursion was made up the left bank of Bala Lake to Castell Corndochan. The Rev. W. Hughes, the local secretary, read a paper, in which he referred to the leading objects of the day's excursion,—Caergai, Castell Corndochan, and Llanuwchllyn Church. "Llanuwchllyn" was derived from its position above Bala Lake. Llan-uwch-y-Llyn, the church above the lake. In early times, he said, the word "Llan" was not only applied to churches, but it also signified the spot surrounding the church. The existence to these days of so many Llans bearing the names of Welsh saints, such as Llandudno, Llandewi, Llandaff, and Llandrinio, showed the independence of the early British Church of the Church of Rome, and that she had a noble army of saints and martyrs to boast of long before Augustine came over from Rome, A.D. 596, to preach the Gospel to the pagan Saxon. The parish of Llanuwchllyn was one of much archæological interest, not the least point in which was that the historical river Dee rose in it under the hill called Duallt, and not at Pantgwyn, as was sometimes supposed. Some writers asserted that the Dee did not acquire the name at any higher point than where it emerged from Bala Lake; but the tributaries to the lake are so well defined that one of them must be the Dee. The tributaries are the Twrch, Afron, Llan, or Little Dee, the Llyn, and the Llafar. The Welsh name of the Dee was Dyfrdwy, which was variously derived, Dwfr-dwy-afon, from the fact of its springing from two sources. Giraldus called it Deverdorn. Might not, he asked, the word "Dee" be an Anglicised form of "Da," and "Deva" a Latinised form of the Anglicised word "Dee"? No river in the kingdom presented a more fertile source for archæological research than the Dee.

Caergai, the next place of interest in the day's excursion, was described by Mr. Hughes. Camden said it was at one time a castle, built one Caius, a Roman, while the Britons assigned it to Gui, foster-father of Arthur, which seemed to be the view adopted by Spenser. In that case, Caergai would be a British and not a Roman fort. Pennant, however, favoured the theory that it was a Roman fort, and mentioned the discovery of many coins there. Roman tiles had been found in abundance about the houses and fields, and round bricks may be seen now, probably the remains of hypocaust pillars. Traces also remained of an old Roman pond diverging towards Mons Hriri through Prysam, Castell-y-Wann, Mvel Strodyd, Cwm Pryser, and Lwm Helen. Castell carn Dochan, the next place of interest, was described as situate on an imposing situation, on a precipitous projection of Ifud-helyg-y-Moch. The ruins form an inner parallelogram, 24 ft. by 20 ft., with walls 6 ft. thick, defended by a wall of loose stones and other walls. The bare walls simply remain, and there are no architectural details. The portion now exposed probably formed the dungeon and cellars of an old fort, perhaps a fortress in times of trouble. Diggings were made in 1828 and 1872, but only charcoal, burned soil, bones, and pieces of lead were found. At the foot of the Castell carn Dochan is a place called "Ller Llys," or place of the Court, or Manor-house. Llanuwchllyn Church, the last but not the least interesting object in the day's excursion, was dedicated to St. Duniol, and, with the cathedral of Bangor and the parish church of Hawarden, were the only churches in North Wales that bear the name of the first Bishop of Bangor.

At Llanuwchllyn Church the objects of interest were a curious brass almsplate, an old oak-covered baptistery, shaped like a hip-bath, and a full-length effigy of a knight in armour with a hound at his feet, and the inscription, "Hic lacet Iohannes ap Gruffyt ap Madoc ap Iorworth cuius an. me. P. itur Deus Amen. Anno Dni. mccclxx." The records of this church appeared to be in a very sad state of neglect from damp and mutilation, those previous to 1675, so it is said, having been presented by a rector of the parish about the beginning of this century to some shoemaking friends of his who found the vellum useful for trade purposes! A move was made from this place for Llangower, a small church between the road and the lake, where a dilapidated old timber structure was pointed out as a fairly representative horse-bier upon which the coffin used to be borne palanquin fashion, the bearers being horses placed between shafts 5 ft. 8 in. long by 2 ft. 3 in. across. The coffin rested on eight elm "thwarts," some of which in the present instance appeared to have been recently replaced. Plâs Rhiwaedog, an old mansion believed to have been once occupied by Llywarch Hên, the poet-prince of those parts, early in the seventh century, was next visited. Colonel Evans-Lloyd read a brief but highly interesting paper on the place and its history.

On Thursday, the 21st, the members visited the Vale of Llangollen, and were occupied in investigating the ancient remains of the neighbourhood. The chief point of interest was a "tommen," or Roman mound of observation, situate a short distance from Maentwrog, called Tommen-y-Mur (*Hereri Mons*). This Tommen-y-Mur is a conspicuous tumulus within a large parallelogram formed of a strong vallum and ditch. On both sides of the tumulus another strong vallum has been thrown up, dividing it into two equal parts. The approach to this is well guarded by lines of defence, and in one portion a section of Roman paved way, four yards in width, was hit upon. At a distance of a few hundred yards to the north-east, and near the point where two Roman roads cross each other, is a very fine amphitheatre nearly circular, the distance north and south being 114 ft., and east and west 104 ft. These have before been noticed and have been described in the journal *Archæologia Cambrensis*. A visit was also paid to the ruins of Cymmer Abbey, which lie hidden amid trees, and which form part of the buildings of a farm-house. From the confirmation charter of Llewellyn ap Iorworth, Prince of North Wales, dated 1209 (according to Dugdale's "Monasticon"), to the Abbot and monks of Kemmer, of the Cistercian order and Benedictine rule, serving God and the blessed Virgin, it appears that the abbey was founded by Meredyd and Gruffyd, the sons of Cynan (referred to above), and that associated with them, probably as a late benefactor, was Howell, the son of Gruffyd. The form of the building is unusual for a Cistercian building. The plan is not cruciform, but consists of one continuous long nave and western tower. At the west end is an arcade opening into a chapel, the walls of which are continued to the east end of the church and form a lean-to, but shut out from the church. It may probably have been a sacristy. There are no remains of cloisters, and the chapter-house and other buildings have disappeared, but a little to the west of the church stands the ancient guest-hall or Abbot's hall (now used as a domicile), and has an open oak roof. Other buildings are also to be seen at the west end, but east of the guest-hall.

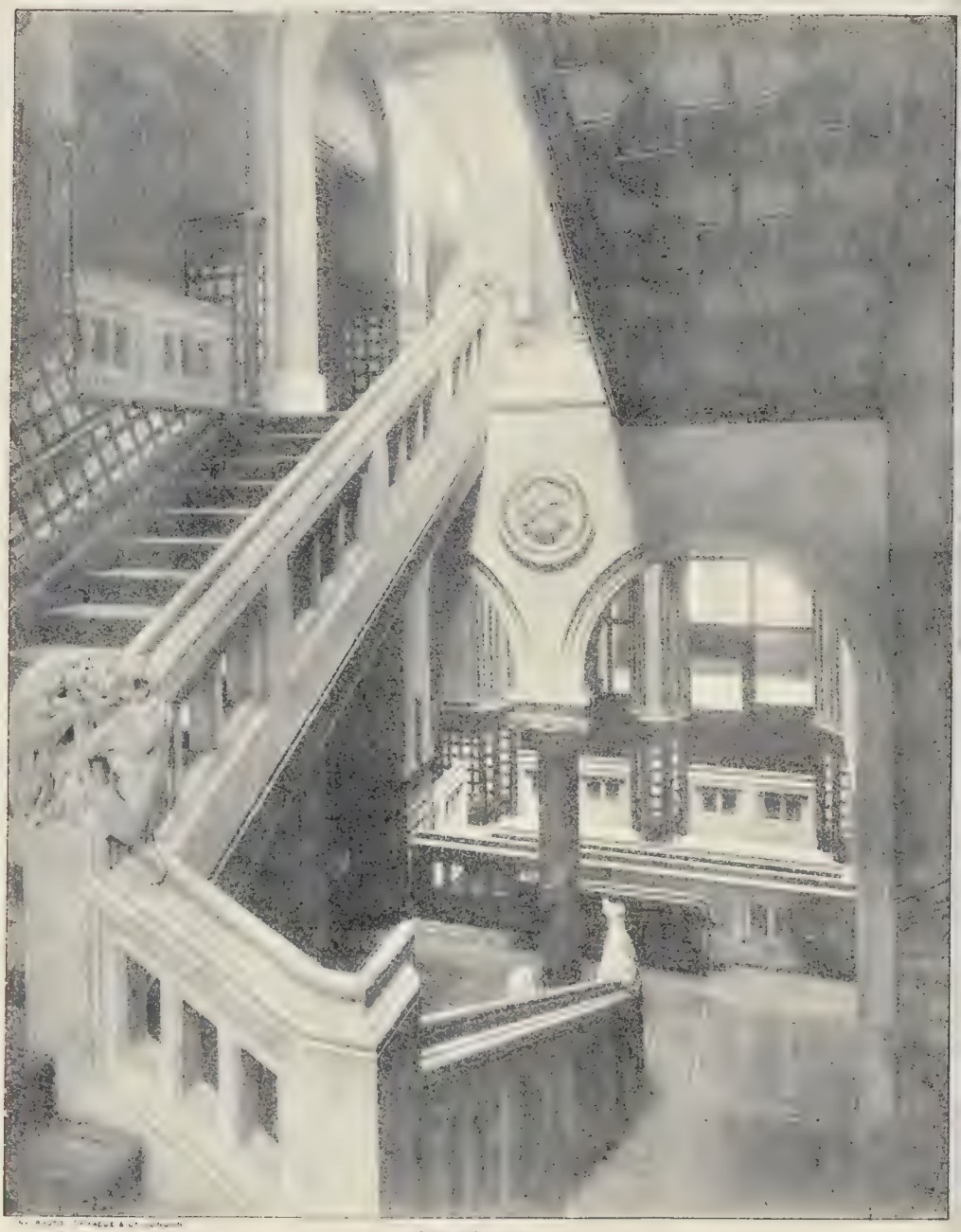
On the 22nd the excursion was among the Berwyn mountains, and the antiquities in the district around Llangollen were also examined.

After visiting Llantysilio Church, the travellers reached Valle Crucis Abbey,—a ruin romantically situated in a leafy hollow among the hills. The stone fragments have been carefully collected together and placed as nearly in their original positions as practicable on the carefully-shaven turf which now takes the place of the paved floor of the abbey. A slab in the south wall of the nave records that by permission of the proprietor the levelling and clearing of the ruins of the abbey was effected under the superintendence of Arthur Viscount Dungannon, of Brynkinalt, and Mr. W. G. Wynne, of Penarth, and occupied from May, 1851, to May, 1852, Mr. Penson, of Oswestry, being the architect. The chapter-house, on the south side of the abbey, was still left untouched; it was in fact used as a farm-house up to the spring of 1883, and the walls and fine vaulted roof were plastered over. All this has now been removed. Over the chapter-house were the dormitories of the monks, and in front of the chapter-house still runs a clear stream of water, as it has done by repute for ages past. In the restoration of the chapter-house a curious plan was adopted for preserving a memorial which is believed to have no proper connexion with the abbey itself. This is a monumental slab on which the vine, Maltese cross, &c., are carved, which is built into the south wall over the central one of three recesses. The church is of the usual cruciform type,—an aisleless presbytery, transepts, with two chapels forming an eastern aisle to each. There was a low square tower over the crossing, and a nave of six bays, with two side aisles. The extreme length is 165 ft.; length of transepts from north to south, 98 ft.; width of nave and aisles, 67 ft. 6 in.; width of chancel, 30 ft.; and of the transepts, 30 ft. The two end gables stand out almost perfect, and the north and part of the south walls of the chancel remain as described in the Journal of the British Archæological Association.

Another important feature in the day's programme was Castell Dinas Bran, which is locally known as "Crow Castle," and which proves a most conspicuous object, as seen from the Vale of Llangollen, in the neighbourhood of that town. It stands on the summit of a conical hill, 600 ft. high, among other surrounding mountains. Its broken walls and jagged turrets, as seen from below, form a striking feature in the landscape. It must have been impregnable against any attack when fortified in the days of rude warfare. Its early history appears to be unknown, but, according to history, it was in 1200 the residence of Madoc ap Griffith, the founder of Valle Crucis, from which it is distant only two or three miles. Madoc, it appears, became a traitor to his king, and when he afterwards gave in his submission it was readily accepted, for the probable reason that the sovereign was aware of the impregnability of his castle, to which he had retired.

We are partially indebted to reports in the *Cambrian*, the *Western Mail*, and the *Times*, for the foregoing particulars of the proceedings of the Congress.

**Messrs. Seeley's New Premises in Essex-street, Strand.** — The east side of Essex-street in the Strand is at present undergoing an architectural improvement by the erection of an extensive block of new buildings for Messrs. Seeley & Co., of Fleet-street, the well-known publishers. The building, 62 ft. in height, and 48 ft. in width, will have an attractive and richly-carved frontage, the elevation towards the street level comprising four lofty stories, besides dormers. The building up to the second-floor is faced with Portland stone, ornamented at the angles and between the windows with Minton Hollins & Co.'s herring-bone red tiles in varied patterns. The elevation is enriched with elaborate carving and sculpture on the entablatures. Within pediments above the second-floor windows are allegorical figures, whilst other parts of the frontage are filled in with devices emblematic of literature, science, music, and the arts. The panels at the foot of the several windows are likewise all filled in with foliage. The whole of the carving and sculpture is being executed by Mr. Mullins. The first and second floors contain ranges of five-light projecting bay windows, oriel in form. The upper portion of the frontage, containing the third and fourth floors, is faced with red brick, and the elevation is surmounted by an ornamental central pediment, 12 ft. in height above the main cornice. The roof will be covered with pea-green slates. The basement, ground, and the third and fourth floors are intended to be entirely occupied by Messrs. Seeley & Co., whilst the first and second floors will be let as offices, to which there is a separate entrance. Mr. H. C. Boyes, of Bow Churchyard, is the architect, and Messrs. J. & J. Greenwood, of Maltby-street, Bermondsey, are the contractors. Mr. W. B. Lee is foreman of the works.



Office Staircase.

LEEDS MUNICIPAL OFFICES. Mr. Geo. Corson, Architect.

*From Photographs by Mr. E. Wormald, Leeds.*

# FIRST FLOOR PLAN

Scale of Feet




Wyman & Sons Photo-Litho

PROPOSED NEW ADMIRALTY AND WAR OFFICE.—Design sub




Competition, by Messrs. I'Anson & Son, and F. T. Baggallay.



Williams & Sons Photo Litho

PROPOSED NEW ADMIRALTY AND WAR OFFICE.—D



C.Queen St London WC

IN FIRST COMPETITION, BY MESSRS. I'ANSON & SON, AND F. T. BAGGALLAY.









Troston Church



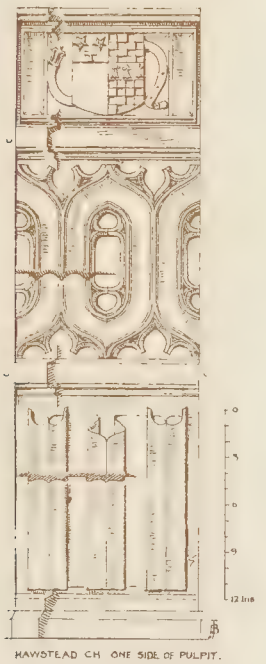




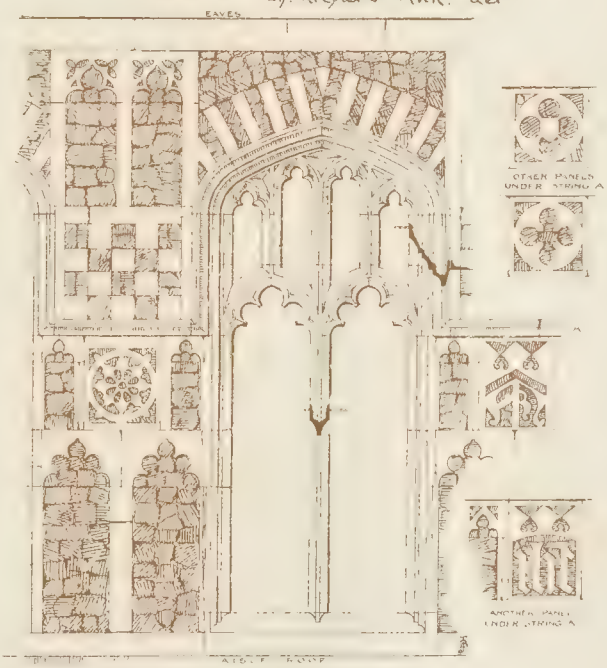





Ch: Richard Pink. del[T]




HAWSTEAD CH ONE SIDE OF PULPIT.




Woolpit Ch: One Bay of Clerestory.

8 Castle St Holborn London E.C



VIEW IN CENTRAL HALL.

LEEDS MUNICIPAL OFFICES, Mr. GEO. CORSON, ARCHITECT.

*From Photographs by Mr. E. Wormald, Leeds.*

## Illustrations.

### DESIGN FOR WAR OFFICES: BY MESSRS. PANSON & SON AND F. T. BAGGALLAY.

WE publish this week another of the designs submitted in the Preliminary Competition for this important building; the elevation shows the Whitehall front, and to this is added a perspective sketch by Mr. Baggallay showing the grouping towards the Park. We may take the opportunity of saying that in other cases in which the authors of designs in the first competition wish for the publication of their drawings, we shall be glad to publish also a perspective drawing of the design if the authors like to furnish it, so as to put them on more even ground for comparison with the nine selected designs, the illustration of which we shall commence next week, and which will all be shown in perspective.

The present design has, as we think all our readers will agree, points of very great merit in the architectural treatment: the angles are powerfully accentuated, and contrast finely with the more elegant treatment of the intermediate spaces; and in these again the treatment of the four stories is very well contrasted, and a very picturesque effect is given by the continuous range of small columns and arcaded windows beneath the cornice.

We give the following extracts from the architects' report, which will serve to explain their own intentions in their own words:—

"The authors have adopted the Italian style, freely treated, as being best adapted to a public building. They have found from their large experience that it gives the greatest amount of light to the rooms and corridors, is easy of construction, and it will certainly be more in harmony with the National Buildings in the immediate neighbourhood than any other style. The treatment is simple, but they believe it will be effective, and they have carefully avoided useless ornament as being costly and unsuitable to the atmosphere of London.

On the south and west side overlooking the Horse Guards Parade an arcade is introduced so as to give increased grandeur to the building, and also to afford facilities for viewing the troops on holiday or state occasions. As will be seen by the drawings, this arcade forms no structural part of the building, and might be, if deemed desirable, entirely omitted, and a terrace only formed on the ground-floor level.

The authors have grouped the buildings round one large quadrangle, which, in their opinion, is a nobler and more convenient form of treatment than several small courts, and gives the maximum of light and air.

Private staircases and entrances have been provided for the Commander-in-Chief, the Secretary of State for War, and the First Lord of the Admiralty.

The glass-covered courts, which are one of the chief features of this design, and by which the corridors are, to a large extent, lighted, are roofed over with glass at the level of the ceiling of the second floor. They will be found to form very handsome and striking features in the corridor, besides being excellent ventilating shafts and a means of distributing heat, as pointed out in the special clause on that subject.

The draughtsmen's offices are on the third floor, and by the arrangement of windows on that floor which we have adopted, each draughtsman will have a window to himself, a point to which special attention has been directed in the instructions.

It was proposed to face the whole of the buildings externally with grey Aberdeen granite up to the level of the plinth, and above that height with Portland stone, as these two stones have been found by long experience to stand the effects of the London atmosphere better than any others."

The plan is open to considerable objections in detail, and the desire for architectural dignity and uniformity seems to have led to the window-space being too contracted, and the windows being inconveniently placed in many of the rooms. The merit of the design is therefore architectural rather than practical. When, however, we compare this with one or two of the designs (considered purely as designs) which it has been thought proper to include among the "sacred nine," we may certainly question whether the doctrine of considering plan as everything, and design as nothing, may not be carried too far.

### SKETCHES AT PLACES VISITED BY THE ARCHITECTURAL ASSOCIATION.

Of the four small sketches at the top of the left-hand side, one shows a corner of Hengrave Hall, with its cupola-topped turret. These turrets occur at every corner, and larger editions flank the entrance. Last week we gave part of the oriel window over this entrance. To-day we give, in the right-hand corner, some of the very fine mantling from one of the Kytson tombs in Hengrave Church. It will be seen that the shield bears the same arms as that on the corbel to the oriel window mentioned above. Another of the four small sketches shows a group of cottages at Melford, typical of the old-fashioned Suffolk cottages. The two churches, Hawstead and Livermere, are also typical of the smaller churches of the neighbourhood. They have no aisles, only nave, chancel, tower, and porch. Hawstead was the church of the Drurys, and contains some of their monuments. There is also a fine late pulpit, of which we give one panel. Livermere was not visited by the excursionists *en masse*, but a small detachment went thither and to Troston on an off-day. Livermere contains several things worth seeing. The benchends are quaint: there is a good late pulpit, a handsome panelled font, a bold wood roof to the porch, and a remarkable wood cornice to the chancel roof, in which Renaissance shields are enclosed in Gothic tracery. Troston, of which we give a measured drawing of the porch, is another small church. It contains some wall-paintings inside, but the south porch is its most notable feature, and is a very good specimen of the flush-panelled flint work of the district. Another specimen of this distinctive work is given in the clearstory of Woolpit Church. Here we have not only the flint panelling, but the chequerwork which is to be frequently seen, and which is particularly effective. It will be observed that the patterns of the panelling necessitate often very much cutting of the flints, and in many cases the flints have fallen out from the minute intersections of the stone lines. Last week we gave other examples of flint panelling from Fornham All Saints and Wetherden Church. From the latter to-day we give a bit of mantling from the Sulyard tomb (see right-hand top corner). Another sketch shows the entrance to Rushbrooke Hall. The porch forms the middle stroke of the E which represents the plan of the hall. It is the only portion which has any detail to speak of. We gave last week a view of the end of the top stroke of the E, and a bit of the railing round the moat. From Coldham Hall we give to-day two scraps of detail, which may be said to exhaust all there is. The remaining sketch shows part of the tracery of the Spring pew at Lavenham.

### LEEDS MUNICIPAL OFFICES.

WE give this week two more interior views of this important new building. One shows the office staircase (see plan in our last number), in which the stairs are constructed with wrought-iron beams and joists filled in with concrete, and finished with cast-iron risers and treads laid with tile tesseræ. The stair parapet is of Hopton Wood stone, and the walls are lined with tiles to a certain height. The soffits of the stairs are finished in plaster.

The other illustration shows the Central Hall, the walls of which are built of Caen stone, and the pillars are of Devonshire marble.

### NEWCASTLE-ON-TYNE:

#### NEW PUBLIC BUILDINGS, DOCKS, ETC.

NEWCASTLE-ON-TYNE was *en fête* last week, on the occasion of the visit of the Prince and Princess of Wales, who, on the 20th inst., opened the Jesmond Dene portion of the Armstrong Park,—which is, for the greater part, the gift of Sir William Armstrong to the Corporation. It is mainly situated on the north-eastern slopes of the narrow valley through which runs the Ouse Burn. The tract of land is two miles in length, and as its entire superficial extent, including that of Sir William Armstrong's latest gift, is only about 104 acres, the fact that it is but a long and very narrow belt stands confessed. But (according to the *Newcastle Chronicle*, to which journal we are indebted for these particulars) so richly is it wooded, and so thoroughly hidden are its boundaries, that its real limits are never visible, and it appears to be many times its actual size. The park is in three sections, the limits of which are marked by intersecting public roads. The first section is the Heaton Hall Estate, of 22¼ acres, acquired from Mr. Addison Potter for 12,562*l.*, in March, 1878. The second is Sir William Armstrong's first gift of land to the public parks, namely, 26 acres of the Jesmond Estate. This section is contiguous to the first, and comprises the narrow slopes between the Heaton Hall ground and the old Benton-road. The third and last section is made up of Sir William Armstrong's second and most valuable gift to the city, namely, about 54 acres of land on his High Jesmond Estate, presented by the donor in February, 1883.

*The New Museum.*

On the same day the Prince opened the new Museum. The old Museum of the Natural History Society of Northumberland and Durham was for many years an educational centre of the utmost importance to the locality; but, being entirely built in on all sides, only a very small portion of the erection was visible from any point of view, and the main entrance was at the extremity of a narrow lane. The members were, many years ago, keenly alive to the unsuitable nature of their building; but the difficulties attending upon a change of quarters were very serious, and it was not until the early months of 1879, when the site known as St. James's came into the market, that decisive steps could be taken for the erection of a new Museum. The site in question is a triangular piece of land occupying the space between the North Road, on the eastward, and the old Moor road on the opposite side. The apex of the triangle points towards the Barras Bridge, and the base is marked by a boundary wall which separates the ground from that occupied by the Virgin Mary Hospital for Freemen. When the question of buying the land first arose, an old house, with an ivy-covered terrace in front, stood upon the spot. The ground was, in Mediæval times, a portion of the site of the ancient hospital for lepers, and a few scattered remains of that building have been discovered in the course of the recent operations. These relics include portions of the mouldings of an arch, showing dog's-tooth ornamentation, and they have been carefully put together and placed in front of the new structure. The price asked for the site was 6,000*l.*, and this sum was given for the purchase of it in October, 1879, by the late Colonel John Joicey. But the tenure of the land was only leasehold with right of renewal, and it was resolved to get it enfranchised. The cost of this procedure was 2,000*l.* additional, and Colonel Joicey also contributed that amount. Thus the site was acquired before the Christmas of 1879, and no time was lost in procuring designs for the building. The architects employed were Messrs. J. Wardle & Son, of Ridley-place, and the plans were supervised by Mr. John Hancock and other gentlemen interested in the affairs of the society. The interior of the structure is laid out in three large transverse apartments, which are lighted from the top, and surrounded by a system of corridors. These latter also give admission to rooms for the curator, for the committee, and for classes, and flights of stairs lead from them to the galleries which run round each of the apartments. The rooms are each 104 ft. in length, but the central one is 50 ft. in breadth, and the first and third ones are each 40 ft. 6 in. broad. The cost of the entire structure, with its internal fittings, was a trifle over 40,000*l.* The contractors for the fabric were Messrs. E. B. Reed & Son, of Newcastle, and this firm also supplied part of the fittings; but the greater portion of the work of furnishing and fitting up the interior was executed by Messrs. Robson & Sons, of Northumberland-street and Spital Tongues, and Messrs. Sopwith & Co., of Northumberland-street and Sandyford-road.

*The Reference Library.*

After leaving the Museum, the royal visitors proceeded to the Public Library, where they opened the new Reference Library, the contents of which, relating to every branch of art and science, are detailed in the *Chronicle*, only to make us regret the more the supineness of our great and wealthy metropolis in leaving whole districts as large or larger than Newcastle without such valuable aids to progress. The new Reference Library threatening to interfere with the Carliol Tower, as to the proposed removal of which there was much opposition, the Lords of the Treasury sent down as Commissioner Mr. E. J. Smith, who, after holding a public inquiry on the 18th of April, 1879, made his report to their Lordships, who shortly afterwards advised the Town Council that the application for borrowing powers had been acceded to. They (the Lords of the Treasury)

considered that the retention or the removal of the Carliol Tower was a purely local question, and that after an inquiry on the ground by Mr. Smith, one of their Commissioners, their lordships saw no grounds for interference. In February, 1880, a contract was entered into with the late Mr. George Bailey, for the erection of a new building from the designs of Mr. A. M. Fowler, leaving out the Carliol Tower, which was removed on the 20th of May, 1880, "to make way for a building more in keeping with the progress of the times." The Carliol Tower, although it occupied the site of one of the old towers of the town wall which surrounded that part of Newcastle, preserved in itself no vestiges of antiquity, as it had been entirely restored from the foundation almost within the century. It was declared by no less an antiquary than Dr. Bruce unworthy of retention. In the meantime, the lecture-hall of the Mechanics' Institute was arranged as a provisional lending library, and the educational work of the institution was continued in the upper rooms of the building.

*The Albert Edward Dock at Coble Dene.*

The Coble Dene Dock, opened by the Prince of Wales on the 21st inst., is the latest of the many improvements so energetically carried out by the Tyne Commissioners. Coble Dene Dock, situated a little to the west of North Shields, comprises in extent 26¾ acres, and will be mainly used for the accommodation of the import trade. After the Act was obtained for the construction of Coble Dene Dock, and before commencing the working drawings, extensive borings were made, which resulted in a resolution to change the position of the entrance. It was begun further inland than was at first contemplated, which had the effect of increasing the outer basin. The working drawings, prepared by Mr. P. J. Messent, Engineer to the Commissioners, and approved by the late Mr. J. F. Ure, their former engineer, were completed in May, 1874. The delay was occasioned in consequence of the alterations made by the borings. Shortly afterwards the works were commenced by the Commissioners' own men, and they went on rapidly until they were delayed by the failure to obtain the Act for additional powers in 1876. The second application in 1877 was successful, and the work was resumed with activity. Last year operations were so far completed that the water was let into the lock. The gates and sluices of the lock were then used for admitting and letting out the hoppers attending the dredgers which were employed in further completing the deepening of the dock. The length of quay and dock is about 3,000 ft. A new river wall about 1,500 ft. long can be used as a quay from the river. The total excavations, a large portion of which has been done by the dredgers and steam navvies, comprise 2,620,000 cubic yards. The total quantity of granite used in the entrances, quays, walls, and other erections is 343,732 cubic yards, the granite and other ashlar used at the entrance-steps and coping being 355,000 cubic feet. The greenheart used in the construction of the gates amounts to 36,600 cubic feet. The tidal entrance is 80 ft. wide, and the lock 60 ft. wide, each having gates to it made of greenheart. The depth on the sills of the tidal entrance and the upper end of the lock is 15 ft. at low water, and 30 ft. at high-water spring tides. The depth on the lower sill of the lock is 21 ft. at low water, and 36 ft. at high water, so as to enable vessels to be locked from and to the river at low-water spring tides. The length of the lock between the gates is 350 ft. Grooves are made outside the gates for caissons, by which the length of lock may be increased to 400 ft., or more if necessary. The whole of the work has been done by the Commissioners' workmen, without contractors, including the heavy gates of greenheart, which were constructed at the Commissioners' works at Howdon yard. The hydraulic machinery in connexion with the gates and other appliances are the manufacture of Sir William Armstrong & Co. At the north end of the dock there is a coal-shipping staith of sufficient length to tide a vessel 400 ft., and on each side two vessels of 250 ft. long. The staith is provided with four spouts on each side, and extensive standage ground connected with the North-Eastern Railway and the Northumberland collieries. Mr. Messent has patented an apparatus for shipping coals without breakage, and it will be applied to one of these spouts.

## OBITUARY.

*Mr. Thomas Wisedell.*—The *New York Times* announces the death, on the 31st ult., of Mr. Thomas Wisedell, of whom it speaks as "the leading theatrical architect of this city, and for his age one of the foremost architects of this country." Mr. Wisedell was born in London, in September, 1846, and early in life he became a pupil of Mr. Robert J. Withers. While still with Mr. Withers he attracted the attention of Mr. Vaux, of the firm of Vaux & Withers, of New York (the latter of whom is a brother of the London architect), who was on a visit to England, and was by him induced to go to America. That was in 1868. For many years thereafter he was a valued assistant to Vaux & Withers, and in 1879 he became a member of the firm of Kimball & Wisedell. For the past eight or ten years he has, under the direction of Mr. Frederick Law Olmstead, designed the architectural features of the improvements of the Capitol grounds at Washington. In connexion with Mr. Kimball, he has designed and built many well-known theatres in this and other cities. Among these are the Madison-square Theatre, Harrigan & Hart's Theatre, and the Casino, at Broadway and Thirty-ninth-street, in New York; the Springfield Opera House, at Springfield, Mass., and the Yonkers Opera House, which was opened last spring.

*M. de Nittis*, the well-known French painter, died almost suddenly on Saturday, of a chest disease, at the early age of thirty-nine. M. de Nittis was born at Barletta, near Naples, but went whilst very young to France, and was essentially a Parisian.

*The Marquis de Mesgrigny.* — The *Athenæum* announces the death, at the age of forty-eight years, of M. le Marquis de Mesgrigny, the painter of French river scenery.

*Dr. Moritz Thausing.* — The *Academy* reports the death of Dr. Moritz Thausing, who had been in ill-health for some time past. He was keeper of the Albertina Collection at Vienna and professor in the university of the same city. The work by which he will be known is his "Life of Albert Dürer," first published in 1876, of which a second edition appeared only a few months ago. An English translation was issued by Mr. John Murray in 1882, under the editorship of Mr. Frederick A. Eaton.

*M. Leonard Lugardon*, the *doyen* of Geneva painters, has just died at the age of eighty-three.

## COMPETITIONS.

*New Municipal Buildings, Burnley.* — Mr. Waterhouse, A.R.A., having been elected by the architects competing for these new buildings to award the three premiums due, according to the conditions, to the authors of the three designs judged most worthy, reports that, after carefully examining each of the designs, with the aid of Mr. Windsor, the surveyor, he is induced to recommend the design of Mr. Henry Holtom, of Dewsbury, for the premium of 200 guineas; that of Mr. George Corson, of Leeds, for the 100 guinea premium; and that of Messrs. G. Nattress and F. G. Coward, of London, for the 50 guinea premium. Mr. Waterhouse adds that, in making these awards, he endeavoured to consider the compliance of the various designs to the instructions:—their artistic excellence,—convenience of plan,—constructive skill shown in each design,—the way in which the difficulties of the site had been overcome,—and lastly, their comparative cost. Though nearly all the competitors thought their designs could be realised for the sum at their disposal, it is clear that some of them would be far less costly than others. The artistic treatment of some of the elevations he regards as far above the usual average, though they were unfortunately not always accompanied by the best plans. The success of the competition is, he thinks, largely due to the evident fairness with which its conditions have been prepared.

*School of Science and Art, Lincoln.*—A new school of science and art is proposed to be erected here, at a cost of 7,000*l.*, that amount having been raised by private subscriptions in this place. It is to be built on land given by the city, worth about 1,000*l.* Designs having been invited in competition for three premiums, viz., 100*l.*, 50*l.*, 25*l.*, sixty-five designs have been sent in, and the building committee have requested Mr. Charles Barry to act as their adviser in making a selection of the three best.

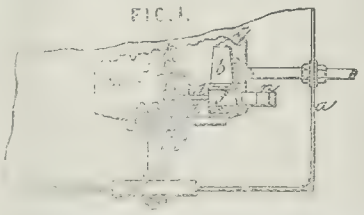
*Cheshunt Drainage.*—The Cheshunt Local Board have awarded the premium for the best scheme for the sewering of their town to Messrs. Gotto & Beesley; and a further premium to Messrs. W. P. Orchard & E. van Putten for the second best. There were twenty-six sets of plans submitted.

## ILLUSTRATIONS OF RECENT PATENTS.

5,727, Improvements in Apparatus for Measuring Water and other Liquids. William H. Tooth.

The important question of the measuring of water supplied to the household is dealt with by this invention, which offers a mechanical solution of the problem by an improved water-meter. The chief advantages claimed by the inventor are accuracy and simplicity of construction, the meter not being liable to get out of order. A chamber, tank, or cylinder is fitted with two valves, one at top and one at bottom, and having weighted levers connected together by a vertical rod on which a tube carrying a float slides freely. The plug of either of the valves is connected to a ratchet mechanism operating an index. The connecting-rod of the valves is screwed up with set screws or nuts to the proper position for registering the quantity of water

FIG. 1.



which is allowed to pass the cistern at each operation. The upper valve is the inlet, and the lower one the outlet, valve. A plan of the apparatus is given (fig. 1), shown as fitted to a cistern or tank. A front elevation, with the ratchet mechanism removed, is given at fig. 2, the side elevation of the same being shown by fig. 3. Fig. 4 is a perspective view, showing the meter attached to an ordinary supply cistern. Detached views of parts are given, figs. 5 and 6, and a section of the valve is represented by fig. 7. In the drawings all the letters

FIG. 7.



refer to similar parts in each figure; *a* is the vessel, and *b* the inlet valve, *c* is the outlet valve at the bottom of the chamber or tank. The levers, *f* and *g*, weighted by *h* and *i*, are connected by a vertical rod, *j*. A tube, *l*, slides on the rod, and carries a float, *m*. The weights, *n* and *o*, at the end, are to counterbalance the weight of the rod *j*. The lever of the lower valve, *c*, is fixed upon the spindle, *p*, but the lever of the upper valve works freely on the spindle, *q*, and is provided with an escapement, shown in figs. 5 and 6, for preventing the inlet valve from opening before the outlet valve is closed, and *vice versâ*. The rising and falling of the float, *m*, strikes on *u*, the pallets of the escapements, and operating a ratchet and pawl from an arm, *z*, on the valve lever, *a*, serves to actuate the indexes on the dials *e*. The meter being fixed to any reservoir of which the capacity is known, the inlet valve, *b*, is connected with the water main. The chamber being empty, the outlet being closed, and the inlet open, water from the main will pass into the chamber *a* of the meter through the inlet valve. As the level of the water rises, the float *m* will be raised, and when the chamber is nearly full, or the given quantity of water has been admitted thereto, the tube *l* of the float presses on the under-side of the regulating nut, and raises the rod *j*. The lever *d* is then oscillated, and when the vertical portion *h* makes an angle of about 22 degrees, the slot *x* will have moved over the end of the lower lever and the float *m* will raise the lever, and open the valve *c*, the weights will fall, and while the lower outlet valve is thus opened, the upper valve will be closed, and by the mechanical arrangement of tappets and spindles (as shown in the section, fig. 1), the pallets of the escapement are lifted, and the index hand is moved as the measured quantity of water runs off

FIG. 2.

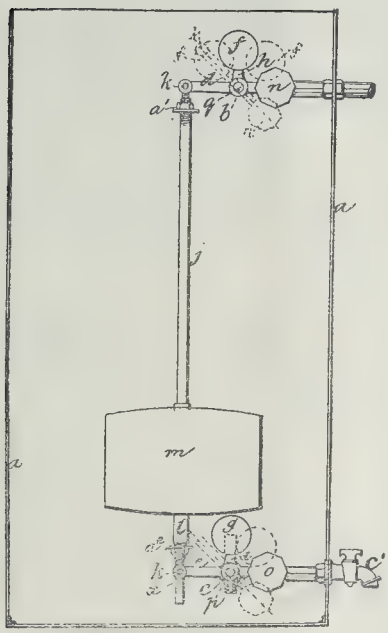


FIG. 3.

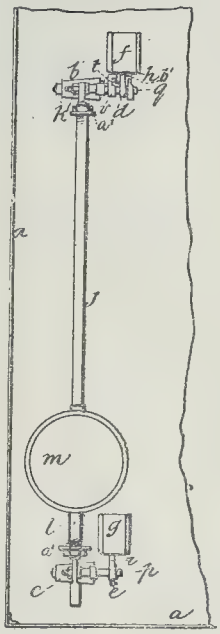


FIG. 4.

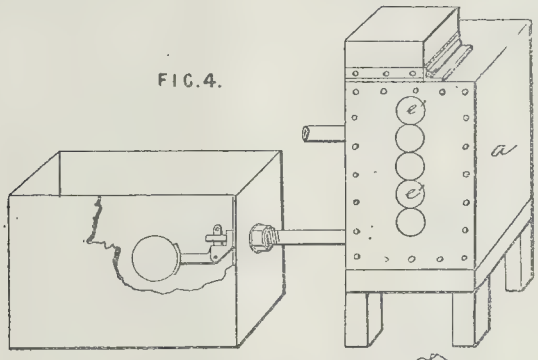


FIG. 5.

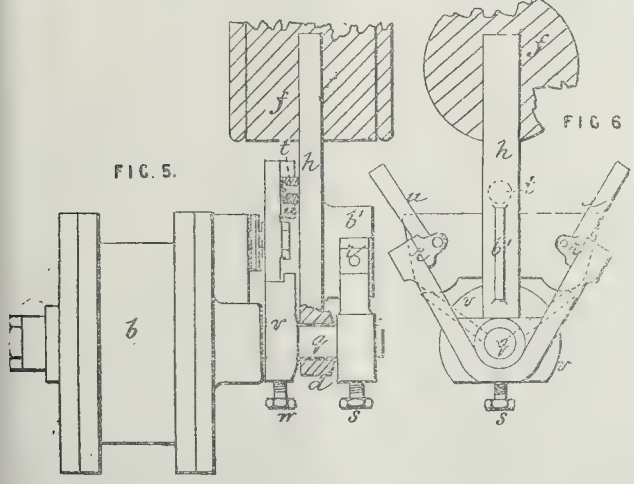


FIG 6

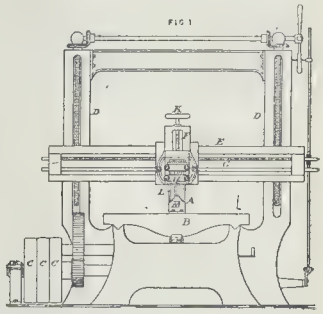
*Tooth's Patent Apparatus for Measuring Liquids.*

at the outlet valve, *c*, into a supply cistern, or is drawn off, as in figures 1, 2, and 3. The action of the escapement affords a certain measurement as the arm *z*, each time that the lever *d* is raised, rotates the ratchet to the extent of one tooth, and the amount of water which has passed through the chamber *a* is indicated on the dial *e*', each division of the index showing the quantity of water which has been allowed to flow into the cistern at each operation.

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5,821, Improved Process for Working Marble and Stone. George Murray Morgan.

The methods usually employed in the manipulation of stone and marble for building and decorative trades are by manual labour with the primitive hammer and chisel. In this invention machinery is brought to aid in the sawing, moulding, or carving of stone or marble. The elevations and details are given in our illustrations, which will make the method perfectly clear. The marble to be worked is fixed by wedges, by cement, or by a box (A, fig. 1),



upon a travelling-table, B, which moves backwards and forwards by reversing gear. This traversing movement is automatic, and arranged so that on the termination of the forward and backward travel of the table B the strap is automatically shifted from one pulley to another, and the motion of the table reversed. Over this traversing table are fixed vertical side frames, D D, carrying the traversing tool-box slide, E, upon which one or more tool-boxes, F, rest, and which are capable of transverse adjustment to any required position by means of the leading-screw, G. A tool-rest, H, upon this tool-box, F, is fitted with the usual vertical movement, controlled by the screw, K, and in this tool-rest the multiple roughing-tool (figs. 2 and 3), or the finishing-tools shown in figs. 4 and 5, are fitted by

FIG. 2.

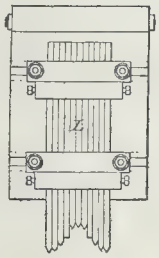


FIG. 3.

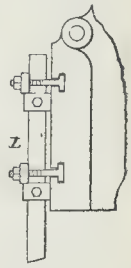


FIG. 4.

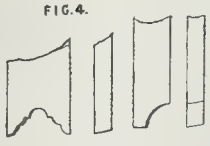


FIG. 5.

clamps and nuts. The traversing table under the fixed tool-rest carrying the cutting-tools is utilised to cut the moulding upon the surface of the marble or stone to any required shape. Several tool-boxes may be fitted upon the transverse tool-box slide E, and several different pieces of marble or stone may be cut and moulded simultaneously. In roughing out marble or stone, a multiple series of tools *h* (fig. 2), ground to diamond or angular points, are used. From the brittle nature of the material, a pointed tool effects the removal of the rough material with the least possible amount of cutting labour, and consequently most expeditiously. The tools are of considerable length; and with their cutting-edges kept comparatively

close to the tool-rest, in order to render them very rigid, and they are ground with a cutting-edge at a somewhat more acute angle than that generally used for cutting cast iron. A finishing tool is shown in fig. 4, and a right and left banded tool for each half moulding alternatively adopted is also shown in fig. 5. To avoid chipping at the end of the piece of marble or stone a cast-iron open three-sided box, with its end M-shaped to the form of the moulding is used (fig. 6). One end (M') is adjustable upon

FIG 6.



the end of the box, so that when the piece of marble is embedded in the box, the movable end is brought close up to the end of the marble or stone moulding, and securely bolted there in position. The strip of marble or stone moulding is thus supported at its ends by the ends of the cast-iron box, and is, consequently, prevented from chipping. To fit the moulded portions together, as in the case of a fender, a circular saw in a sliding-frame is sometimes mounted over the bed of the said machine, so that the saw-frame can be set to the desired angle with the work, and the ends be trimmed by traversing the saw, which at the same time is rotated at a suitable speed over the work as it lies upon the bed.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

SIXTH NOTICE.

British Guiana, as seen from the sea, is represented as suggesting the idea of one vast forest, parts only of which are cleared for cultivation. Although the Gold Coast is situated almost immediately under the line, the thermometer is seldom known to rise above 93°, and the average heat of midsummer ranges from 85° to 90°. The soil along the coast varies from a light sandy or gravelly nature to a fine black mould and loamy clay, and beyond are seen the highlands crowned with lofty trees and thick underwood. Advancing from the shore it is found that as we proceed the richness of the soil increases, and when a distance of six or eight miles is reached, it seems fit for any species of cultivation. Fruits in infinite variety abound, and many of the trees grow to a height of 100 ft.; they consist of almost every variety of such as are valuable for hardness and durability, as well as of others which are richly veined, capable of taking the finest polish, and well adapted for all sorts of ornamental furniture, while others yield valuable dyes or exude balsamic and medicinal oils. Wild animals and beasts of prey are abundant. These comprise the ferocious jaguar, the cougar or red tiger, the tiger cat, the crabbodago, the great ant-bear, porcupine, armadillo, sloth, opossum, different species of deer, lizards, chameleon, &c. Of the serpent tribe there are various species, from the large aboma snake, which sometimes grows to the length of more than 20 ft., to those of the smallest description. The feathered tribe also abound, amongst which are seen the crested eagle, vultures, owls, butcher-birds, parrots, the toucan, pelican, tiger-bird, woodpecker, humming-birds, &c. One of the most disagreeable frequenters of the forest is the vampire-bat, which grows here to an enormous size. Insects, such as mosquitos, ants, and centipedes, abound, and in the rivers are abundance of edible fishes.

The wild beasts and birds are not represented in the exhibition, but there are examples of the reptilia, including an interesting specimen of the iguana, which bears a marked resemblance to the dragon as represented in Mediæval times; it is, however, an innoxious creature, subsisting upon a vegetable diet, and is considered by the natives a great delicacy. The fish of the rivers present an equally old-world look; in capturing them, either by lines or by shooting them with arrows, the natives display great dexterity. Of the trees, one of the most valuable is the *Mora gigantica*, the wood of which is hard and resembles teak. The tree sometimes attains the height of 300 ft., and a girth of 18 ft. It was at one time extensively used in this country for shipbuilding purposes, but since iron has come to be so much used for that purpose the demand for it has fallen off; still it is found to be well suited for railway sleepers, for which purpose it has been used in Demerara, Barbados, and Trinidad, where, from the bitter principle which it contains, it is found free from the attacks of insects.

In Georgetown this wood fetches about ¼d. per cubic foot. Another wood possessing the quality of resisting insect attacks is that known as the Greenheart. It has a specific gravity of 75 lb. to the cubic foot, and is most valuable for the construction of piers, jetties, &c. Specimens which have been under ground for a century as the foundation of houses are exhibited, and these appear as sound as when first laid down. The collection embraces upwards of 100 varieties of the trees which abound in the colony, which are generally of good size and excellent texture. Amongst them are various examples of cedars, forty-eight varieties of which, all beautiful in their markings and colour, are wrought into a table. There is shown a portion of a tree called the Yarioro, which is peculiar in its growth, resembling a clustered Gothic shaft. These shafts are cut downwards by the natives, and are easily formed into paddles, for which purpose they are well fitted, owing to the fibrous nature of the wood and its freedom from cross grains. The walla, a hard and resinous wood, is valuable for coopers' work, and there are many others which space and time are not at command for referring to.

As is generally the case where forests exist in the tropics, parasites and fungi abound, and of these there are interesting examples in the collection. The bush-rope, which winds in festoons from tree to tree, is one of the most remarkable of these; some of them have all the appearance of a manufactured rope. Its mode of propagation is peculiar. The seed is deposited by birds on the upper branches of trees, where it takes root and subsists upon the sap, gradually growing downwards till it reaches the ground, on reaching which it takes root and gains new vigour. Of fibrous plants there is great variety, some of which are spun into ropes by the natives. Specimens of this native manufacture are shown, and this variety of plants may yet become extensively used in the making of that class of goods, as the fibres are long and tough. The cotton plant, which is indigenous to the colony, was, at one time, extensively cultivated, and formed a staple industry of the country; but America has now the chief hold of the market as regards that article. It is shown in different stages as manufactured into hammocks and fabrics for clothing, &c., by the natives. The cocoa-nut tree is also put to various uses, and several examples of the inner bark of trees, also used by them, appear as if they might be more extensively utilised. Examples are shown of Gum Animi obtained from the locust-trees, which is of fine amber-colour, and is used in making the finer kinds of varnish. It is scarce and of great value, some of the purer blocks fetching as much as 200*l.* a ton. The blocks take the form of stalactites, and are produced when the tree receives any slight injury from insects or otherwise, and their formation progresses slowly year by year. This secretion is formed in the interior of the tree, and, of course, cannot be got at until the wood is cut open. Amongst the exhibits are specimens of india-rubber and gutta-percha, which latter is used for covering submarine cables. Samples of the Cassava from the root of the Manniоc, which forms a staple article of food of the natives, and a large assortment of medicinal barks, are submitted for inspection. There is a model of the "banab," or woodland hut of the natives, formed by driving poles into the ground, the spaces between which are left open, and are covered by a roof of palm-leaves. It is divided within into two apartments, and from the roof rafters hammocks are swung, under which fires are lighted to keep off damp and insects. In its construction the fibrous substances found in the woods are used for lashing the timbers together, and the scanty furniture is made of wicker-work. A canoe scooped out from a block of cedar, and another formed of bark, are characteristic examples of native boat-building. A model of the punt raft used for floating timber down the rivers is sent for exhibition. As the rivers are tidal for nearly 100 miles they afford great facility for the transit of the timber to the places of shipment, of which Georgetown is the chief. The forests are so extensive and luxuriant that there is no need to supply what is taken away by fresh planting, and as yet nature sufficiently makes up for the outtake, which is confined to no particular period of the year. As a precautionary measure, however, Government has appointed superintendents to overlook the traffic, and it is proposed to establish a School of Forestry with the view of utilising the abundant products to the best advantage.

## BRITISH ARCHÆOLOGICAL ASSOCIATION.

The forty-first annual meeting of this Association, to be held at Tenby, will extend from Tuesday, September 2nd, to Thursday, the 11th, inclusive. The president is the Right Rev. the Lord Bishop of St. David's. The following is an outline of the intended proceedings of the Congress:—

*Tuesday, September* 2. Members and visitors to assemble at the Town-hall, at 2 p.m., for the reception of the Bishop of St. David's, president, officers, &c., of the Association, by the Mayor and Town Council of Tenby; afterwards the President will deliver the opening address. At its close the party will proceed to the examination of the ancient town walls and towers and ruins of the castle, together with the old buildings of the town, under the guidance of Mr. Edward Laws, hon. local secretary of the Congress, and then inspect the many objects of antiquity preserved in the museum. During the afternoon the parish church will be visited.

*Wednesday, September* 3.—Leave by special train at 9 a.m. for Pembroke, where carriages will be in readiness to proceed, viâ Orielton, to Brownslade, the seat of Colonel Lambton, for the examination of a long barrow. After leaving Brownslade the party will be driven to Castle-Martin, where the church will be examined, and described by the vicar. Afterwards, under the guidance of Mr. Edward Scott, the drive will be continued to Newton Burrows, where a cromlech, close by the high road, will be examined and commented on. Thence the party will proceed to Angle, and afterwards to Rhos Crowther, where the Edwardian house of Jestinton (now called Eastington), will be commented on, and the old parish church, which will be explained, and its history given by the rector. Evening meeting at the Town-hall at 8.30 p.m., for the reading and discussion of papers. (No papers are to exceed twenty minutes in reading.)

*Thursday, September* 4.—Leave by carriages at 9 a.m., and drive to Manorbere Castle, which will be examined and commented on by Mr. E. P. Loftus Brock, F.S.A., and then the party will walk to the church close by, which will be described by Mr. George Patrick. Afterwards the party will walk to the cromlech overlooking the bay, which will be described by Mr. Edward Laws. Thence the party will return to Manorbere Castle, and after luncheon will take carriages to Hodgeston Church, and the drive will be continued to the remains of the Bishop's Palace at Lamphey, returning to Tenby in good time for the evening meeting at the Town-hall, at 8·30, where papers will be read and discussed.

*Friday, September* 5.—Leave by special train at 9.30 a.m. for Pembroke, where carriages will be in readiness to proceed direct to the Stack Rocks and thence to St. Govan's, where the chapel will be described and examined. The carriages will then proceed to Bosherston Church, which will be described by the Rector, and thence to Stackpole Court, by the permission of the Earl of Cawdor. Afterwards a visit will be paid to the prehistoric village on Stackpole Warren, where the tumulus or barrow opened for the occasion will be examined and described by Col. Lambton and others. The party then will drive direct to Pembroke in time for the special train to Tenby at 6.30 p.m. An evening meeting will be held at the Town-hall at 8.30, for the reading and discussion of papers.

*Saturday, September* 6.—Leave by carriages at 9 a.m. from the Royal Gate House Hotel, and proceed to Gumfreston Church, which will be examined and described, and thence to St. Florence Church, which will be described, and its history given, by the Rev. E. J. S. Rudd, as well as the remains of the old Flemish House close by. At about 10·30 a.m. the carriages will proceed to Carew Castle, which will be examined, and commented on by Mr. Thomas Blashill, and afterwards the ancient interlaced Cross, outside the Castle wall, will be inspected, and then the church examined, and explained by the Vicar and Mr. Loftus Brock. Luncheon will be partaken of at 2 p.m. in the Castle-grounds. At 3 p.m. the party will be driven to Upton Castle, where the disused church or chapel in the grounds, near the ruins of the castle, will be visited. Evening meeting at the Town-hall, Tenby, at 8·30.

*Monday, September* 8.—Leave by special train for Pembroke at 9 a.m., and then walk to the Castle, which will be examined and commented on by Mr. Loftus Brock and others. Afterwards, the party will walk to the Church of St. Nicolas at Monkton, with the remains of the interesting Monastic buildings in the churchyard, which will be described by the Vicar. The Prior's House, now the residence of the Vicar, will then be visited and described. Luncheon will be partaken of at the King's Arms Hotel, Pembroke, at 2 p.m., and at 3 p.m. the party will return by train to Tenby for the closing meeting of the Congress, at the Town-hall. It is proposed that a *conversazione* shall take place at the Assembly-rooms at 8·30 p.m.

Three extra days have been arranged for, viz.:—

*Tuesday, September* 9.—Members and visitors to start by train for Haverfordwest, whence by carriages a visit will be made to Glenhaddon and Picton Castle, the seat of Mr. Charles E. G. Phillips, V.P., taking any object of antiquarian interest on the road there.

*Wednesday, September* 10.—Leave the Castle Hotel by carriages, and drive to St. David's, taking certain antiquarian remains on the way, and halting at Roch Castle, and taking the tumulus at Pointz Castle. On reaching St. David's, luncheon will be partaken of at the Grove House Hotel and other inns, where accommodation will be arranged for the night. At 2 p.m. a visit will be made to the cathedral, where, under the guidance of the Dean of St. David's, an examination of some of its principal features will be made. After service, a further investigation will be made of the monuments, effigies, &c., and then a visit paid to the remains of Bishop Gower's Palace, &c.

*Thursday, September* 11.—Members and visitors to proceed after breakfast to St. David's Head, and there examine the stone circles, stone avenues, and cromlech, and other prehistoric monuments. Return to St. David's by the reputed site of the supposed Roman city of Menapia, and inspect the ruins of St. Justinian's Chapel on the seashore. Afterwards leave St. David's by carriages, and return to Haverfordwest, thus bringing the Forty-first Annual Congress of the Association to an end.

## MASTERS AND MEN.

*Scotch Masons.*—At general meetings of the operative masons of Edinburgh and Leith, held on Saturday afternoon, two delegates from Glasgow reported that the strike there was still continuing. They stated that three weeks ago 2,500 men came out for an advance of wages to 8d. per hour. Fifty-eight employers had agreed to pay the sum asked, and had employed 1,050 hands. Upwards of 1,000 had left the city, and had found employment throughout the country, and the strike roll was now reduced to 275.

*North Wales Slate Quarries.*—The men employed at the Maenoffen Slate quarries, one of the largest industries in North Wales, who struck work a fortnight ago against a reduction of 5 per cent. in wages, on the 22nd inst. resumed work upon the masters' terms. The slate trade in North Wales keeps very flat.

## AN ARCHITECT'S CLAIM FOR PROFESSIONAL SERVICES.

NORMAN *v.* THE LEZANT SCHOOL BOARD.

Mr. Giffard, judge, on Monday last, gave his decision at the Stonehouse county court in the case of Mr. A. Norman, architect, *v.* The Lezant School Board.

Mr. Norman claimed 30*l.* 9s., which he made up as follows:—Surveying Kenna school-buildings and the master's house and reporting in what respects they were not in accordance with the specifications, 6*l.* 6s.; measuring the work in detail and making estimates of cost, conformably to the contract, 7*l.* 7s.; numerous attendances and correspondences as arbitrator, 12*l.* 12s.; umpire's fee, 2*l.* 2s.; expenses, 2*l.* 2s. The first item of 6*l.* 6s. and last of 2*l.* 2s. were paid into court, the defendants contending that this was all Mr. Norman was entitled to. It appears he was instructed to make a report on the buildings in question, and named as his price 6*l.* 6s. and expenses, which was accepted. Circumstances afterwards arose calling for further services on his part. He therefore claimed for further remuneration.

His Honour gave a verdict for the plaintiff with costs, and remarked that in his opinion there was nothing in the course Mr. Norman took inconsistent with his duty, and he was fairly entitled to remuneration for his time and labour.

## DISSENTING CHURCH-BUILDING NEWS.

*Chatham.*—The memorial-stones of a new Bible Christian Chapel and Hall in the Luton-road, Chatham, have been laid. The buildings consist of a chapel and hall with class-room, vestries, lavatories, &c. They are situated on a commanding corner site, the chapel having a square buttressed tower at the angle of the building, with turret on opposite side, large rose-window in centre of arched recess, and double-entrance porch, while the side elevation is divided into five bays with double windows and buttresses between. The elevation of hall is of similar design to side of chapel, to which it is joined by vestry buildings and choir and organ recess over. The style adopted is Early English, the materials being red bricks with white stone dressings and slated roofs. Mr. J. Kingwell Cole, of Mount-street, Grosvenor-square, is the architect, and Mr. C. E. Skinner, of Chatham, is the contractor.

*Forest-hill.*—The new Bible Christian Church of St. James, situated in the Stanstead-road, Forest-hill, was formally opened on the 1st inst. The church, with its spire, 120 ft. in height, is in the Early English style. It has a double entrance in the front. There is sitting accommodation for 500 persons. The organ, built by Mr. Hunter, of Clapham, is fixed in the chancel in the rear of the choir-stalls. In front is the rostrum, which is of stone. The contract price for the erection of the church and adjoining hall is 7,800*l.*; but the building of the hall will not be immediately proceeded with. The architects are Messrs. James Tolley & Son, of 66, Cannon-street; and the builders are Messrs. J. M. Macey & Sons, of Battersea. The gas-fitting work has been supplied by Mr. Dodson, of Fetter-lane; and the heating and cooling apparatus by the Æolus Water-spray and General Ventilating Company.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—IX.

THIRTEENTH-CENTURY GOTHIC.

We have now taken note of the various styles that had come into existence previously to the development of the Pointed Gothic style, which reached its culminating perfection, in the opinion of the best authors, in the thirteenth century.

Rosengarten, with pardonable national prejudice, heads his chapter v. (page 287), as "The Pointed Style, called also the Gothic or German Style." We have seen, however, that the Germans developed and clung to a *round-arched* Gothic style, of which they may well be proud, and which they may well be content to call a German style. The Italians developed a Pointed Gothic style which has beauties of its own, and in some individual instances,—such as the Campanile at Florence, designed by Giotto in 1324 (see Fergusson, page 788; Rosengarten, page 361; Prof. Roger Smith's "Gothic and Renaissance," page 121),—their work is unrivalled; but they were half-hearted in their appreciation of the style. In Sicily there is some Gothic work, such as Palermo Cathedral, but as nearly all the styles of the known world met in that small island, they all exhibit a mixed character, highly interesting, but decidedly adulterated. Spain is now known, through Street's special work on the Gothic architecture of that country, to contain some very fine examples of this style. The north-east of Europe displays its local peculiarities, as at Lubeck. Norway has its Trondhjem Cathedral, Sweden its Upsala, Holland its Dordrecht, Belgium its Malines, and we in England have a series of buildings, which are certainly unsurpassed for quiet beauty and lovely proportion by any other Gothic work in the world; but it must be admitted that the main problems of the Pointed Gothic style were worked out in France, and that it spread from that country, more or less directly, into all the others that cared to adopt its principles.

Before describing the fully-developed style, it will be well to accompany Fergusson, who, starting on p. 293 of his Handbook, and from the time of Charlemagne, 768 to 813 A.D., goes steadily through the various districts of France, in which the several local peculiarities are distinctly recognisable. He begins with Provence at the south-east, where the Romanesque influence is strongly marked in such churches as Notre Dame des Doms at Avignon (mentioned in the former article on Romanesque), and which led to the Classic frieze-like result in the porches of St. Trophime at Arles. He proposes his theory that the pointed arch was introduced in order to reduce the weight over the apex of the continuous tunnel vaults, which were immediately covered with their external tiles, without an outer wooden roof; other authors attribute the introduction of the pointed arch to the Crusaders, who became acquainted with it in Syria in the twelfth century; but there can be no doubt that the real origin of the pointed arch was a constructional one, and that it arose in the first instance from the tendency of large round arches to sink at the crown. Thus in Furness and Kirkstall abbeys all the large arches of the nave arcade are pointed, though the small arches in the same buildings are round. Mr. Fergusson then takes the adjoining district of Aquitaine, which, as we have seen before, contains the remarkable Church of St. Front at Perigueux, copied from the Byzantine example of St. Mark's at Venice, except that the arches and domes are pointed; this he considers easier of construction than with round arches; whereas Scott, in his Academy Lectures, holds the contrary opinion. Thence follow other domed churches, but all on the plan of a Latin cross, instead of the Greek cross. [These churches are illustrated by Verneilh, in his "Architecture Byzantine en France," 1851, 1 vol. quarto.] He then mentions the typical Church of St. Sernin at Toulouse, and points out the aisle continued around the apse and chapels growing out of the aisle, which constitute a *chevet* as distinguished from the simple *apse*. He next takes the district of Anjou, north of the latter, in which we get the remarkable church at Loches, with its row of octagonal domes like squat spires, and the domed church at Fontevrault, where our Plantagenet kings, Henry II. and Richard I., were buried. Then he illustrates the Church of Notre Dame at Poitiers, the west front of which shows the local love for sculpture. Next he takes Auvergne,—a purely volcanic country, whose inhabitants long retained their original characteristics unchanged, and whose style of architecture is distinct, and early reached perfection. This district may be studied in an excellent paper by Street, illustrating the churches of Le Puy. It was also visited by members of the Architectural Association, under the direction of the late Mr. Sharpe, with the result of a finely-illustrated work on the subject. After remarking the Frankish style as exhibited by a church called the Basse Œuvre at Beauvais, not unlike a Roman basilica, he goes on to Normandy and treats of the difficulties of vaulting the nave of a church without having recourse to a pointed arch. Here the subject is brought home to us by the churches at Caen erected by William the Conqueror, who introduced the Norman style into England in 1066 A.D.

The next district, Burgundy, is remarkable for its abbey churches, that of Cluny, now destroyed, having been one of the largest in Europe, measuring 580 ft. in length. It was begun in 1089 by St. Hugues, and dedicated in 1131, and was lacking in the contrivances of groined vaulting, which provided clear-story windows, and must therefore have shared the upper darkness common to churches without such means of lighting. The church at Tournus has the peculiarity of a series of barrel vaults, at *right angles* to the direction of the nave, an example, perhaps, worth imitating for many reasons. At Autun the fluted Corinthian pilasters are rather startling, until we look about and find them accounted for as being inspired by old Roman work in the town. The church at Vezelay is remarkable for the progress in vaulting exhibited in the nave, and afterwards the porch or narthex required by the rules of the monastic order to which it belonged (no connexion with the Classic "orders").

Fergusson concludes his topographical arrangement with Frankish architecture, Frankia being the central province of which Paris is the head, and he then goes on to describe the features of those fully-developed cathedrals of which a surprising number were erected in the thirteenth century, including the end of the twelfth,—that is, from the revival of the national power, under the guidance of the great Abbé Suger, about the year 1144.

It should here be mentioned that England was again indebted to French influence in two more leading examples, at Canterbury Cathedral, from the design of William [of Sens, in 1175, and at Westminster Abbey, where French arrangements are strongly marked in the portion built in 1269. We had, however, developed a style of our own, known as Early English (and not to be confused with the upholsterers' abominable misuse of that title), of which Salisbury Cathedral, built between 1220 and 1258, is a well-known example.

For those who can read French, no better author can be consulted than Viollet-le-Duc. His "Lectures" and his "Habitations of Man" have been translated into English; but not his finest, most exhaustive, and most practical work, "Dictionnaire raisonné de l'Architecture française du XI^e^ au XVI^e^ Siècle," or, rather, the translation has only been begun. In vol. i., under the word "Architecture," is a long essay from p. 116 to p. 452, which deals not only with the subject generally, but afterwards with the Ecclesiastical, Civil, and Military divisions of it in complete detail.

He demonstrates that the development of Pointed Gothic architecture is entirely a question of stone vaulting. At first continuous tunnel vaults were used over the nave, supported *at their springing* on each side by half tunnel vaults over the upper story of the side aisles, and he instances the Church of Notre Dame du Port, Clermont-Ferrand, in the south

of France. This church is also illustrated by Rosengarten on page 266, and shows how this arrangement precludes the introduction of light into the upper part of the nave. On account of this difficulty the naves of some churches had a *wooden roof* only above the level of a range of clearstory windows, as at the original church of St. Remy at Reims. The aisles of these churches were often covered with *groined* vaults (that is to say, the intersection of two vaults at right angles to each other) which admitted of windows being continued up to their apex; but the early builders were not able to construct a groined vault over the width of a nave. Moreover, such a vault is most easily applicable to a *square* plan, and, if the bays of the aisles were square it follows that the wider naves consisted of *oblong* bays; that is to say, the arches from side to side, and which were strengthened by *transverse ribs*, were *wider* than the arches from pier to pier, which were strengthened by *wall ribs*.

What was to be done? If they all sprang from the same level, the wee wall arches would only reach part of the way up the transverse arches and would look ridiculous (though this system is adopted in Renaissance buildings, such as our St. Paul's Cathedral, and is there well managed). If the transverse arches were bodily raised above the clearstory the want of abutment would bring the whole church to grief. At Autun Cathedral they reduced this danger by adopting a *pointed* tunnel vault over a clearstory, but such churches have either fallen or been subsequently supported by flying buttresses, and still their tunnel vault is dark.

In the nave of Vézelay Abbey church a new departure was made at the beginning of the twelfth century by building a groined vault which rose from the apex of the wall ribs up to the level of the apex of the transverse ribs. This construction, or "domed groining," as it is sometimes called, was also used in the Rhenish churches. An improvement was effected in the porch or narthex of this same church at Vézelay (of which a section is given by Fergusson on p. 655), so far as the appearance of the vault is concerned, but at the sacrifice of clearstory windows again, so that not much had been gained. Viollet-le-Duc next discusses the possibility of getting the crowns of the wall ribs up to the same level as those of the transverse ribs, so that the wooden tie-beam roof may sit comfortably above them without any waste of space, with the result that down goes the springing line of the transverse ribs! That would not do. He says that it was after many hesitations that, towards 1220, the crowns of these two sets of ribs were arranged so as to reach the same level. Now the groins came to be strengthened by *diagonal ribs*. By comprising *two bays* of vaulting and making these diagonal ribs a semicircle, their height agreed pretty comfortably with that of the transverse ribs. True, this arrangement produced six spaces and gave the wall ribs a squint-eyed appearance; but it was followed for many years, and goes by the name of *hexpartite* vaulting.

The height of these great diagonals was felt to be a nuisance, for Viollet-le-Duc insists that the builders of those days *did not* wish to give their naves any loftier proportions than were required for the necessary fitting on of the side aisles; and that, at last, it occurred to them to treat *each bay* of the nave with its own diagonal ribs, of consequently less altitude and forming four spaces or *quadripartite* vaulting. This subject is more clearly explained in the lectures at the Architectural Association by means of a model; but it is also very fully described and illustrated in Scott's Academy Lectures, Nos. 14 and 15, in vol. ii.

Willis's paper on the construction of the vaults of the Middle Ages in vol. iii. of the Loan Collection of the Transactions is a recognised standard work on the subject, and deals with English examples. An excellent means of studying a building, book in hand, is afforded by Scott's "Gleanings from Westminster Abbey," and also by Willis's "Canterbury Cathedral." While Rickman's "Gothic Architecture" is a valuable companion in a visit to any part of our island. Parker's "Glossary," in three vols.; Bloxam's handy little pocket volume, Paley's "Gothic Mouldings," De Caumont's "Abécédaire" (for France), and Smith's "Gothic and Renaissance" (for all countries), are also portable friends in need.

Of larger works on Gothic architecture there is nearly no end. Pugin's "Specimens," his "Examples," Pugin & Britton's "Normandy," Britton's "Cathedrals," Sharpe's "Parallels," Turner's "Domestic Architecture of the Middle Ages," are all most useful; while of monographs on particular buildings, Neale's "St. Albans," Christian's "Skelton," and hosts of others will be found in the Institute Library. Last, but not least, the early volumes of the "Architectural Association Sketch-book" were far more devoted to Gothic work than the recent ones have been. While recognising the fact that there are many beautiful buildings in England that are not Gothic, it must not be forgotten that our Early English, Decorated, and Perpendicular styles are thoroughly national and are more at home in our climate and in the midst of our lovely scenery than Italian work can ever be; and that, in assimilating the juices of the latter we need not loosen our hold on the stem and branches of the former.

## Miscellanea.

**Prizes for Designs for Furniture.**—The Council of the Society of Arts are trustees of the sum of 400*l.*, presented to them by the Owen Jones Memorial Committee, to expend the interest thereof in prizes to "Students of the Schools of Art, who in annual competition produce the best designs for household furniture, carpets, wall-papers and hangings, damasks, chintzes, &c., regulated by the principles laid down by Owen Jones"; the prizes to "consist of a bound copy of Owen Jones's 'Principles of Design,' a bronze medal, and such sums of money as the fund admits of." The prizes will be awarded on the results of the annual competition of the Science and Art Department. Competing designs must be marked "In competition for the Owen Jones Prizes." No candidate who has gained one of the above prizes can again take part in this competition. The next award will be made in 1885, when six prizes are offered for competition, each prize to consist of a bound copy of Owen Jones's "Principles of Design," and the Society's Bronze Medal.

**A New Smoke-consuming Locomotive.** An engine of a novel type has recently been constructed by the Brooks Locomotive Works for the Chicago Locomotive Improvement Company. The head-light is placed where the stack generally is, while the stack is at the rear of the boiler and close to the cab. The boiler is one of the largest manufactured (what is known as a 60-in. shell), and the smoke, gas, &c., traverse it twice, along the bottom and over the back on the top to the stack. This makes such a good combustion that the finer particles of fuel, the gas, and the smoke are almost entirely consumed, and when the engine is going at full speed it is impossible to see any smoke. The smoke stack itself is very small, being not more than 7 in. to 8 in. in diameter. The patentee, Mr. Charles B. Coventry, claims among the advantages of this invention that it gets a steady, even draught, reduces the waste of fuel to a minimum, and throws no cinders, sparks, or fire. The locomotive is peculiar in appearance, but it is said that it does its work well. It weighs 40 tons, which is 10 tons heavier than the largest engine at present on the Dunkirk, Alleghany Valley, and Pittsburgh Railroad.—*Iron*.

**Royal Victoria Hall and Coffee Tavern.** This hall (long known as the Victoria Theatre), will re-open this Saturday, August 30. The programme for the coming season comprises "Variety" entertainments and lectures. In this connection we note that Mr. Malden is engaged to deliver a course of lectures on "Egypt and the Soudan." On each Monday André's Alpine Choir with soloists will appear, and on Wednesdays an assault-at-arms is included in the plan. The managers are evidently striving energetically to provide cheap amusements for the people, and we hope they will succeed in attracting large audiences.

**Eastbourne Fine Art Exhibition.**—We learn that in order to meet the wishes of exhibitors, the committee have decided upon a change of date, and to hold the above exhibition from the 24th of September to the 3rd of October, all exhibits to be sent in on the 22nd of September, 1884.

**Parcel Post Accommodation at St. Martin's-le-Grand.**—The roofs over the yards at the General Post-Office, St. Martin's-le-Grand, mentioned by us a fortnight ago, are glazed on Mr. T. W. Helliwell's patent system.

**A South Kensington Exhibition for 1886.**—The principal Indian Princes and Chiefs have been sent invitations to join the Royal Commission for the Exhibition of India and the Colonies, to be held in 1886. Among them may be named the Nizam, Scindiah, Holkar, the Maharajahs of Mysore, of Bhownuggur, of Cashmere, and of Oodeypore. The Governor General, the Governors of the two Presidencies of Bombay and Madras, the Political Agents, the Secretary of State, and some members of the Indian Council, Mr. Godley, Sir Owen Burne, Sir George Birdwood, Sir Philip Cunliffe Owen, Mr. Pedder, and other gentlemen connected with India have also been invited.

**Enlargement of the London School Board Offices.**—The offices of the London School Board on the Thames Embankment are now undergoing a very considerable enlargement by the erection of a new block of buildings having a frontage to the Embankment of 60 ft., and extending from the present offices to the newly-erected Fitzalan Chambers, which have just been built by the Law Land Company. The elevation of the extension will be uniform with that of the existing building. The accommodation provided by the enlargement will contain (besides numerous general offices) a new committee-room. The building is being erected from the designs of Mr. E. R. Robson, architect to the Board. The contractors are Messrs. Higgs & Hill.

**Tunbridge Wells.**—On Saturday last the Marchioness of Abergavenny laid the foundation-stone of a new convalescent home, which is about to be erected on a site adjoining Hawkenbury Church, near Tunbridge Wells. It was about fourteen years ago that Mrs. Thomas Ladds first established a similar institution on a small scale at Frant Forest. The new building, which will be of the Domestic Gothic style of architecture, will cost about 1,900*l.* It will be of red brick, and the walls will be hollow throughout. There will be accommodation for twenty-eight beds. The architect is Mr. J. Ladds, of Chapel-street, Bedford-row, London, and the builders are Messrs. Beale & Son, Frant-road, Tunbridge Wells.

**New Gas Tubing.**—We have received from Mr. Fletcher, of Warrington, a specimen of his new elastic rubber tubing, which is stated to be perfectly gas-tight and free from smell. The tubing is made of two layers of rubber, with pure soft tinfoil vulcanised between. This tube is "the result of many years' experiments." Irrespective of the well-known fact that extremely thin layers of rolled or beaten metal are perfectly gas-tight, the tube has been in practical use for some time, and has been thoroughly tested for months under continuous and heavy pressures of gas.

**Errata.**—By two vexatious errors which occurred in our last, the signatures of two of our correspondents were incorrectly given. The printer had been directed to substitute "R." for the "H." incorrectly printed as the initial letter in Mr. Herbert Carpenter's signature, so as to make it read correctly as "R. Herbert Carpenter," but in "correcting," the "R." was somehow substituted for the "E." which was the first initial of the writer of the letter about the curious floor at Croydon, whose signature should have been printed as "E. G. Carpenter."

**Gilchrist Engineering Scholarships.**—These scholarships, in connexion with University College, London, are given by the Gilchrist Trustees. They consist of an entrance scholarship, value 35*l.* per annum, tenable for two years, and a senior scholarship, value 80*l.* (half payable at the time of the award and half in the succeeding June), to be awarded at the close of each session. The examination for the entrance scholarship will be held this year on the 25th September and following days.

**Scandinavian Antiquities.**—Dr. Phené, F.S.A., has been for some time investigating the museums and private collections of antiquities in Scandinavia, and also the Ship Mounds of Norway, and the stone monuments of Denmark and Sweden, in continuation of his researches in Iceland and the Northern American Continent.

**The New Council Chamber at Guildhall.** The opening of the new Council Chamber at Guildhall will (according to the *City Press*) take place about the 25th of September. The building has cost about 40,000*l.* We gave a large view of the interior nearly a year ago.

**Disinfection and Deodorisation.** — We have received certain papers from Messrs. Fearenside & Baynes as to a patent automatic disinfecting and deodorising apparatus, which can be used in connexion with water-closets, urinals, water-carts, &c., and which is so designed that any given quantity of a disinfecting fluid can be mingled with the water and be automatically delivered whenever either of the appliances referred to comes into use. Mechanically the arrangement is ingenious, and wherever the regular mingling of a fluid disinfectant with any water becomes necessary it will be useful. But our doubt as to the value of this and allied appliances is twofold. If a water-closet, for example, be foul, its filth will certainly not be "disinfected" by means of such an arrangement. Disinfection must be regarded as meaning the destruction of matter capable of conveying infection, and in the present state of our knowledge as to what constitutes the poison of the infectious fevers we cannot speak of disinfection apart from the destruction of all the organic matter in which the infection may lie hidden, and it is certain that no occasional flushing with water containing a certain quantity of any of the ordinary so-called "disinfectants" attains this end. Then, again, if a water-closet does really stand in need of such occasional chemical flushings, it may be taken for granted that the apparatus is in fault, being one permitting the retention of contents or being otherwise favourable to foulness. The remedy is to get rid of the faulty contrivance, not to attempt to deal with it by disinfecting fluids. In so far as the apparatus facilitates deodorisation it may have important uses, especially in connexion with urinals and street watering, but even then we should prefer to see the removal of the conditions which lead to offensiveness, rather than the attempt, however successful, to deal with them by an ingenious method of deodorisation.—*Lancet*.

**A New Patent Safety Cage for Collieries.** At a meeting of the Bolton and District Colliery Managers' Association, held on Monday, Mr. J. Lindley, of the Clifton and Kearsley collieries, exhibited his model clip cage to prevent accidents arising from overcrowding or the breaking of the winding rope. In case of overcrowding, the orifice through which the rope passes presses together the loose iron jaws from which the cage is suspended, releasing the central pin, which slips out of the jaws, and the cage remains suspended instead of being dashed through the head gear. The apparatus to prevent the cage falling down the shaft through breakage of the rope, consists in connecting the lower ends of the top rods to a pair of levers mounted on each side of the cage, the other end of the levers being forked and connected to opposite ends of a pair of links, which are fastened to the ordinary wooden or iron guide rods. As soon as the cage is released from the rope the inner arms of the levers rise and force the links together. The inner side of the forks being provided with wedge projections, which come in contact with similar projections on the sides of the links, the cage remains suspended, wedged fast to the guide rods. The meeting approved the principle of the cage.

**Accidents in Summer.**—The remark is often made that accidents in the summer time rarely occur; in the short days of winter, darkened by fogs, and the roads made dangerous by frosts and floods, accidents are looked for as a matter of course. The growing taste for athletic pursuits, and the increasing risk to those who engage in them, have, however, brought the two seasons more into unison as regards liability to accidents, and no more striking evidence of the truth of this statement can be found than the statistics of the Railway Passengers Assurance Company. In the week ending the 12th of August, notice of injury to 210 insurers was received, and no fewer than five fatal cases were reported; the injuries were caused by accidents at lawn tennis and cricket, when bathing, boating, riding, and driving, bicycle and tricycle riding, &c.

**Health Exhibition Library.**—The catalogue of the Health Exhibition Library, which has just been brought out, but is to be regarded as still "under revision," owing to the influx of new publications, presents a long array of titles of books relating to hygiene, forming a collection which visitors to the exhibition are to have the opportunity of consulting, and two rooms in the Albert Hall have been set apart as a library and reading-room. The collection consists entirely of voluntary contributions.

**Roman Remains in London.**—Mr. Roach Smith, in a letter to the *Times*, says:—The destruction of the remains of London Wall has brought to light some unexpected and important evidence of the fortunes of Londinium which do not yet seem to have been adequately attended to. Many years since I noticed that the foundations of the Roman wall on the river side were largely constructed of materials which had previously been used in public buildings, and near Tower-hill some fine sepulchral monuments have been made to serve in the same inglorious capacity. More recently, during the further demolition of the wall, it has been ascertained that it was in part constructed with the materials of anterior buildings to an unsuspected extent, some of the bastions being largely composed of them; and now, in the curtain wall near Castle-street, in Bevis Marks, additional sculptured stones with fragmentary inscriptions are being disinterred, luckily under the supervision of a few active members of the London and Middlesex Archæological Society. They will make a valuable addition to those in the Guildhall Museum. These remains confirm the opinion I published many years ago on the comparatively late date of the circumvallation of Londinium known to us as London-wall.

**The New Sewerage Scheme for Sheffield.** At a meeting of the Sewerage and Rivers Committee, Mr. Wm. Todd, of Sheffield, was appointed clerk of the works in connexion with the sewerage scheme. There were 108 applications.

**The Iron and Steel Institute.** — The autumn meeting of this Institute is to take place in the city of Chester, on September 23rd and three following days.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Municipal Hall and Offices, Bombay | Municipal Commissnrs. | Rs. 5,000, 3,000, 2,000 | Nov. 6th | ii. |
| School Buildings | Governors of Longton Endowed School | Not stated | Not stated | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Making Roads | Wandsworth B. of Wks. | *Official* | Sept. 2nd | xxi. |
| Connecting House-Drainage with the Sewers | Brentford Local Board | do. | do. | ii. |
| Sewerage Works, &c. | Westminster B. of Wks. | do. | Sept. 3rd | xxii. |
| Painting, &c., Union Workhouse, Bromley | Grdns of Stepney Un. | Messrs. Harston | Sept. 4th | ii. |
| Pipe-Sewer and Road, Penge | Not stated | W. Adams Murphy | do. | ii. |
| Schools, and Master's Residence | Stanwix School Board | C. J. Ferguson | Sept. 5th | xxii. |
| St. Andrew's Church, Birchills, Walsall | do. | J. E. K. Cutts | do. | xxii. |
| Piling, &c. | Teddington Local Brd. | *Official* | Sept. 8th | ii. |
| Extension of Passenger Station at Halifax | Lan. & Yorks. Ry. Co. | do. | do. | xxii. |
| New Station at Bradford | do. | do. | Sept. 9th | xxii. |
| Broken Guernsey Granite | East Ham Local Board | do. | do. | ii. |
| Reservoir, &c. | Stratford-on-Avon T. C. | Ed. Pritchard | do. | xxii. |
| Shops and Offices, Market-place | Leicester Corporation | F. E. Lidiard James | Sept 11th | xxii. |
| Granite | Twickenham Local Brd. | *Official* | do. | xxii. |
| Asphalte Carriageway Pavements | Commissionrs of Sewers | do. | Sept. 12th | ii. |
| Sewerage Works at Presteigne | Knighton Un. R. S. A. | Chas. Slagg | Sept. 15th | xxii. |
| Brick and Pipe-Sewers, &c. | Willesden Local Board | *Official* | Sept. 16th | xxii. |
| Post-office at Stroud | Com. of H.M. Works | do. | Sept. 20th | ii. |
| Police-court and Offices at Stratford | West Ham Local Brd. | do. | Sept. 23rd | xxii. |
| Cooking Apparatus, Kitchen and Bakery Fittings, &c. | Corporation of Exeter | R. Stark Wilkinson | Sept. 25th | xxii. |
| Brick Sewer at Grove Park, Lee | Met. Board of Works | *Official* | do. | ii. |
| Enlargement of Station, Perth | Perth Gen. Statn. Com. | Blyth & Cunningham | Sept. 26th | ii. |
| New Offices, Berwick-street, Newcastle | Tyne Improvment Com. | R. J. Johnson | Sept. 30th | ii. |
| Re-building of superstructure & strengthening of Hammersmith Bridge | Met. Board of Works | *Official* | October 2nd | ii. |
| Portland Cement | Improvemnt Commsnrs Port of Calcutta | | October 8th | ii. |
| Gas Brackets, &c. | Leeds Corporation | *Official* | Not stated | ii. |
| Excavation, foundations, &c. | National Liberal Club | A. Waterhouse | do. | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Assistant to Surveyor's Office of Works | Civil Service Com. | Sept. 5th | Not stated | xviii. |

### TENDERS.

For new station, Upper-street, Islington, for the London Salvage Corps. Mr. Wimble, architect:—

| | |
|---|---|
| Dove Bros. | £13,675 0 0 |
| Scrivener & Co. | 13,615 0 0 |
| Grover | 13,334 0 0 |
| Bird | 13,289 0 0 |
| Greenwood | 12,993 0 0 |
| Lawrance & Sons | 12,771 0 0 |
| Morter | 12,737 0 0 |

For pulling down and rebuilding Nos. 1, 3, 5, and 7, Great Portland-street, Nos. 37 and 38, Great Castle-street, and premises in rear of Oxford-street, for Mr. Peter Robinson. Mr. A. E. Hughes, architect. Quantities by Messrs. Corderoy & Sandell:—

| | |
|---|---|
| Higgs & Hill (accepted) | £37,740 0 0 |

[Full list published by us a fortnight ago.]

For rebuilding No. 321, Strand, W.C. Mr. T. E. Knightley, architect. Quantities by Messrs. Batterbury & Huxley:—

| | |
|---|---|
| Kiddle & Sons | £3,900 0 0 |
| J. & J. Greenwood | 3,739 0 0 |
| C. Wall | 3,666 0 0 |
| Wm. Brass | 3,497 0 0 |
| Patman & Fotheringham | 3,385 0 0 |
| Ashby Bros. | 3,245 0 0 |

For the erection of a Bible Christian Chapel, Shanklin, Isle of Wight. Mr. James Newman, architect:—

| | |
|---|---|
| James Huyden | £1,932 0 0 |
| John White | 1,927 0 0 |
| George Hayles | 1,868 0 0 |
| Isaac Benton | 1,760 0 0 |
| James Ball (accepted) | 1,695 0 0 |
| A. Newnham | 1,490 0 0 |

For the erection of studio, Golder's-hill, Hampstead, for Sir T. Spencer Wells, bart. Mr. Arthur Vernon, architect, 26, Great George-street, Westminster, and High Wycombe:—

| | |
|---|---|
| Bird (accepted) | £316 0 0 |

For new sugar-boiling and confectionery works at Lincoln, for Messrs. Poppleton & Son. Mr. James Whitton, architect. Quantities supplied.

| | |
|---|---|
| Harrison & Sands | £3,847 0 0 |
| Kendall | 2,799 15 0 |
| Simpson & Goy | 2,756 0 0 |
| Horton | 2,745 0 0 |
| Morgan | 2,693 11 0 |
| Martin & Sims | 2,649 0 0 |
| Baines | 2,646 10 0 |
| H. S. & W. Close | 2,645 0 0 |
| Middleton | 2,607 19 0 |
| Knight | 2,600 0 0 |
| Bradley & Noble | 2,596 0 0 |
| Wright | 2,589 0 0 |
| Crosby & Sons (accepted) | 2,495 0 0 |
| J. M. Harrison | 2,487 0 0 |
| J. B. Harrison | 2,484 0 0 |
| J. & H. Woolhouse | 2,390 0 0 |
| Codd & Esberger | 2,165 0 0 |

For completing five houses, Gascony-avenue, Kilburn, for Mr. Geo. Gladman. Mr. Chas. J. Gladman, architect:—

| | |
|---|---|
| Falkner | £1,275 0 0 |
| Pryor | 1,175 0 0 |
| Barnett | 1,050 0 0 |
| Barnes (too late) | 1,232 2 9 |

For alterations and additions to No. 173, High-street, Brentford, for Mr. Geo. Stone. Mr. Chas. J. Gladman, architect:—

| | |
|---|---|
| Gibson | £334 10 0 |
| Nye | 265 0 0 |
| Dovey | 258 18 10 |
| Barnes | 244 3 10 |

For alterations and repairs to No. 34, Baker-street, for Mr. Arthur Canton. Mr. Chas. J. Gladman, architect:—

| | |
|---|---|
| D. D. & A. Brown | £417 0 0 |
| J. Brown | 375 13 0 |
| Langridge & Sons | 300 0 0 |
| J. Styles & Son | 295 0 0 |
| Falkner | 257 0 0 |

For the erection of a 42-quarter brewery, at Vauxhall, for Barrett's Screw Stopper Bottling Co., Limited. Messrs. H. Stopes & Co., architects, 24a, Southwark-street, S.E. Quantities by Mr. F. E. Morris, Colchester :—

*Main Building only.*

| | | | |
|---|---|---|---|
| Babbs Bros. | £8,230 | 0 | 0 ! |
| Thos. Hooper | 7,005 | 5 | 3 |
| R. & E. Evans | 6,598 | 0 | 0 |
| Balsam Bros. | 6,000 | 0 | 0 |
| Thos Watson | 5,896 | 0 | 0 |
| J. Rider Hunt | 5,656 | 0 | 0 |
| Chas. Oldridge & Sons | 5,650 | 0 | 0 |
| W. W. Lordeo & Sons | 5,549 | 0 | 0 |
| Ben Cook | 5,590 | 0 | 0 |
| Chas. Manning | 5,515 | 0 | 0 |
| G. Howard | 5,528 | 18 | 0 |
| O. T. Gibbons | 5,450 | 0 | 0 |
| R. W. Priestley | 5,437 | 0 | 0 |
| Jones Bros. | 5,342 | 0 | 0 |
| Chas Blyton | 5,400 | 0 | 0 |
| Edwin Stafford | 5,358 | 0 | 0 |
| Scharien & Williams | 5,278 | 0 | 0 |
| C. Ansell | 5,225 | 0 | 0 |
| W. F. Crosker | 5,195 | 0 | 0 |
| E. C. Howell & Sons | 5,190 | 0 | 0 |
| D. D. & A. Brown | 5,120 | 0 | 0 |
| F. Higgs | 5,080 | 0 | 0 |
| J. Allen & Sons | 4,989 | 0 | 0 |
| G. Stephenson | 4,978 | 0 | 0 |
| J Tyerman | 4,883 | 0 | 0 |
| J. Dickeson | 4,816 | 0 | 0 |
| Stephens & Bastow | 4,733 | 0 | 0 |
| Chas. Dickinson (accepted) | 4,480 | 0 | 0 ! |

For alterations and additions to Lucton Foundation Schools, near Kingsland, Herefordshire. Mr. F. R. Kempson, architect, Hereford. Quantities by Mr. F. Downing :—

| | School. £. | Sanatorium. £. s. |
|---|---|---|
| Jones & Sons, Sedgley, near Dudley | 12,000 | 1,900 0 |
| Beni Weale, Ludlow | 11,526 | 1,821 0 |
| D. D. & A. Brown, London, S.E. | 11,487 | 1,705 0 |
| Hudson & Warwick, Hereford | 11,450 | 1,780 0 |
| Bowers & Co., Hereford | 11,300 | 1,700 0 |
| Richard Yates, Shifnal | 11,150 | 1,695 0 |
| John Wood & Co., Westminster | 11,141 | 1,489 0 |
| Henry Welsh, Hereford | 11,000 | 1,700 0 |
| William Collis, Hereford | 11,000 | 1,700 0 |
| Horsman & Co., Wolverhampton | 10,997 | 1,595 0 |
| Thos. Collins, Tewkesbury | 10,984 | 1,560 0 |
| Chas. Claridge, Banbury | 10,568 | 1,495 0 |
| Edwards & Grosvenor, Leominster and Ludlow | 10,400 | 1,480 0 |
| Treasure & Son, Shrewsbury | 10,137 | 1,477 7 |
| Page & Son, Leominster | — | 1,418 10 |

For branch stores and dwelling-houses for the Denton and Haughton Cooperative Society, Limited, Denton, near Manchester. Mr. T. Cook, architect, Victoria-buildings, Manchester. Quantities by the architect :—

| | | | |
|---|---|---|---|
| Sandam & Thomson, Fairfield | £3,275 | 10 | 0 |
| Turner, Rumsford | 2,900 | 0 | 0 |
| Rone, Manchester | 2,727 | 0 | 0 |
| Macfarlane & Co., Manchester | 2,599 | 0 | 0 |
| Butter & Carson, Manchester | 2,589 | 0 | 0 |
| Haughton, Godley | 2,550 | 0 | 0 |
| Robinson & Parkes, Hyde | 2,527 | 0 | 0 |
| W. Brown, Salford * | 2,435 | 0 | 0 |
| Warmington, Newton Moor | 2,407 | 10 | 0 |
| Holland, Pendleton | 2,425 | 0 | 0 |
| Williams, Manchester * | 2,397 | 0 | 0 |
| Whittell, Manchester * | 2,331 | 0 | 0 |
| Burgess & Gault, Manchester | 2,310 | 0 | 0 |
| Haynes, Holme | 2,325 | 0 | 0 |
| Shaw Cuzner, Stalybridge | 2,312 | 0 | 0 |
| Aughton, Dukinfield | 2,310 | 0 | 0 |
| Clayton, Denton (accepted) | 2,300 | 0 | 0 |
| Robinson, Hyde | 2,297 | 0 | 0 |
| Stover, Denton | 2,291 | 0 | 0 |

* Too late.

For erection of additional schoolrooms and infant mistress's residence, at the Quarry-hill Board Schools, for the Gray's Thurrock School Board. Mr. E. Clerk Allam, architect, Romford. Quantities supplied :—

| | | | |
|---|---|---|---|
| E. Stafford, Old Kent-road | £6,298 | 0 | 0 ! |
| G. D. Seager, Gravesend | 4,570 | 0 | 0 |
| Thompson & Tweed, Burdett-road | 3,279 | 0 | 0 |
| Wm. Wood, Chelmsford | 3,184 | 0 | 0 |
| G. Mower, Hackney | 3,035 | 0 | 0 |
| Jas. Well, Stratford | 2,925 | 0 | 0 |
| S. W. Hawkins, London | 2,741 | 0 | 0 |
| Aldridge & Jenvey, Camberwell | 2,563 | 0 | 0 |
| H. J. Carter, Grays (accepted) | 2,635 | 0 | 0 ! |

For the erection of a shop and bakehouse at Williamstreet, Grays, for Mr. J. R. Banks. Mr. E. Clerk Allam, architect :—

| | | | |
|---|---|---|---|
| J. Brown, Grays (accepted) | £968 | 0 | 0 |

For rebuilding premises at the corner of Long Acre and Mercer-street, for Mr. Fredk. Kingwell. Mr. Albert E. Kingwell, architect, Victor House, Theobald's-road. Quantities supplied :—

| | | | |
|---|---|---|---|
| G. Kirk | £2,549 | 0 | 0 |
| W. & H. Salmon | 2,497 | 0 | 0 |
| Lawrance & Son | 2,350 | 0 | 0 |
| Pickersgill Bros. | 3,300 | 0 | 0 |
| Martin Wells & Co. | 2,280 | 0 | 0 |
| Kirk & Randall | 2,180 | 0 | 0 |
| Green (accepted) | 1,835 | 0 | 0 |

For painting, &c., at the Workhouse and Infirmary, for the Guardians of the Parish of St. Leonard, Shoreditch. Messrs. Lee & Smith, architects. Quantities by Mr. Walter Barnett :—

| | | | |
|---|---|---|---|
| Coombe | £675 | 0 | 0 ! |
| Shurmur | 675 | 0 | 0 |
| Green | 653 | 0 | 0 |
| Maskall | 572 | 0 | 0 |
| Barton | 550 | 0 | 0 |
| Gibbin | 533 | 0 | 0 |
| Flaxman | 512 | 0 | 0 |
| Hayworth | 495 | 0 | 0 |
| Wythe (accepted) | 442 | 0 | 0 |
| Harper | 437 | 10 | 0 |
| Ware | 400 | 0 | 0 |
| Deacon | 298 | 0 | 0 |
| Lawson | 275 | 0 | 0 ! |

For constructing 1,276 ft. lineal of 50 ft. road and 153 ft. lineal of 40 ft. road, kerbed with 12 in. by 6 in. granite kerb, and the requisite water-drainage, on the Surbiton Estate, No. 2, of the National Liberal Land Company, Limited. Mr. Geo. Pooley, surveyor, 26, Charing-cross, London, S.W. :—

| | | | |
|---|---|---|---|
| William Carter, Anerley | £1,155 | 0 | 0 |
| John Stickley, Surbiton | 1,050 | 0 | 0 |
| Samuel Chafen, Rotherithe | 947 | 0 | 0 |
| James Bloomfield, Tottenham | 925 | 0 | 0 |
| William Nicholls, Wood-green* | 895 | 0 | 0 |

* Accepted.

For the erection of three houses at Dorking, for Mr. G. Whitford. Mr. F. C. Dyer, architect, 93, Gracechurch-street, E.C. :—

| | | | |
|---|---|---|---|
| D. Dubbin (accepted) | £920 | 0 | 0 |

For Kettering Sewerage Works. Mr. R. W. Johnson, surveyor and engineer, Kettering :—

*Contract No. 1.—General Works.*

| | | | |
|---|---|---|---|
| Cooke & Co., Battersea | £5,690 | 0 | 0 |
| Corrie & Co., Lichfield | 5,327 | 0 | 0 |
| E. Barton, Rothwell | 5,273 | 0 | 0 |
| Sanders, Northampton | 4,748 | 0 | 0 |
| Dickson, St. Albans | 4,800 | 0 | 0 |
| C. & F. Henson, Kettering | 4,650 | 0 | 0 |
| F. Barton, Kettering | 4,108 | 10 | 0 |
| Geo. V. Henson, Kettering* | 4,100 | 0 | 0 |

*Contract No. 2.—Ironwork.*

| | | | |
|---|---|---|---|
| Wright Bros., Leicester | 724 | 6 | 0 |
| Cave, Northampton | 495 | 0 | 0 |
| Mobbs, Northampton | 492 | 10 | 0 |
| Cort & Paul, Leicester | 473 | 0 | 0 |
| Salmon, Kettering | 450 | 0 | 0 |
| Studd & Co., Kettering | 444 | 6 | 0 |
| Gimson & Co., Leicester* | 396 | 15 | 0 |

* Accepted.

For making new road, to be called Franche Court-road, leading out of Burntwoodlane, Wandsworth, and sewer, for Mr John Mossop. Mr. Richard M. Hiscocks, architect and surveyor, Wandsworth :—

| | | | |
|---|---|---|---|
| G. & R. Neal | £248 | 0 | 0 |
| Jas. Neal | 220 | 0 | 0 |
| J. Nobbs | 210 | 0 | 0 |
| G. Butler | 185 | 0 | 0 |
| W. Hampton (accepted) | 174 | 0 | 0 |

For making a new road and sewer, leading out of Garratt-lane, Wandsworth, for Mrs. Diana Keatch, of Garratt. Mr. Richard M. Hiscocks, architect and surveyor, Wandsworth :—

| | | | |
|---|---|---|---|
| G. & R. Neal | £174 | 0 | 0 |
| J. Nobbs | 135 | 0 | 0 |
| Jas. Neal | 124 | 0 | 0 |
| G. Butler | 114 | 0 | 0 |
| W. Hampton (accepted) | 112 | 0 | 0 |

For the erection of a portion of premises in Baldwin and Queen Charlotte streets, Bristol, for Messrs. C. T. Jefferies & Sons. Mr. Frank Wells, architect :—

| | | | |
|---|---|---|---|
| Brock & Hine | £4,353 | 0 | 0 |
| A. J. Beaven | 4,200 | 0 | 0 |
| A. Krauss | 4,170 | 0 | 0 |
| H. A. Fuse | 4,158 | 0 | 0 |
| J. Wilkins | 4,130 | 0 | 0 |
| W. Church | 4,079 | 0 | 0 |
| C. Clark, Fishponds | 4,033 | 0 | 0 |
| G. Humphreys | 3,998 | 0 | 0 |
| R. J. Crocker | 3,957 | 0 | 0 |
| Stephens & Bastow | 3,949 | 0 | 0 |
| J. E. Davis | 3,943 | 0 | 0 |
| Eastabrook & Sons | 3,930 | 0 | 0 |
| E. & T. Hatherly | 3,857 | 0 | 0 |
| W. Cowlin & Son (accepted) | 3,821 | 0 | 0 |

For the enlargement and decoration of Lewinsdale House, Weston-super-Mare, for the Rev. Wm. Wheeler Aldridge. Messrs. E. H. Lingen-Barker & Fredk. T. H. Chambers, architects :—

| | | | |
|---|---|---|---|
| Theophilus Palmer (accepted) | £452 | 11 | 10 |

For new stables, &c., to Lewinsdale House, Weston-super-Mare, for the Rev. Wheeler Aldridge. Messrs. E. H. Lingen-Barker & Fredk. T. H. Chambers, architects :—

| | | | |
|---|---|---|---|
| John Palmer | £753 | 0 | 0 |
| Theophilus Palmer | 667 | 0 | 0 |
| Edwin Bryant | 551 | 0 | 0 |
| Thomas Lye | 495 | 0 | 0 |
| Underhay & Pine | 459 | 0 | 0 |
| Charles Addicott (accepted) | 445 | 0 | 0 |

Accepted for altering and rebuilding The Bridge of Hope Mission-rooms, St. George's-in-the-East. Mr. E. M. Whittaker, architect :—

| | | | |
|---|---|---|---|
| The Building, Fitting, and Furnishing Company, Limited (formerly Thos. Hogben & Co.) | £945 | 0 | 0 |

Accepted for shop fittings to Nos. 128 and 129, Cheapside, for Mr. G. Fischer :—

| | | | |
|---|---|---|---|
| The Building, Fitting, and Furnishing Company, Limited | £411 | 0 | 0 |

Accepted for office fittings to the Equitable Fire Insurance Office, No. 69, Lombard-street :—

| | | | |
|---|---|---|---|
| The Building, Fitting, and Furnishing Company, Limited | £222 | 10 | 0 |

Accepted for shop-front and fittings, for Mrs. Swindley, No. 21, Church-street, Kensington :—

| | | | |
|---|---|---|---|
| The Building, Fitting, and Furnishing Company, Limited | £218 | 0 | 0 |

*The "Falcon," Clapham.*—In our last (p. 279) we gave a list of tenders for alterations at the Falcon public-house, Bedford-road, Clapham. We are asked to say that the accepted tender was that of Mr. Benjamin Cook, of Farringdon-street, and not "Cook Bros."

*Cottages, Shacklewell Estate.*—The name of the successful competitor for this work, and for that mentioned immediately following it in our last (p. 280), should have been printed "Dales," *not* "Dale." Correspondents should be more careful in writing names. We this week have to exclude a list of tenders altogether on account of illegibility.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

C. C. H.—Major K.—R. S. F. (photograph received).—A. W. (proof shall be sent).—A. J. (photographs received).—W. H. T. (drawing received).—L. & L.—J. J. H.—L. H.—W. P. B. (next week).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors

*We cannot undertake to return rejected communications*

Letters or communications beyond mere news-items which have been duplicated for other journals, are NOT DESIRED.


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"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 28s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

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And Farleigh Down.
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# The Builder.

VOL. XLVII. No. 2170. SATURDAY, SEPTEMBER 6, 1884.


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### *The Two Designs for the Decoration of St. Paul's.*



ON the 5th of July last we published a coloured plate showing a reduction of the general design by Mr. Poynter for the decoration of the dome of St. Paul's, and two plates, giving on a larger scale the subjects painted by Sir F. Leighton and Mr Poynter respectively for the larger and smaller circular spaces between what may be called the ribs of the design. The design from which our coloured illustration was taken was then expected to be in a few days exposed to public view in its place in the dome; but unforeseen difficulties in the fixing of the immense cartoon appear to have led to repeated delays, and it was only about the commencement of this week that the scaffolding was so far removed as to render it possible to form an idea of the effect of the cartoon *in situ*. Since that design was published we learn that there has been "another Richmond in the field." Mr. Hugh Stannus has been for some time engaged in working out a design of his own, the cartoon for which is also now fixed in position on the opposite side of the dome. We publish in this number a fac-simile of a line drawing kindly furnished to us by Mr. Stannus, showing his design so far as it can be shown without the aid of colour; and in another column will be found his own statement, at some length, as to his views and intentions in the design. Mr. Poynter's description of the motive and working out of his design will be found in the *Builder* for July 5th, under the heading "Illustrations." Both designs are professedly based, in general scheme, on the grand sketch left by Stevens, of whom Mr. Stannus, we believe, was a pupil; and both may be said to have to some extent the same object,—that of reducing the lines of Stevens's design into more strictly architectural form, and rendering it more in accordance with architectural fitness and expression in regard to the arrangement of the substructure.

It is only fair to Mr. Stannus to say at once that the drawing he furnishes, and for which we are not responsible, does no justice to the effect of his design as seen in the coloured cartoon; and those who are interested in the experiment and are within reach should visit St. Paul's and make their estimate from the cartoons themselves. It is also as well to explain that the larger and smaller intermediate circles are purposely only roughly filled in with indications of pictorial subjects, because, as we understand him, Mr. Stannus regards those as out of his jurisdiction and to be filled up, as in the other scheme, by Sir F. Leighton and Mr. Poynter. He has designed certain accessory figures in the base of each compartment and in the lunettes in the drum, and of these it is not, perhaps, necessary to say much. They are not likely to be executed as designed; but that does not affect much the main *raison d'être* of Mr. Stannus's design, which, as he himself says in his description, is an architect's design rather than a painter's, and is intended really to suggest a different method of treating the architectural detail and arranging and dividing the space.

The other cartoon, of course, stands on different ground. Though grouped in accordance with what may be regarded as the architectural lines of the structure (concerning which a word anon), and though it was intended, as explained in the description given, mostly in Mr. Poynter's own words,—(p. 11, *ante*), to reduce to more architectural congruity the rather ragged lines of Stevens's composition, it is essentially a painter's design, and as such is to be judged. Of the very fine character of some of the work there will be no question, we surmise, raised anywhere. We must humbly confess that the large circle, painted by the "P.R.A.," the picture of "the sea giving up her dead," does not strike us as happy, even with some alterations which appear to have been made in it since it was first painted. Its effect is, as we heard it put, somewhat "gruesome." There is no suggestion in it, to our thinking, of the rising of imprisoned souls to a vision of immortal life, which surely would have been the most suitable idea to have suggested in the centre and crowning portion of a great Christian church. It suggests rather the slow and painful ascent of corpses from the waves, as if dragged up perpendicularly by some unseen but relentless force. The idea is not an inspiring one, and we fear the design will not find many favourites. Of Mr. Poynter's figure subjects, two portions at least are equal to anything he has ever done, and may, in fact, rank among his very finest productions. The seated figure of the prophet, and that of the angel beside him, recall Michelangelo, certainly; but, they recall him in a way in which modern painting has not often succeeded in recalling the manner of the great Florentine. They are in his spirit, but are no plagiarisms. In this respect they carry on also the spirit of Stevens, whose powerful figures they supersede, and who may be said to have been Michelangelesque or nothing. The painting in the lunette above, of "Christ in Judgment," has less of the Michelangelesque and more of the modern artist. As we saw it in Mr. Poynter's studio, it appeared a grand design, and one which to a remarkable degree solved the difficult problem of combining decorative effect with life-like delineation of the figure. The aspect of the face of Christ, stern and passionless, the foreshortening of the outstretched right hand, the drawing and grouping of the other figures in the composition, the cherubim who fill up the space in subordination to the principal figure, go to make a very powerful work, impressive in feeling as well as in drawing and composition. But now comes the moral of the tale: how are all these qualities to be recognised by the spectator who, with aching muscles, throws his head back to gaze up at this apparently small lunette far up in the dome? The fine points of the work are quite lost; only the main disposition of the figures can be realised. The small scale to which the work is reduced is the more emphasised by the larger size of the circular subject underneath it and somewhat nearer the eye; and the proper relative importance of the two subjects thus seems reversed; the incident of the rising of the dead from the sea becomes the most important and strikes the eye most, while the figure of Christ in judgment, which certainly should be the predominant one, is placed in a smaller and less important section of the design, and thus becomes dwarfed into a secondary position. In regard to this, Mr. Stannus's arrangement of the spaces appears to afford better opportunities for the painter. The two sets of circles are more distinct in size, and thus the large lower circle could be employed for the principal subjects, and the small ones above merely for subsidiary related subjects or decorative figures. That is not the idea suggested by Mr. Stannus; but that is the use to which we should put his scheme when it came to filling in the framework with painted subjects. The main subjects would then have more space and be nearer the eye. Whether Mr. Poynter's lower figures of the prophet and the angel, at the base of the segment, tell any better from below, it is not easy to say, as on Tuesday, when we looked at them, the scaffold still partially hid the base of the cartoon. They will probably tell the best, however, from their vigorous action and their more favourable position in regard to the spectator on the floor.* But in regard to the upper lunette, the result appears to us to be, what we feared from the first, the consigning of very fine work to a position in which it is quite lost.

When we leave the consideration of the pictorial subjects, and come to regard the effect of each design as a whole and in relation to the architecture, we can then consider them on equal ground. The idea in both is

* Of course from the Whispering Gallery the subjects can be seen well enough; but then one can hardly regard them as painted to be seen from there.

that of dividing the dome into eight compartments by eight ribs or more solid and architecturalised portions of the design, and eight interspaces corresponding to the division which is in some sort suggested by the architecture. Considering them in this light, the contrast between the painter's and the architect's design comes out very characteristically. If it be regarded as an object to divide the dome up into ribs and spaces, Mr. Poynter's design fails in emphasis. The rib portions are not sufficiently homogeneous (though far more so than in Stevens's design), nor do they assert themselves with sufficient prominence to keep the spaces in subordination. There is a want of leading lines about the whole; or, rather, the leading lines are not sufficiently brought out. It may have been Mr. Poynter's object to avoid this,—to break up the whole so as to escape having too prominent a division between ribs and spaces. But half measures are not satisfactory in such a case. Either you wish the dome to be a "rib-and-space" design, or you do not. If you do intend that, do it thoroughly and with no shirking. If the ribs are to be architectural lines, supposed to have relation to the structure, let them be strong and clearly defined, as architectural lines should be. Now from this point of view Mr. Stannus's arrangement meets the case the better of the two. He has not only emphasised his rib-lines and kept them simpler and more homogeneous, but he has suggested further strengthening them by treatment in relief; and this is strictly logical if the rib-and-space treatment be accepted. Supposing that we wish this architectural division of the dome, Mr. Stannus's is a frank acceptation of it worked out in a frankly architectural manner. His lines are everywhere stronger and more decisive; and he has acted well in stopping the design somewhat below the opening of the lantern, and strongly emphasising the horizontal circle there (more so in the cartoon than this drawing shows). In the conventional scroll-work running round the drum of the dome, which both designs exhibit nearly in the same position, Mr. Poynter shows more elegant, graceful, and original detail, more distinctively painter's work; Mr. Stannus shows larger and broader and more strictly architectural detail, more in keeping with the building; but also, from its large scale, rather tending to dwarf the architecture. If the whole of the substructure were decorated in the same key and in the same style, Mr. Stannus's dome design would be a thoroughly architectural finish in the ordinary sense, locking the whole design of dome and substructure together with its firmly-knit lines. But,—and this is a very formidable "but,"—it would sensibly and materially lower the apparent height of the dome. It does so already, even in ordinary colouring; so much so that it is difficult to believe that it is not actually lower than Mr. Poynter's, though both of them, we presume, are fixed in the same manner against the internal surface of the dome; and how much more would it do so if executed with the harder surface and stronger colour of mosaic!

And this brings us to the very central question affecting the whole scheme. Is it, after all, the right thing to divide the dome up into compartments in this formal manner? We spoke advisedly of such an arrangement as having reference to the "substructure," but what about the dome itself? The reply of those who wish for this rib-and-space division, of course, will be that Wren has so divided the dome structurally by his interposition of solid piers between each set of three windows. In other words, Wren knew that the dome wanted both lighting and buttressing, and he arranged for both, and he showed the buttressing externally also. But because counterforts are thus provided for the dome without interfering with its light, is it, therefore, any less in itself a dome, viz., a homogeneous spherical roof? Certainly not, and there is not a hint of dividing it internally into gores or sections, architecturally speaking. Thornhill treated his paintings so, it is true, and we may observe in passing that it is a question, if this architectural division of the dome be adopted, whether Thornhill's design is not, saving its Brobdingnagian rococo ornaments, the most effective in its general idea of all the three schemes that are at present to be seen on the concave of the dome. But we assert, in the face of all three, that this is not the true way to decorate a dome internally. A dome is essentially an undivided concave vault. To divide it into so many ribs is not only to contradict its real construction (whatever may be the arrangement of its substructure), but to lose all its effect of grandeur and mystery by dividing it up into measurable slices. Mr. Poynter's design, irrespective of its pictorial value, reduces the height, and what may be called the special expression of the dome, less than Mr. Stannus's, *because* its rib-divisions are incompletely emphasised, and are, therefore, less forced upon the eye. Sweep them away altogether, then, and instead of pretending to divide up the dome into ribs and spaces, treat it as what it is, one great homogeneous concave; fill it with a host of angels, or some such suggestive treatment, which would give a grand total effect, and would suggest a grand idea, without making the hopeless attempt to place a number of isolated and differentiated individual figures in a position where it is impossible they can ever be really seen, or their special expression appreciated. Do not throw away fine painting by placing it where it can never be seen; and do not throw away the whole real grandeur and mystery of a dome by cutting it up into sections like an orange. That appears to us to be the summary of the moral to be derived from the study of the two cartoons now hung in St. Paul's Cathedral.

## PROPOSED FORTH AND CLYDE SHIP CANAL.

A PROMINENT engineering tendency of the age is the construction of short-cuts for ocean navigation and traffic. The magnificent success of the great Suez project, persisted in through much evil report and infinite discouragement, has been the chief incentive, and now all over the globe schemes of a kindred description are found in various stages of inception and progress. The days of canal making for purposes of inland traffic intercommunication merely have long since gone by, this class of work having been rendered all but obsolete by the greatly superior contrivance of the steam-worked railway. The railway cannot do everything, however. It is confined somewhat strictly within its legitimate domain of dry land, and cannot in any appreciable degree invade that of ocean navigation, although in mere coasting traffic it stands a powerful rival. The sea-going steamer may, on the contrary, by means of the ship canal contrivance, be made to affect the railway supremacy to a serious extent, there being, it may be said, no physical limit to the piercing of dry land for these waterways, except that of expense alone. In this sense, the operation of canal building, once so active and of late so dead, promises a vigorous revival, with results of a thoroughly revolutionary character so far as the channels of ocean-borne traffic are concerned. The Manchester proposal, for the time in abeyance, is that which has elicited the most earnestness and vigour within our own borders. Its almost realised success, so far as the Parliamentary stage is concerned had previously revived discussion upon the subject of ship canals generally, including one to connect the Tyne and Solway, but more particularly an older and much more momentous project, that, viz., of cutting the strikingly narrow neck of land between the estuaries of the Forth and Clyde, and thereby transforming the one island of Great Britain into two. This is a scheme which even an uninformed glance at the map will show to be rather a fascinating one.

From Lizard Point in Cornwall, the most southerly stretch of England, to Dunnet Head in Caithness, the most northerly projection of the Scottish mainland, the distance, as the crow flies, is about 600 miles. The Orkney and Shetland groups of islands stretch in all about 150 miles still farther to the north, terminating in the Scaw of Unst, which is thus in a straight line distant about 750 miles from the most southerly point in England. With all vessels of any pretensions to size making from the North Sea into the Atlantic, it becomes a question whether passage is to be made southward through the English Channel, or northward *viâ* the Pentland Firth. This alternative does not hold good, however, in certain exaggerations of unfavourable weather, and sometimes, especially in the case of sailing vessels, the longer though opener route, right round the north isles, is preferred before crowded Channel and dreaded Pentland alike. On the east coast, nearly 200 miles from the most northerly point of the mainland, the estuary of the Forth cuts about due west into the land, presenting on the map a wedge-like indentation, sixty miles long or thereabout. Almost directly opposite, on the west side, the Firth of Clyde breaks the coast-line with rather more of irregularity, projecting its inner waters in the direction, generally speaking, of the higher reaches of its eastern *vis-à-vis*, from which it is thus separated by a comparatively narrow isthmus. If this isthmus were adequately cut, as has been proposed, the east and west ocean and deep sea traffics would unquestionably be revolutionised, whatever might be the financial fortune or misfortune accruing to the promoters.

It is a neck of land of singularly low elevation, as compared with the ruling cross sections of Scotland, which elsewhere are all very hilly when not positively mountainous. The Romans marked it as a pass of great natural weakness, and drew across it seventeen centuries ago a defending earthwork, whose vestiges at numerous points and stretches from sea to sea are still plainly traceable. Generally speaking, it bears the appearance of a valley of trifling width, bounded on the north by hills of some elevation, and on the south by grounds of a very moderate rise. Except in the neighbourhood of Falkirk, the population is sparse, the small towns of Kilsyth and Kirkintilloch, with a few insignificant villages, comprising the whole, exclusive of the purely agricultural element. The River Kelvin, which falls into the Clyde at Glasgow, occupies the bottom of the depression over more than half its course; while the Carron in its lower reaches with its affluent the Bonny Water, whose united streams reach the Firth of Forth at Grangemouth, take up a similar position over the smaller eastern half. One of the Edinburgh and Glasgow turnpike routes accompanies the valley much of its way. The Kelvin Valley Railway, with extensions and connexions, scores it from end to end; and lastly, there is the Forth and Clyde Canal, which, in its small way, makes the most alike of narrowness of isthmus and moderation of summit level. This canal is quite complete of its kind, and was really at one time a ship canal of the period, accommodating the craft which then carried on the trade between the North of Europe and the West Coast, and for a while, indeed, existing in the highest reputation. The "Great Canal," as it was then termed, has outlived its greatness owing to the enormous strides in navigation of all kinds during the past half-century; but as this concern would have to be "reckoned with" (bought up most likely) in the event of a new enterprise, its record may here be briefly summarised.

In the year 1767 Parliament was applied to uninfluentially for permission to construct from firth to firth a ditch canal, 4 ft. deep, but general attention being thereupon aroused and becoming intensely interested, the scheme at once developed to the scope of a ship canal of 7 ft. depth, under the auspices of a powerful company. Operations commenced in 1768, and in the year 1773 the canal was navigable from Grangemouth to Kirkintilloch. Three years subsequently the neighbourhood of Glasgow was reached, but it was not until 1790 that finished junction was made with the Clyde at Bowling. The Clyde at Glasgow, and for many miles below, was a trifling stream

in those days, capable of accommodating nothing larger than the smallest of sailing craft, and then only at high water. But for this radical defect the canal might have terminated in the river immediately below the city, to the saving of at least ten miles of additional excavation in carrying the work down to Bowling Bay. At various epochs the depth of the canal was increased slightly, but this being a movement necessarily limited in a finished lockage work of the kind, it has long since ceased. Rising from the tidal water at Grangemouth, the work mounts in the course of ten miles and a half, by means of twenty locks in all, to its summit level of 156 ft. This level is maintained unbroken for sixteen miles, descent to the Clyde being effected over the remainder of the course by means of nineteen locks. The length of the work from sea to sea is thirty-five miles. The locks measure 74 ft. by 20 ft., and the waterway when full affords a draft of rather over 9 ft. The original capital involved stood at 150,000*l.*, but 70,000*l.* had afterwards to be borrowed privately, in addition to 50,000*l.* lent by the Government, sums, however, which were fully redeemed subsequently. As testifying to the amount of general, or rather national, interest surrounding the inception of the undertaking, it is worth noting that at the first general meeting of proprietors, held at the St. Alban's Tavern, St. Alban's-street, London, on the 14th of March, 1768, the Duke of Queensberry and Dover presiding, there were present four dukes, one marquis, four earls, and three baronets, besides a powerful residuum of untitled shareholders. At that time there were only two canals in operation within the British islands, though many schemes were in projection; but this of the Forth and Clyde stood alone in its quality as a navigable arm of the sea, through which, when the wind proved favourable, masted craft might freely pass by the impulse of their own canvas alone. And the idea was in some limited sense realised too, before steam stepped in and revolutionised the conditions of navigation generally. During the long war, traffic from the west of Scotland round the north and south points of Britain became all but extinguished, the canal securing nearly the whole of that portion of it still braving the risks of capture; but when peace was restored, the inevitable restrictions imposed by draught of water and dimensions of canal locks gradually told, and accordingly in the year 1816 we find many ships, slightly larger than the canal capacity, making the round passage to the Continent, and the governor and council of the company stretching every nerve in the way of possible enlargement of works and easement of traffic, in order to arrest, or at least impede, so threatening a tendency. The battle was a losing one for the latter from the first, though this was not generally apparent till the advent of steam navigation and the gradual introduction of those giant changes which have been effected through its agency. The canal has for many years been in the possession, and under the management, of the Caledonian Railway Company. Small coasting sloops and schooners occasionally use it on an emergency, and fishing-boats, from as far away sometimes as St. Ives in Cornwall, employ it as a short cut from eastern to western herring-grounds and *vice versa*. Middlesbrough pig-iron for the Glasgow market follows this route chiefly; but is invariably trans-shipped at Grangemouth into steam barges or horse-tracked craft, by means of which, also, a rather languid traffic in general merchandise is carried on.

When the Forth and Clyde Canal was projected the City of Glasgow was a place of barely 30,000 inhabitants. The Clyde was a paltry stream so far as navigation was concerned, though of some consequence in connexion with the salmon fishing industry. Smeaton, the engineer, had some years previously surveyed and reported upon it to the Navigation Trustees, with the result that an engagement with a Chester contractor was entered into for the deepening of the below-bridge channel. Under these operations the river became so scoured that by the year 1775 vessels drawing almost, but not quite, 6 ft. of water could come up from the sea,—a result which was at that time regarded as partaking of the nature of an achievement. Glasgow in our day, with the suburbs which its mushroom-like growth has gradually absorbed, possesses a population of, in round numbers, 700,000. The Clyde, from Greenock upwards, has since that time undergone so stupendous an excavation, carried on from year to year unceasingly, that the largest ironclad of the navy may now be piloted right up into the harbour itself, in all ease and security. The Clyde below Glasgow and until deep-sea water is reached is, in point of fact, only nominally a river, being in reality an inland ship canal of nearly twenty miles in length,—and a ship canal, too, of the very foremost grade; measured, that is, by depth of water and width of channel. This magnificent artificial waterway cuts into the land in an easterly direction with an inclination southwards, and in any scheme for piercing the Isthmus between the two Firths with a view to large-ship unimpeded navigation, these great Clyde works must be held as presenting, already in an entirely completed state, about one-third of the ambitious channel aimed at. Taking the Ordnance Survey sheets, it is seen that under the vastly improved conditions noted, a straight line drawn between the two points of deep-sea navigation which most closely approach each other, namely from the mouth of the Carron at Grangemouth to the Clyde about two miles and a half below Glasgow, stretches a distance of about twenty-five miles only. It is not necessary to go down now to Bowling or elsewhere for deep-water, deep-water having already been carried artificially up, even much higher than necessary for the particular purpose under review. The straight line thus hypothetically drawn, pursues throughout, with a fidelity which is rather striking at first glance, the base level of the crossing valley or depression already described. A short distance from the Clyde, whose margin at the point struck presents an exceedingly moderate rise, the Bowling arm of the old canal is crossed, and immediately after the river Kelvin is caught up at a great elbow of its course, round which it turns to the south-east in seeking a rather tortuous outlet higher up the Clyde at Glasgow. The Kelvin, which is not in any sense at all a navigable stream, is, generally speaking, straight in its course above this elbow. The valley through which it flows, and which bears its name, is at least practically straight stretching at a very gentle rise east-north-east past Kirkintilloch and Kilsyth, and pointing throughout right across the isthmus on the line of its narrowest section. Our suppositious map line keeps about the centre of this valley all the way, joining, about four miles distant from the Kelvin elbow mentioned, the course of the Forth and Clyde Canal, which at construction was made to hold rather more to the south than the levels demanded, and that for the purpose of passing Glasgow at a moderate distance only, a navigable cut to the northern suburbs of that city being also part of the scheme. The existing canal, once thus caught up, is not left again to any appreciable extent, as, after passing the head-springs of the Kelvin, it traverses the east-going and now descending valley of the Bonny Water, and soon thereafter enters upon the flat low-lying carse land through which the Carron tediously seeks its way for some distance above its entrance into the sea at the port of Grangemouth, the point at which also the present artificial navigation ceases. On the line thus rapidly overrun in description there are no hilly ranges to be cut; hardly anything even of the nature of a difficult ridge to be pierced, if difficulty be here measured by the best resources of modern engineering. But unquestionably the cutting of the isthmus for a tidal deep-water lockless canal, even under natural and artificial conditions of so singularly favourable a kind, must prove a work of extraordinary labour and outlay. The existing canal reaches its summit level at 156 ft., and remains at that for sixteen miles. There is here provided a kind of basis for calculating the amount of excavation which the cutting of a tidal waterway would necessitate. Yet is there room for a very liberal discount in the calculation; for it is found that over these sixteen miles the old canal, to preserve its level unbroken, has often to pass incidental depressions either by a deviation of track at the expense of increased length, or by embankment at the cost of massive works. Indeed, the old waterway, in its summit level section, is so far from taking advantage of the lowest levels procurable, that it is very frequently carried over, rather than under, roadways, railways, and watercourses. In the case of a tidal canal starting, as such a work must inevitably do, with a wholesale and uncompromising scheme of excavation throughout, a straighter, and therefore shorter, route might be embraced, and the benefit could be freely taken of whatever incidental depressions of surface the surveyors might encounter. The value of the land along the central valley is not very great. Much of the area was of old time mere morass, and part of it is still comparatively worthless moss. The arable portions take generally a very moderate standing as to market value, and the principal wealth consists in the minerals, which are worked almost unbroken from sea to sea. The mineral interest especially, and probably all the others except railways alone, would hail the prospect of a ship canal with the greatest ardour, and be prepared severally to concede the requisite facilities on terms most equitable, not to say most favourable. The roads and railways intersecting the route, for which swing or other opening bridges would have to be provided, are not numerous. The intersecting traffic is already partly inured



to the drawback, the Scottish Central Railway and the Great North Turnpike having been all along served in this way, though the Caledonian Railway and many minor roads are made to pass underneath.

It has been proposed,—perhaps hardly in serious mood, however,—to carry the canal by a wide half-circle round into Loch Lomond and thence through the Endrick and Forth valleys to the deep water of the eastern Firth. Over and above the almost fatal necessity of lockage impediments militating against a proposal of the kind, there are other disabilities, such as tedious length of route, barrenness of borders, &c., to which it would be difficult to reconcile likely promoters; and the idea has, therefore, been generally dismissed as beyond the pale of serious discussion. The central valley is the only likely route for a ship canal connecting the two estuaries, and if not made there it may safely be asserted that it will be made at no other crossing. The existing canal would be of immense assistance in aiding the progress of the new works, and even although it had to be bought and paid for bodily, as a preliminary to the starting of operations, the works services afterwards rendered might more than square the outlay. The advantages to be gained in a national point of view by the cutting of this isthmus for a ship canal of really first-class proportions are so prominent as to forcibly indicate the realisation as a suitable and proper undertaking for Government itself, rather than any mere syndicate of private investors. It has been pointed out, and not without justice perhaps, that were this country at war with any coalition of foreign naval powers, the ability to send ironclads from coast to coast within the space of a few hours would be almost equivalent to a doubling of the actual national fighting material afloat. In a large measure, too, the canal would furnish a solution of the east coast harbour-of-refuge problem, so far as Scotland is concerned; for traffic, instead of running the gauntlet south or north along the dangerous coast line would, as a matter of course, make for the Forth,—then as now the only available natural harbour of refuge on the Scottish line; and then, in addition, affording a safe and swift passage across to the western seas. Ocean traffic in foreign bottoms from the Baltic and North of Europe generally would take advantage of the short cut when bound west, while Glasgow, which at present sends large fleets constantly both round north and round south to the Continent, would of itself be answerable for no small part of the revenue necessary to make ends meet. The British Government is not entirely new to the canal business. The Suez investment has turned out successful beyond the dreams of the most sanguine at the time the purchase was made. The Caledonian Canal, finished on a national basis in the year 1822, and connecting West Highland waters with the Moray Firth, is not susceptible of so complacent a review, however. It was meant really to be a ship canal, serving all the uses of commerce and for all time to come. Its locks were constructed 170 ft. long, 40 ft. wide, and offering quite a generous draught of water, but it can hardly be said ever to have been accepted as other than a wondrous effort of civil engineering, and a noble monument to the genius of Telford. Tourist steamers have it now almost entirely to themselves, and they are abundantly patronised for the scenery is of the grandest; but as a through traffic route it has never taken any place, and it is chiefly useful to the Government and the nation as a standing warning against the repetition of costly, yet still but half-hearted, schemes of the kind. The existence of locks seems to be fatal to the permanent cultivation of a sea-to-sea navigation on any scale, and the histories of the Forth and Clyde and Caledonian canals are in this respect one and the same. The latter, constructed at a later date, resolved to avoid the mistakes of the former, and in size of locks and draught of water it really made a formidable step in the desired direction; but the Caledonian now is where the Forth and Clyde was so long as three-quarters a century ago, and that is practically and hopelessly out of the competition in the matter of through sea-going traffic. The lesson of the Suez Canal is to be taken to heart in all future projects of the kind. Finished as it is, and rejoicing in an enormous revenue, it is still essentially elastic in its conditions of construction, and may from time to time be deepened or widened to suit the exigencies of traffic, and that without suspending navigation for an hour. If the Scotch project is conceived on similar principles it will most likely prove a great engineering success, and remain so permanently.

## NOTES.

THE subjects of the principal papers in the Health and Art Sections of the forthcoming Social Science Congress seem likely to be very well taken up this year, and in a manner worthy of the importance of some of them. In the Health Section the question "What is the best method of dealing with (*a*) town sewage, (*b*) the products of house and street scavenging, and (*c*) the products of combustion" is to be treated of by Mr. E. Pritchard, C.E., Mr. Lawson Tait, and Captain Douglas Galton. The only fault to be found with the "question" is that it perhaps attempts to deal with too many and too complicated subjects at once. Any one of the sub-divisions would be enough for a good day's work; but it is, perhaps, thought that some new light may be thrown on some practical relation between them. The second question in the same section, "What are the best means, legislative or other, of securing those improvements in the dwellings of the poor which are essential to the welfare of the community?" is well worded, as the latter part of the sentence seems intended as a fence against demonstrations of ill-judged and sentimental philanthropy on behalf of a class. "The welfare of the community" is the only solid ground which can be taken for public action on such a subject. The paper on this question is to be read by Mr. John Hamer, hon. secretary of the Mansion House Council on the Dwellings of the Poor. In the Art Section the very practical question, "Ought elementary instruction in drawing to be made an essential part of national education?" is to be dealt with by Mr. J. P. Seddon, from whom an exposition both sound in its matter and trenchant in its style may be confidently expected, and from whom we should have no difficulty in predicting an affirmative answer to the question, on which Mr. C. G. Leland and Mr. Rowland Hamilton will also contribute papers. "What is the value to the ear, the mind, the health, and the disposition of the young produced by class instruction in music?" is the second question in the Art Section, on which a paper will be read by Lady Macfarren, from whom we shall expect to hear a decisive attack on the false so-called teaching "by ear" or by a music-made-easy method which has been far too much countenanced by our educational legislators. Mr. Manby Sargison follows on the same subject. Concerning the third question:—"How can a love and appreciation of art be best developed among the masses of the people?" we have already expressed an opinion that such vague and large questions are of little practical value; but Mr. Walter Besant is to take it up, and we have no doubt the author of "All Sorts and Conditions of Men" will, at any rate, have something that is interesting to say, and give much pleasure to his listeners, even if no further result is attained.

WE gave, on August 23rd, in a "Note," the names of nine of the architects who had been selected from among those who had sent in sketches in competition for admission among the number who were to be asked to furnish designs for the Liverpool Cathedral. It was understood that twelve were to be selected for special consideration, and we now learn that among those thus selected were Messrs. Carpenter & Ingelow, whose name was omitted from no fault of ours. There is still no official statement published, and there are conflicting rumours on the one hand that twelve, on the other hand that only ten, were selected. If the latter is the case, we have now given all the names. From these, according to a statement in a Liverpool paper, which we have not yet seen contradicted, four architects have been finally invited to submit designs,—Messrs. Pearson, Bodley, Brooks, and Emerson. These are a very good four, no doubt, but this is a very limited competition for so important a thing as a new cathedral, and a larger number might very wisely have been invited. We cannot help adding that it would have been more fair to the competitors if a correct official statement of the result had been communicated to them and to the architectural press, instead of leaving the truth to be discovered by a system of cross questions and crooked answers. There can surely be no mystery about it, and those who have been selected had a right to expect that their names should be made known.

THE sceptics who doubted the wisdom of the Transatlantic trip of the British Association must surely be sufficiently answered by the accounts which have come across of the entire success of the meeting, both in a scientific and a social sense. It may be true that the practical importance of the work of the Association in advancing science is relatively less than it formerly was. There are so many more channels now for the communication of new ideas and new discoveries in science, that any one who has made a real step in any branch of scientific research may be sure of finding a hearing among the minority at least who are qualified to understand his work. But the great advantage of the annual meeting is that it tends to bring the scientific and the popular mind *en rapport* (to the benefit at all events, of the latter) and to quicken and extend general public interest in scientific discovery. In this light it may be regarded as an educational influence of a kind which nothing else exactly supplies the place of. The idea that the excursion to Canada would be a precedent for further excursions beyond the boundaries of these islands is not one to be regarded with distrust or dislike. The head-quarters of the British Association will always be Great Britain; but that it should take advantage of the greatly increased facilities of travel and intercommunication in these days to extend its meetings occasionally to distant parts of the English-speaking world, is really a consummation to be wished, and a probable benefit, one way or another, to all concerned.

MR. H. J. LANCHESTER, A.R.I.B.A., has suggested the construction of a new low-level bridge across the Thames between London Bridge and the Cannon-street Railway Bridge. This, he claims, would materially relieve London Bridge, for Southwark Bridge is, as he points out, too far west to be of any service in relieving congested traffic near London Bridge. He might have added that the gradients of Southwark Bridge are too severe for any but the lightest traffic. But the construction of the bridge now suggested by Mr. Lanchester involves the question of approaches. On the south side he suggests that a new street should be made, commencing in the High-street, Borough, crossing Southwark-street nearly at right angles, and passing through the Borough Market (which would have to be re-arranged) right up to the south end of the proposed new bridge, "which is to be carried over the Thames at a low level into Upper Thames-street, at a point 100 yards east of the Cannon-street Railway Station. At the junction with that street a square is to be formed of sufficient size to allow this traffic to pass readily east and west into Thames-street." The proposed bridge would no doubt in some degree facilitate traffic between Thames-street and Billingsgate and the southern suburbs. It is not suggested as in any way providing for traffic across the river at any appreciable distance eastward of London Bridge, for the accommodation of which Mr. Lanchester favours our view, that well-designed steam-ferries should be fairly tried before deciding upon bridge-building below London Bridge.

IN the South Annexe of the Health Exhibition is a model illustrating a design for the Utilisation of Tidal Power, a problem the solution of which has long exercised many ingenious minds, but which has not, we believe, been ever turned to useful account. In the tide, however, there exists an enormous reservoir of power capable, without question, of being profitably employed. That Mr. Maynard Walker's patent is an ingenious application of it is very apparent, but that it is an economical adaptation to the disposal of sewage from cities and large towns is not so clear; for though its action may be automatic, and the working expenses in consequence practically nothing, yet the works necessary to render it available cannot be erected except at so large a capital outlay as to make the interest amount to a very heavy item in comparison with that chargeable on the first cost of steam-pumping machinery, the working expenses of which would probably fall short of that interest. The economical application of Mr. Maynard Walker's system to some of the other purposes enumerated in the exhibitor's prospectus is quite possible, and especially in the accumulation or storage of power for the generation of the electric light, where a comparatively small storage area is required. The economical limit of its application, however, is a matter of very simple calculation. One indicated horse power being represented by 33,000 foot pounds, or, in round numbers, by 530 cubic feet of water raised through 1 ft., the same power would be obtained by 26·5 cubic feet raised through 20 ft., a volume requiring a cistern of 5¼ square feet, with a depth of 5 ft. The comparative economy with that of a steam-engine to do the same work would depend on the number and cost of cisterns to be erected in order to furnish the amount of power required, a calculation which any engineer could make in a few minutes.

FROM Dr. Airey's report to the Local Government Board, dated August 6th, on the sanitary state of the Borough of Burnley, we learn that the main drainage scheme has been completed, and the work of connecting the houses with the sewers, and cutting off the old drains that discharged into the rivers and canal, has been generally accomplished. The cleansing of the rivers has been greatly aided by the paving of their channels. The following particulars in regard to the treatment of the sewage, extracted from the report, will be of interest at the present moment:—

"The sewerage outfall is by the side of the River Calder, about two miles below Burnley. Here the sewage is treated by General Scott's process for the manufacture of cement. Lime is added, and lime-sludge precipitated in a series of settling tanks, from the last of which the effluent water escapes to the river. After heavy rain the volume of the sewage is greater than can be dealt with at the tanks, and the surplus goes into the river unaltered. On the day of my visit everything at the tanks was in very proper order, but I was led to suspect that this was not always the case, and that it often happened that the main object of dealing with the sewage so as to prevent its polluting the river was not attained. The lime-sludge is recovered from the settling-tanks and dried by heat previous to being burned to a slag in a lofty furnace. The slag is crushed to powder in a powerful mill, and the powder makes a good commercial cement. The process is by no means a remunerative one. It is worked by a company to whom the Burnley Corporation pay 1,400*l.* or 1,500*l.* a year. Complaint of nuisance from the fumes of the furnace is made by some residents in the neighbourhood.

Should the question ever arise of disposing of the sewage in some other way, it would be well to consider whether it might not be dealt with by irrigation. The position of Burnley in relation to the lower valley seems favourable for it, and the experience of the neighbouring town of Blackburn is encouraging."

VISITORS to the Health Exhibition, who really go there to study sanitary matters (if any do), will find some useful hints in regard to the portions representing the "Sanitary Arrangements of Dwelling-houses," in a pamphlet by Mr. Mark H. Judge, published by the Sanitary Assurance Association. It suggests what should be the desideratum in regard to various sections of house arrangement, and gives some information as to the objects to be found in the Exhibition in connexion with each subject mentioned. The pamphlet arose out of a Report to the Council of the Association.

IN Mr. Lovegrove's annual report of the Surveyor's Department for the Hackney District we note the mention of an experiment in rendering a roadway more durable under special conditions. On the western side of Stamford Hill it had been observed that, what with waterwash and the action of skidded wheels, this part of the road was difficult to keep in repair. Hot tar was, therefore, mixed with the granite at the wharf and carted to be laid on the road and rolled in. The success was only partial, but the surveyor thinks it would be more successful in future if the granite was first heated to thorough dryness before mixing. In the same report are some statistics as to the wear of asphalte under traffic. A sample laid down an inch thick in Broad-street in 1877 is now ⅝in. thick. The surface generally is in good condition, but in some of the narrower parts it is worn through to the concrete. The degradation from 1 in. to ⅝ in. is noted in several places where the asphalte was laid two years later, in 1879. Material laid down seven months since, at the same thickness, is not degraded at all. The asphalte in all these cases was the Limmer Company's Compressed. In regard to concrete paving, a sample of the Eureka Concrete, laid near the Stoke Newington Station, shows both longitudinal and lateral cracks. Mr. Lovegrove believes, however, that this defect will be avoided by the improved method of laying in alternate panels, which has been tried in the Kenton and Oakfield roads with success, no cracks having developed in these cases.

THE state of the Lower Thames has found a defender in Mr. Chas. A. Cameron, Vice-President of the Royal College of Surgeons, Ireland, who, according to a letter in the *Times* of Thursday, has, like some other people, gone down in a steamboat "to see and smell the Thames in a leisurely manner." Mr. Cameron smelt smells, but to him they all seemed to come from the banks of the river, and not from the water. He enjoyed his run through Barking Creek, and perceived not the slightest smell of sewage. Mr. Cameron's experience is certainly at variance with that of which many other observers have given evidence, but perhaps this may be accounted for by the fact that he went in a steamer "kindly placed at his disposal" by a member of the Metropolitan Board of Works, who is specially concerned with the sewage. No doubt the sewage is better behaved than to make itself disagreeable under those circumstances.

THE Vicar of Combe, Woodstock, communicates the following experience on "restoration" to the *Times*:—

"A few years ago a clergyman, who was also an archæologist, visited an ancient village church. On entering, he saw in the midst of it a man, who was on his knees, bowing low and facing the altar. The clergyman, of course, thought he had lighted on an instance of religious fervour, and that, moreover, expressed in an unexceptionable manner,—an instance which was highly exemplary, especially in these degenerate days. But, on getting a close view of the being in the reverential attitude and in the eastward position, the clergyman, also an archæologist, found, to his horror, that the supposed devotee was earnestly and vigorously wrenching out of the stone floor a fine old brass, and in doing so knocking it to pieces. The surprised and grieved beholder exclaimed, with some excitement, 'What are you about?' Without looking up, and without desisting one moment, the rustic,—a workman employed there,—quietly answered, 'We be a-restorin'.'"

This is an unquestionably good restoration anecdote,—too good to be true, some people may think; but we must protest against this sort of lively anecdote being put forward as an indication of the evil deeds of restoring architects. Granting the correctness of the facts, did the "clergyman, also an archæologist," ascertain whether the man was acting under orders, or whether he was not a stupid fellow exceeding his instructions?

MR. WHEATLEY brings to a conclusion, in the September number of that admirable periodical the *Antiquary*, a short series of interesting papers on "The Adelphi and its Site," which are well worth the attention of those who are interested in London records. The article for this month contains an illustration of the old deserted tavern "The Fox under the Hill," once much frequented, and which still stands on the land under the terrace. Mr. Wheatley concludes with a remark which should be taken to heart by architects and those who are concerned in promoting building in London. It is to the genius, he observes, of the Adams that we owe it that a site little different in regard to distinguishing character from the sites around, should have become a recognised district with a distinct name. The genius of the Adams, and the artistic value of their style, have been of late somewhat exaggerated; but still it was genius, and by the impress of it the brothers redeemed an ordinary city building locality from commonplace, and gave it a name and a permanent interest. The moral is, Go thou and do likewise.

## ARCHÆOLOGICAL PROGRESS IN CYPRUS.

THE excavations of General Cesnola have not exhausted the possibilities of Cyprus, and surely if Englishmen are to excavate anywhere this island is the natural field for their labours. A committee, consisting of Englishmen and Cypriotes, was formed in 1882, by Sir Robert Biddulph with the object of establishing a local museum at Leukosia. Under the auspices of the committee, excavations on a small scale and supported by private subscriptions have been carried on in the years 1883-1884. It is a little surprising that these excavations have had to be conducted by a German, Herr Max Ohnefalsch-Richter, and that the report appears this month in a German periodical, the *Mittheilungen*, of the German archæological institute at Athens.

The site chosen was the village of Voni, the ancient Chytrai, and the find has been a large one. It speedily became evident from a multitude of inscriptions that the excavators had lighted on a sanctuary of Apollo. The architectural remains are insignificant, but there is evidence that on the remains of the old Pagan shrine a Christian church had been raised, into the walls of which a mass of fragments of ancient sculpture was built. The sculptural find was a very rich one, as many as 133 statues are already catalogued. They were found, for the most part, near the east front of the building scattered among a *débris* of ashes, bones, inscribed stones, fragments of terra-cotta, glass lamps, &c. As is usually the case in Cyprian remains, considerable monotony prevails,—a few types appear in endless replicas. The statues cover a wide area as to date: within a few square yards we have representatives of Egyptian, of Oriental, of Greek, and of Roman styles. The majority of the statues have been intended to stand against a wall; the back parts are unfinished; the front frequently picked out with colour. Three types, which all occur in several replicas, are of special interest. First, a statuette of Herakles, with lion-skin over his shoulders, and a horn in the left hand. Herakles, it will be remembered, is a hero always at home in Cyprus, and indeed in every Phœnician settlement. He frequently appears on Cyprian coins. Second, a male standing figure draped, holding in his left hand lustration twigs; in his right a figure of Nike. This little figure of Nike is interesting because its pose is like that of the famous Nike of Pæonios. The statue may possibly represent Apollo in his aspect of the Victory-bringer (Nikephoros). Third, the statuette of a boy seated with one leg tucked under him, and holding a dove. Probably this type represents Adonis, who is frequently connected with the worship of Apollo as with that of Aphrodite.

Together with the statues were found a large number of dedicatory inscriptions, with the names of worshippers and a record of their offerings to Apollo. In one instance, on the statuette of a female figure, a quadrangular tablet is engraved, bearing a well-preserved inscription in Cypriote characters.

While so much new work is going forward, it is satisfactory to learn that steps are being taken to render the Cyprian material already amassed by the Cesnola excavations permanently accessible to archæologists. If anything could console us as a nation for the loss of the Cesnola collection, which in a moment of national niggardliness we allowed to slip through our fingers, it is the proposed publication of a pictorial atlas illustrating the collection. The publication of such an atlas has been undertaken by the firm of Osgood & Co., Boston, under the auspices of the trustees of the Metropolitan Museum of Art, in which the collection now lies. It will be complete in three volumes, one of which is to appear this autumn: each volume is to contain 150 plates, some in colour by the chromolithographic process; some in heliotype from photographs. Only 200 copies will be printed, after which the plates are to be broken up. The total cost is to be 150 dols. The accompanying text promises to be second only in value to the plates. There is to be a general introduction, by Professor Curtius, and from him, if from any one, we may look for a brilliant and suggestive exposition of the historical significance of the Cypriote antiquities. Volume I., which is to contain objects in marble, alabaster, and stone, large and life-size statues and statuettes, busts, heads, bas-reliefs, votive offerings, and sarcophagi, is to have a special preface by Dr. Samuel Birch, of the British Museum. Vol. II. is to contain bronzes, silver and gold ornaments, rock crystal, glass, and engraved gems, and is to be prefaced by the writer, who has already contributed so much to the elucidation of the Cesnola antiquities, Mr. A. Murray, of the British Museum. Vol. III. is to contain terra-cotta statues, heads, busts, horsemen, chariots, lamps, vases, inscriptions. Every one who is following M. Perrot through his delightful history of Phœnicia and its dependencies which is issuing weekly from the press will rejoice that the preface to this third volume is to be by his hand. In addition to these prefaces each object is to be fully described in accompanying letter-press, and so far as possible explained. The promise of the work is very great; its execution we shall hope to notice later.

## THE BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE British Archæological Association opened their forty-first annual meeting at Tenby, on Tuesday last, under the patronage of H.R.H. the Prince of Wales, and the presidency of the Bishop of St. David's.

A better president it would have been impossible to select than the joint author of Jones and Freeman's "History and Antiquities of St. David's," and the sole author of "Vestiges of the Gael." Thirty-four years ago the Bishop of St. David's, then the Rev. W. B Jones, drew attention to the fact that an immense number of place-names all over Wales refer to Gaels; from this and other evidence he deduced a theory that the Gaelic or Irish branch of the Keltic family preceded the Kymric or Welsh. This has been abundantly confirmed by ethnologists and philologists; and it is now pretty well established that the Gaels were the vanguard of the Ayran race, and preceded their Kymric cousins, not only in Wales, but over the continent of Europe. It was the "Vestiges of the Gael" that paved the way to this interesting discovery.

The members of the Association assembled in the Town-hall at two o'clock, when they were received by the Mayor (Mr. W. H. Richards) and the members of the Town Council. His Worship, in the name of the Corporation, expressed the pleasure they all felt in welcoming the British Archæological Association and their Right Rev. President to the ancient borough of Tenby. He then withdrew, making way for the President, who delivered his opening address, of which we here append a considerable portion, which we take from the report in the *Times*:—

I suppose we may, with sufficient accuracy for our present purpose, make a rough five-fold division of material antiquities according to date. I think it will not be inconvenient to classify them as primeval, Roman, post-Roman, mediæval, and post-Reformation, the last being, no doubt, a very awkward term, but I do not know how to express the notion better. The name, however, is unimportant, and the more so that I do not intend to refer to any memorials of that period. I have already said that the division is a rough one; the distinction of periods is not clearly defined, and they sometimes overlap one another. For it is plain that certain antiquities, which we call primeval, may date from or even after the Roman occupation of Britain. Some of the early Christian monuments, which we call post-Roman, may have had their origin during that occupation, although I do not suppose that any of them did. It is very hard to say where we are to place the beginning of the middle age, although it is perhaps not so hard to distinguish between the decay of Roman and the development of Mediæval art, while the latter did, as a matter of fact, linger on in some places even into the seventeenth century. Still, I think we must be content with the classification which I have made, for lack of a better. In primeval remains, Pembrokeshire is unusually rich; but, although the district in which Tenby stands is not without them, they are most abundant in the northern and north-western parts of the county. They may be divided into villages, fortresses, sepulchral remains, and early roads or trackways. A good specimen of the first class was discovered not many years since on Stackpole Warren, and to this the attention of the Association will be directed at its present meeting. Fortresses occupy many of the peninsular headlands of the Pembrokeshire coast, and many eminences in the interior. Some of them are of great size and complexity, and show considerable military skill. In some cases we have the fortress and village combined. Perhaps the best example of this combination in South Wales is visible in the well-defined village fort on St. David's Head, where the foundations of the circular houses, forming a considerable group, are defended by a system of concentric walls, of which the masonry forming the face is in some places well preserved. Of primeval remains, intended originally as places of sepulture, most conspicuous are the cromlechs. In this class of antiquities the county is particularly rich, as regards both their number and the importance of individual examples. The great cromlech at Pentre Ievan, in Kemes, which ranks very high among those which are known to exist, the cromlech at Longhouse, in Dewisland, that at Dol Willim (not in Pembrokeshire, indeed, but just beyond the limits of the county), and that at Burton, in Roose, ought to be mentioned specifically. The stone circle is commonly associated with the cromlech, as part of the same arrangement. Antiquities of this class are most abundant in the northern part of the county, in the neighbourhood of the Preselly range, of the Pencaer hills, and the St. David's rocks. I do not learn that at any place in Pembrokeshire there have been found stones with those mysterious markings, which have so greatly puzzled archæologists, which appear to be widely diffused through various parts of the world. Of sepulchral remains of another class,—barrows, tumuli, carneddau, and so forth,—I believe there is good store in the county. Two in the immediate neighbourhood, viz., Carew and Norchard Beacons, were opened immediately after the Cambrian meeting in 1851, and the results are given in the "Archæologia Cambrensis" of that year. Another, situated on Stackpole Warren, will, it is hoped, be examined during the present meeting. Of ancient roads I have not much to say. One seems to run along the ridge of the Preselly Mountains, and its course is marked in the Ordnance Map. I traced another in the neighbourhood of St. David's, and what I found there may be read in the history of that place. I have little enough to say about Roman things. I do not know that there is any trustworthy evidence that the Romans ever got into Pembrokeshire at all. We find material traces of them in Cardiganshire and in the upper part of Carmarthenshire; and, although I am not aware that any Roman remains have been found there in modern times, I suppose there is no doubt that Carmarthen occupies the site of a Roman town. But I see no certain evidence of Roman occupation further west than that place. Well, then, what about Menapia, the site of which is to be visited by the Association, or by what remains of it, on the 11th inst.? When I last went to look for Menapia it was supposed to be under I do not know how many feet of blown sand, so I have no doubt it is quite safe, if it ever existed. But what is the evidence of its existence? Richard of Cirencester, or the ingenious person who wrote under that name. On the whole it would seem most likely that the name of Menapia is simply modified from that of Menevia, the Latin name (and, no doubt, a Latinised form of the ancient Celtic name) of the place of which I have the honour to be bishop. The Ordnance Map finds a place for another station of Richard's,—"Ad Vigesimum," but does not indicate any actual remains. Nor have I ever seen any trustworthy evidence to show that anything of Roman make has been at any time discovered in the county.

After speaking of the period between the Roman and the Mediæval, and of its monoliths and incised crosses, the Bishop observed,—I come now to Mediæval architecture, and begin, of course, with sacred buildings. I may safely say that there is no real Norman church architecture in Pembrokeshire, or, with one exception, in the three south-western counties of Wales. The sole exception, so far as I am aware, is the fine chancel arch of St. Clears, in Carmarthenshire. Probably, during the period in which this style was in vogue, our churches were very poor and small, while the country was unsettled and a battleground of races. There is nothing of this date even at St. David's. Of course, it exhibits alterations, additions, and insertions of various dates down to the beginning of the sixteenth century, and its history, as it has to be read in the traces of these numerous changes, presents an interesting, and at the same time a difficult, problem to the archæologist. But I cannot dwell upon these points in detail at present, nor have I any right to anticipate what will, no doubt, be brought before some of you more fully on the spot. I will only say this, that while the cathedral church of St. David's takes a low rank in point of actual dimensions among the minsters of this country, I know of nothing in the world so impressive. The wild country which surrounds it, the sense of isolation, the neighbourhood of the sea, and the consciousness of its being on almost every side of you, the marvellous picturesqueness of the ruined buildings in the midst of which it stands, undoubtedly enhance the influence of the impression which it produces when it is first seen from without. But the effect of the exterior, which must be admitted to depend in some degree upon these accessories, is far less imposing than the first view of the interior on entering by the south porch, above all, in the low light of the evening. The complicated richness of the Romanesque mouldings, the deep and solemn colouring of the native stone, the strange and fantastic details of the flat ceiling and its pendants, and (now) the painting, gilding, and mosaic dimly visible within the darkened choir, combine to render this one of the most striking architectural views in this country, or anywhere. But, again, I must not anticipate. The chief conventional churches in Pembrokeshire, at all events of which any remains exist, are St. Dogmael's, Monkton, Pill, and Haverfordwest priories. Of these, two only come within the scope of the Association at present, Monkton and Haverfordwest. The former, the nave of which is in use as the parish church, and the choir of it is intended to restore, is utterly unlike anything I ever saw in the way of proportion. It is a long aisleless choir attached to a long aisleless nave, and having a large chapel to the north of the choir, forming, however, a distinct building. In fact, it looks like three churches in contact, and perhaps it really was so; for although it is most difficult to say exactly how the opening from the nave into the choir was managed, there are symptoms which incline me to believe that it was little more than a doorway, so that the choir and nave would have the appearance of being (what they, no doubt, were, as regards their use) two distinct churches. At Haverfordwest the ruins do not give any certain indication of what the church was like; but I should infer from what I have seen that it was a cruciform church of the thirteenth century, certainly without aisles, and probably with a central tower. This was a not uncommon Welsh arrangement for important churches,—witness the abbey church of Talley, and the minster of Llanbadarn-fawr, in Cardiganshire. The two most important parish churches in the county, architecturally, are St. Mary's, Haverfordwest, and St. Mary's, Tenby. The former is quite one of the most interesting churches in Wales, and nowhere,

perhaps, in the principality is there better detail. The latter is striking, but of a somewhat unusual type in Wales. Its ground-plan and arrangements partly resemble some of the larger Cornish churches. None of the churches which I have mentioned, with the single exception of Monkton Priory, exhibit the characteristic features of Pembrokeshire parish churches. This singular type is found, as a rule, only within the English-speaking districts of the county, and I believe no specimens of it are found within those districts on the shores of St. Bride's Bay. Their main features are tall and slender towers, generally diminishing as they rise, a general rudeness of masonry, and internally much vaulting, with side-chapels and squints, and many holes and corners, and a general effect of cavern-like obscurity. Then we come to another class of antiquities, both numerous and conspicuous in this district. Pembrokeshire is a perfect paradise of castles. Not to mention others, three remarkably interesting ones are within easy reach of this place, — Manorbier, which is, perhaps, the most picturesque of the Pembrokeshire castles, especially when looked at in connexion with its surroundings. Carew, which is the most complete, and which (like Kenilworth) contains portions which mark the castellated manor-house rather than the castle, properly so called, and Pembroke, the Queen of South Welsh castles, and certainly one of the most impressive masses of building I have ever seen. One more castle must be specially mentioned, both on account of its inherent interest and because some of those who hear me are to pay a visit to it next week. I mean Picton, which presents the unusual feature of a Mediæval fortress (for it was a real fortress, and not a mere castellated manor-house) remaining in the occupation of the ancient family which owned it down to the present time. Considering that it is at this time a convenient mansion, to which a large addition was made early in the present century, there has been far less destruction of its original features than could have been expected to be the case. Of domestic remains of the Middle Ages there are, in addition to minor buildings and fragments to which I need not now refer, but which are numerous, two great habitations of my predecessors, one undoubtedly, and the other (in part, at least) very probably, the work of Bishop Henry Gower. The palace at St. David's is quite one of the best pieces of Mediæval Domestic architecture in the kingdom. Its style and arrangements are peculiar to itself and to two other buildings commonly attributed to the same prelate, while it presents to the archæologist the unusual spectacle of a great Mediæval house, partially ruined indeed, but otherwise left very much as it was built. It dates from the early part of the fourteenth century, and exhibits few, if any, traces of later addition or change. I suspect the secret of this to have been that my predecessors never found St. David's a convenient or perhaps a very comfortable place to live at, so that they did not care to adapt it to the requirements of their own times.

Sir James Picton returned thanks to the Bishop for his excellent and learned address, but took exception to his views on the Roman question. Mr. Morgan seconded the motion.

Mr. Lambert then gave a short but lucid paper on the Maces of Tenby, Pembroke, and Haverfordwest. Those of Haverfordwest were the oldest, dating back to 1630; one, however, was a recent copy. Pembroke owned two, made in 1632. Tenby's were of the date of 1660, and bore the crown, which was added after the Restoration. All of them were in a terribly dilapidated condition, mended apparently by a tinker with tin. Battered, bruised, and broken, he begged his worship the Mayor to entrust the Tenby insignia to his care, and promised, in case he would do so, to have them restored in a fitting manner.

When the proceedings in the Town-hall were concluded the party, under the guidance of Mr. Edward Laws, hon. local sec., adjourned to the gardens of the White Lion Hotel, whence a good view of the interior of the town walls may be obtained. Formerly Tenby had four gates. Three have disappeared, including the northern or Carmarthen gate, which Leland commended as "the most semeliest as circulid without, with an embatiled but open roofid tour." The west gate, which still remains, was built on much the same plan. It is a semicircular bastion, pierced with four arches, and in the wall which closes it in behind is the gateway. These arches were each defended by a portcullis, "*ex solido ferro*," as Leland says. The bulk of the tower is out of all proportion to its elevation, and it was never roofed. The battlements have been walled up in order that a narrow chamber made in the wall, and running round it, might be covered. This is, of course, modern work; formerly it was the alure, and afforded a defence for archers or musketeers, for whom loops are provided. Any tyro can see at a glance that the fortifications of Tenby were erected at different times; the walls on the northern and western sides are in a fair state of preservation, though somewhat disfigured by modern doorways, &c. In these are eight towers, six circular and two rectangular; in the wall to the north of the western gate is a niche of Decorated work, and on the southern side a tablet inscribed A° 1588 E R 30, showing that the Armada scare stirred up the local powers to repair their walls. The fortifications on the eastern and southern sides ran along the top of the cliff, and were, therefore, not of such a substantial kind as those undefended by nature. These have almost disappeared, though one circular turret remains on the southern side. Oddly enough, the fortifications on the Castle-hill are comparatively flimsy; a round tower and sallyport defended the entrance. Its little keep, which crowns the apex of the hill, is partly round and partly square; it seems rather to have been intended as a watch-tower than a fortification, and appears to have formed one of a chain. Of these, one on the Burrows still exists; another stood behind the cemetery; a third is to be seen at Ivy Tower, about five miles away. Although Roman coins as early as Domitian have been found in Tenby, and the Welsh recognised it as Dinbych y Piscoed, or Fish Littlefort (to distinguish it from Denbigh in North Wales), and the Norseman honoured it as Daneby the Danes town, we do not get much satisfactory information concerning its early days. In 1108 a small detachment of immigrant Flemings were sent to this place by Henry I., and in all probability they were the builders of the earliest portions of the wall. In the year 1150 Meredudd and Rhys ap Gwffyd took Tenby, and put its inhabitants to the sword, in revenge for a poaching fray in Amroth woods. Five years afterwards a new batch of Flemings were sent by Henry II. to take the place of the slaughtered men; these were annihilated by the sons of the Lord Rhys in 1188, and after that the church and town lay ruinous for sixty years, a few men-at-arms being its only inhabitants. Then Warine de Mountcheusy, who had married the heiress of the Earls Mareschal of Pembroke, rebuilt walls and church, and bestowed great store of plate and jewels on the latter. In 1457 Jasper Tudor reconstructed the walls, building a footway, 6 ft. broad, on the inner side, so that the sentinels might patrol the town; and he gave the defences to the mayor and corporation for ever. These good folks repaired the walls, as has been seen, in the Armada year. In 1643 Tenby received Lord Carbery, the Royalist Lieutenant-General of South Wales, rather sulkily, but Langhame and Poyer, the Parliamentarian leaders from Pembroke, retook it after a severe fight in 1644. It remained in their hands until, dissatisfied with the treatment they received from the Independent party, they ran up the Royal standard on Pembroke Keep and Tenby Castle Hill. This brought down Cromwell on Pembroke and Horton on Tenby, who took the places and dismantled them both.

After viewing the walls and tower, the Association passed down Froy-street (debating by the way whether this place was named after the *fleur-de-lys*) to a ruinous building now used as a cellar, which once formed the chapel of a Carmelite convent, founded in 1399 by one John de Swynemore. In it a female skeleton was dug up some few years ago, and in one corner is a sort of tomb, evidently made up with fragments from other tombs and portions of the building; on this is inscribed the date, 1730, and the builder's name, James Eynon, who seems to have been a joker, for he goes on to dedicate his bogus tomb to King Hezekiah.

The entrance to this convent was through an archway facing the west door of the church. This archway is clearly Tudor.

At this point the Association were taken in charge by the Rev. George Huntingdon, rector of Tenby, who conducted them over St. Mary's Church. The tower is capped with a spire, an unusual circumstance in Pembrokeshire. This is evidently a later addition, being Decorated, and built of Caen stone. The tower springs from the south aisle of the chancel. There is no clearstory, but the mullions of its windows were discovered in the chancel wall some years ago during repairs. A flight of ten steps leading up to the altar has a very good effect. The south porch has openings east, west, and south. The outer wall of the north choir aisle is askew. This has rendered it necessary to build pointed arches at the east end of the church and broad segmental ones at the west.

Remains of the old church, destroyed by the Welsh in 1188, may be detected by an examination of the plinths of the pillars. On the eastern side of the north door is a tomb, on which there is a female effigy, clad in a flowing robe, with short sleeves, under a cinquefoiled canopy. A chin-cloth, or barbe, covers the head. This tomb is believed to be not later than the first half of the fourteenth century, and is considered to be the oldest in the church, but that of Thomas White, the friend and protector of Henry Tudor, is, without doubt, the most interesting. It is situated at the east end of the south aisle, under the arch which divides it from the chancel. On it lie two male recumbent figures, which are clad in fifteenth-century costume; their hats hang over their left shoulders, to their girdles hang gypcières, their feet rest on talbots, their heads on peacocks. Thomas lies to the east, his brother John to the west. The church is undergoing a restoration (Mr. J. P. Seddon, architect); this work will not in any way affect the interior of the building, but greatly improve the exterior, as a tumbledown brick vestry will be replaced by stonework, though the general appearance is not enhanced by a hideous brick chimney.

Mr. Loftus Brock, Secretary of the Association, gave an excellent and lucid description of the church, showing how it had grown from a small cruciform edifice into its present lordly proportions. This, he considered, took place when it was rebuilt by Warren de Mountcheusy.

Colonel Bramble then led the party round and examined and expatiated on the numerous and interesting monuments.

After leaving the church the members examined some curious old buildings in Crackwell-street, which gave a notion of what Tenby was in the sixteenth century; its most noticeable feature seems to have been a want of elbow room, land "within wall" being very valuable. This led apparently to great overcrowding of buildings, and probably of their occupants. The expedition ended up on the Castle Hill, many of the party entering the little local museum, in which a very creditable loan collection proved an additional attraction; the more so as Mr. De Gray Birch gave a thorough and exhaustive discourse on the seals and charters of the three boroughs of Haverfordwest, Pembroke, and Tenby; these he considered to be invaluable. He especially drew attention to an impression of a seal of James I., attached to a Tenby Charter, of which only one other copy is known to be in existence. He much regretted the neglected condition in which he found these invaluable documents.

The report of the proceedings will be continued in our next.

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**Value of Building Sites at Rotherhithe.** What have for several years been known as the St. Helena Gardens at Rotherhithe are now being converted into a building estate, and last week forty-seven of the plots on the estate were let by auction on building leases, at the St. Helena Tavern, on the estate, by Mr. F. J. Bisley. The property is situated in Eugenia-road, near the new railway stations, and in the immediate neighbourhood of Southwark Park. The plots were let in eight lots, several of the lots containing six plots, and the remaining lot five plots. Each plot contained a frontage of 15 ft. 6 in., and they were offered on leases direct from the freeholder, for a term of ninety-nine years from June, 1882. There was a large attendance, and the whole of the lots were readily disposed of at prices varying from 25*l.* to 27*l.* each, representing an annual ground-rent for each plot of about 4*l.* 10*s.* At the same time nineteen houses on the estate, in carcass, and partly finished, were offered for sale, and realised 930*l.*

# Illustrations.

## ACCEPTED DESIGN FOR THE NEW WAR OFFICES.

WE give this week the Park view and the two principal plans of the accepted design for the proposed New War Offices, by Messrs. Leeming & Leeming. The competition having been obviously in the main a competition of *plan* rather than of design,—for on no other supposition can the presence of some competitors among the selected nine, and the omission of others, be reasonably accounted for,—we may call attention to the fact that the plans are now first published on such a scale that their arrangement is intelligible and the lettering of the rooms legible.

The following tabular statement of the classification of rooms, as supplied to the candidates, will serve more or less as a key to the plans of all the sets:—

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. ,, Supplies.
  B 3. ,, Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. ,, ,, ,,
  C 2. ,, ,, ,,
  C 3. ,, ,, ,,
  C 4. ,, ,, ,,
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

As will be seen, Messrs. Leeming place the Secretary of State and the First Lord's rooms as "pendants" to one another at the extreme angles of the Park front on the first floor, with their respective staff members grouped about them. The other departments appear conveniently grouped, and the plan has the merit of being geographically simple and easy to find one's way in. Its defects are narrow courts, and rooms with insufficient window accommodation placed at the ends of the rooms. The main design is unquestionably picturesque in general effect and grouping, but it is not a *great* building, and none of the improvements in detail which are quite possible, and some of which have been suggested in these columns already, will make it so. But there,—we have given up having great buildings now, especially for Government purposes.

The view is engraved by Mr. J. D. Cooper.

## THE DECORATION OF ST. PAUL'S CATHEDRAL.

THE accompanying sketch shows the modification I propose in the design by Alfred Stevens for the decoration of the cupola of St. Paul's Cathedral, together with my own designs for the decoration of the subjacent parts of the dome.

The full-sized cartoons are now fixed in the dome itself on the south side, opposite to the modification of Stevens's design by Mr. E. J. Poynter, R.A., which is on the north side. The storiation,—which was arranged by Mr. Edmund Oldfield, M.A., one of the sub-committee appointed on the 9th of June, 1877, to make preliminary arrangements for the decoration,—has been fully explained before in connexion with Mr. Poynter's work, illustrated on the 5th of July last. The two modifications may be described as a Painter's version and an Architect's version. Each version shows two "ribs," with the space between, and covers about one-sixth of the cupola. As I understand the case, it is not a competition between persons, but an experiment to ascertain treatment. Omitting minor details, there is not scope for much originality in either version, and it is rather a question of suitability.

The sketch shows about half of the dome, in order that the articulation of the whole may be better understood.

*Principles.*—The endeavour has been, as far as possible, to avoid the *rococo* elements, borrowed from the Louis XIV. style by Grinling Gibbons and the other carvers who were employed on the fabric; and, while keeping to the pure Italian practised by Stevens, to introduce no new element not in accordance with Sir Christopher's views as seen in his works and shown by engravings and other documentary evidence. Further, to use no architectural feature not suitable to the interior of a roof, and no painted perspective such as would suggest recession, and cause loss of the surface, but to preserve the "pattern-effect" of Stevens's design, and to arrange such a modification as, while providing for the storiation, should satisfy the architectural and other requirements.

*Distance.*—The most favourable point of view is at the commencement of the barrel-vaults under the dome-supports: from this position the whole of the opposite side of the cupola is visible. And at this point the nearest part of it, *i.e.*, the base, is over 200 ft. distant. The minuteness resulting from this may be judged if the engraving be held at a distance of 16 in. from the eye.

*Scale.*—To suit the great distance, the architectural work has been kept simple, and the initial modulus of the figures large. The sitting figures typifying the early Churches, together with that of John himself, would be, if upright, 16 ft.; the attendant angels are 12 ft. 6 in.; the figures in the lower series of visions would also be 12 ft. 6 in.; the demi-figures in the lower rank of rib-roundels, and the figures in the upper series of visions, would be 10 ft.; the demi-figures in the upper rib-roundels, and the Elders, would be 9 ft. Thus a gradual decrease in modulus will prevent the decorative work having the effect of "dragging the cupola down." (The Apostle in the roundel of podium is, I now find, too large; but that is a matter of detail which would be easily corrected.)

*Divisions.*—To ignore architectonic considerations, and decorate the cupola with one picture, as has been suggested, would be, not decoration, but annihilation, of the surface; the disastrous effects of which may be seen at Parma and several other churches which were decorated in the Decadence. Unless the cupola were decorated with one subject covering the whole 16,000 square feet, there must be a series, the several pictures of which would be axial with the architecture below; and hence subdivision becomes necessary. In addition to this logical necessity, there is the further advantage which should not be lost sight of,—that it brings the cupola into scale with the rest of the building.

*Circles.*—Stevens's base of subdivision is the circle; the fact, that every plane section of a sphere is a circle, being the key to his design; and to him is due the credit of first seeing and using this apparently self-evident fact. In addition to being the typical shape for cupola decoration, the circle is a perfect and mysterious shape, well suited to contain "visions," as to give the simplicity and sublimity consonant with religion. The circular frames intersect with the vertical lines; and, being as strongly pronounced as they are, take away the preponderance of the vertical element. The figure compositions in them will be designed by Sir Frederick Leighton and Mr. Poynter, and hence they are only smudges of colour.

*Ribs.*—I have deviated from Stevens in the treatment of the "ribs" between the circles. They are treated, not as constructed features built up in several stories, but merely as continuing decoratively the eight solid bays of the peristyle; for which a precedent may be found in the semi-dome over the altar, where Wren has applied ribs over the pilasters dividing the surface. The decreasing "gores," resulting from this "rib" treatment, do not extend so far upward as the eye of the cupola, but are stopped below the annular frieze of the Twenty-four Elders, where the radius of the cupola changes, according to Mr. Penrose's discovery; and they are not so small as the much-criticised divisions of St. Peter's. The strong lines of colour in the latter are further avoided by gilding the ribs. They will, therefore, have just sufficient emphasis to steady the vision-circles, and to assist in defining the profile of the cupola, without destroying its perfect homogeneity. They contain representations of some of the imagery used by John:—the candlesticks (more properly lamps), the eighth being the typical branched one; the stars, the eighth being the sun and moon; and the martyrs' palms.

*Pattern.*—In connexion with the subdivision it will be noticed how the masses and colour of the roundels, thrones, and niches, being in regularly set-out positions, make a pattern which "runs" not only over the cupola, but also through the peristyle and podium, and thus suggests the unity which existed in the older domes before peristyles had been interpolated between the spandrel panels and the cupola.

*Thrones.*—The axial thrones form one of the most characteristic features of Stevens's design. The details in my version are studied from the window-dressings in the clearstory; and I have connected them with the attic pedestal for simplicity of design.

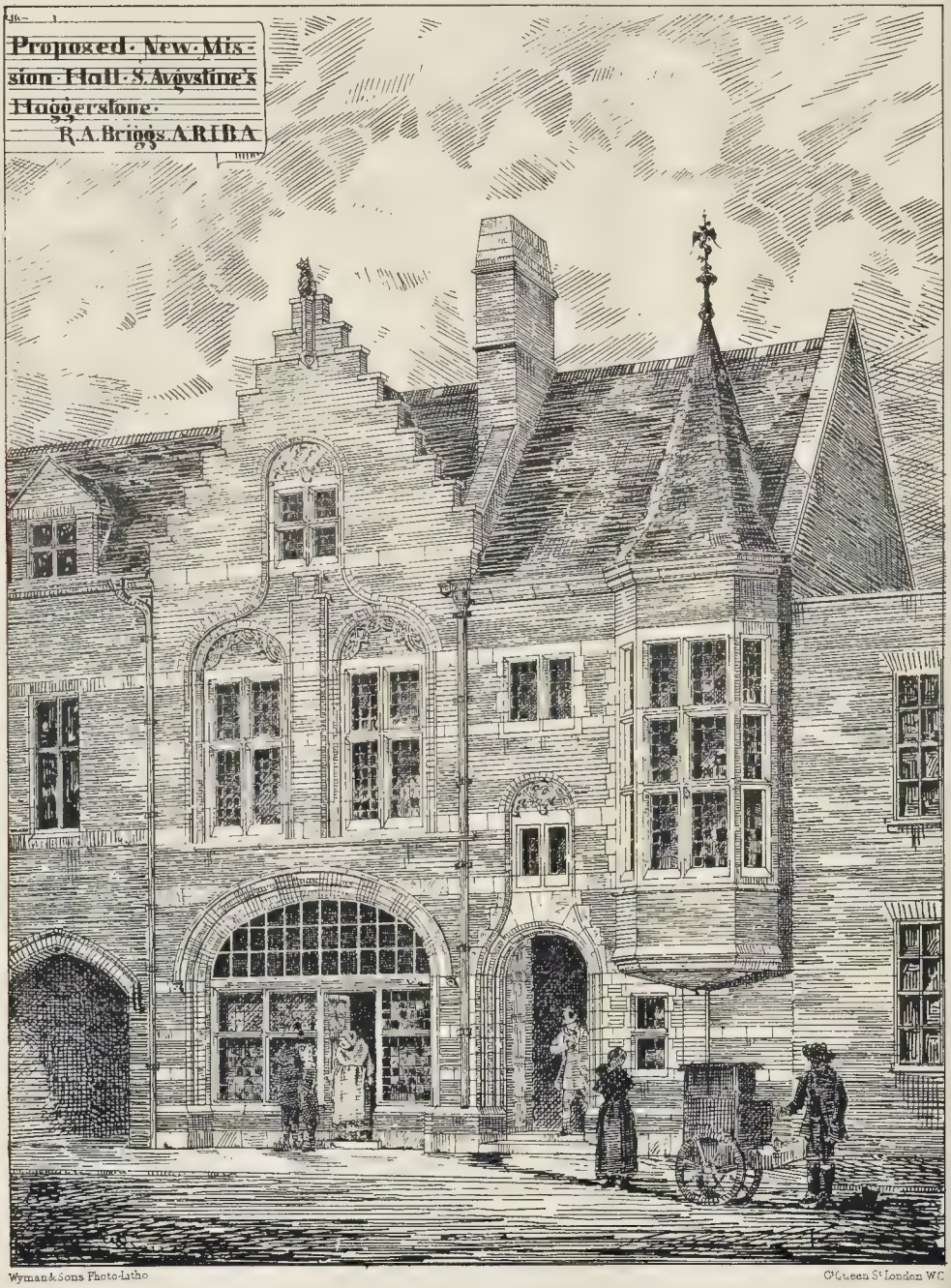
*Attic.*—This pedestal was proportioned in height to the order of the peristyle, and broken over the pilasters: and the cupola design was thus "tied" to the existing architecture, by Stevens.

*Angels.*—The Seven Churches, judging from the reproofs and promises to each, may be taken as typical of Christendom. The "Aggelloi" represents the sorts and conditions of men written to by John; and there seems great fitness in placing them round the base between the Lower things and the Consummation. The attendant angels would not be individualised, but rather considered as messengers, directing, or bearing symbols of the Promises:—the Tree of Life, the Safety from the second Death, the New Name, the Power over the Gentiles, the White Garments, the Pillar of God, and the Grant to sit on the Throne.

*Elders.*—The annular frieze round the eye of the cupola contains the twenty-four Elders, who "surround the Throne." Those on the west side would be represented as sitting on golden thrones, and from them on each side round towards the east they would be singing the song and casting themselves down and "worshipping." Thus they avoid continuing the vertical lines of the ribs, but would instead give a composition sweeping round the circle.

*Cherubim.*—Cherubim and Seraphim are introduced floating in space; they carry the idea of Praise through the design, and are useful, decoratively, in helping to define the rotundity of the cupola.

*Lantern.*—On the ceiling of the lantern at the top of the cone, I would suggest the vision of the Throne. I say "suggest," because it is impossible to depict it. I would use a dark blue ground for the "darkness which surrounded the throne"; on this and over the four windows at the cardinal points I would place the "four living creatures"; between them and over the four intermediate windows the words of their hymn,—"Holy," "Holy," "Holy," and "Amen";




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MESSRS. LEEMIN



DMIRALTY AND WAR OFFICES.

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ACCEPTED DESIGN FOR

THE NEW

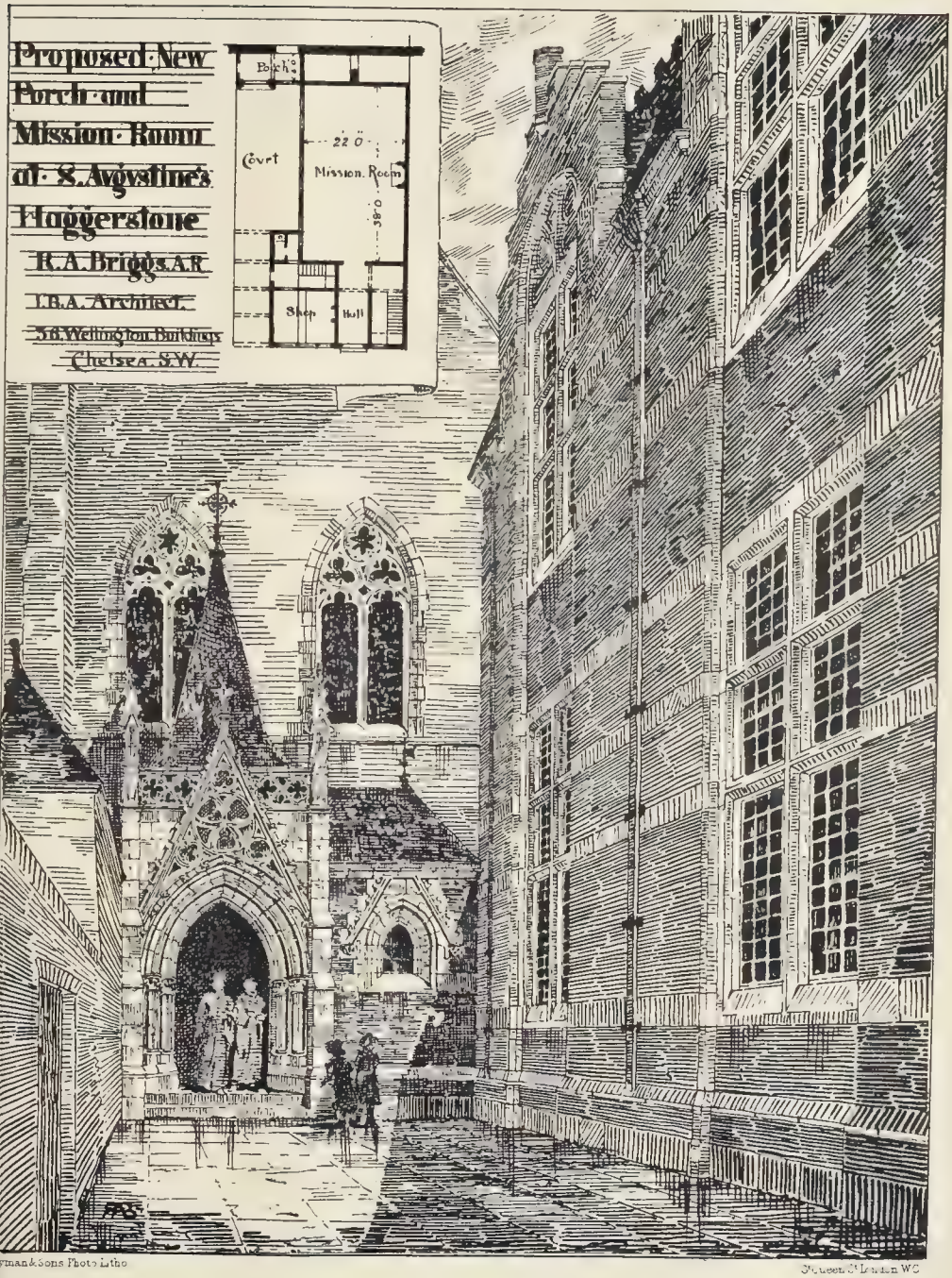
# ADMIRALTY AND WAR OFFICES.

FIRST FLOOR PLAN.

MESSRS LEEMING & LEEMING, ARCHITECTS.




7 Queen St London WC




Wyman & Sons Photo Litho
Queen St London WC

and between and below the eight windows I would represent the "lightning which came from under the throne." Thus the visible portion of the cone would be decorated; and by placing the living creatures on the domical portion, the distortion of "*sotto-in-su*" would be avoided.

*Peristyle.*—The peristyle is treated as an integral portion of the dome, with the object of "carrying-down" the cupola treatment: to this end the pilasters have applied ornaments, similar in character to those above, or adapted from other ornaments in the cathedral. Mr. Penrose has designed those on the north side; and I am responsible for the treatment of those on the south side. The inscription which I suggest is taken from chap. xxii., verse 6, of the Apocalypse.

*Podium.*—The manner in which the eye, on entering the cathedral, runs along the apse, ignoring the Crux, has been pointed out as a defect. The podium, which is the only portion of the dome visible at this point, gives an opportunity for remedying this by making an important central feature, which may arrest the eye, and suggest an axial line of something above. This is attempted by the axial roundels set in the belt or chain of rich colour that appears to enclose the cupola, and serves as a connecting-link between the golden colour above and the graver colour beneath. A typical Apostle is introduced: the demi-figures at the other cardinal points would be typical representatives of the "Prophetarum Laudabilis Numerus," the "Martyrium Candidatus Exercitus," and the "Sancta Ecclesia per Orbum Terrarum"; and the intermediate roundels would be occupied by angels with the Sanctus. One half of the cartoon is shown with a tablet and portion of the sentence from the Te Deum, "Te laudat gloriosus Apostolorum chorus"; and the other shows another experiment with simple ornament. I am responsible for this design; the podium treatments on the north side are by Mr. Penrose.

*Stone Surface.*—In the colour treatment the aim has been to retain the unpolished stone for all constructive features up to the level of the podium, and only to introduce the mosaic and marble inlay in panels; and the gilding on enrichments as now existing from the time of Sir Christopher. It might be washed (*not scraped*), and treated with a silicate that should keep it at the beautiful pale yellowish brown which is its normal colour. Any treatment by painting or removing its *patina* would take away all that lends dignity of colour, and would destroy the indefinable charm of mystery and space. For these reasons I would take the stone as the key of the colour scheme, and avoid the "white and gold" used in assembly-rooms, &c.

*Gold Ground.*—The glorious golden ground, doubtless suggested by S. Marco, is another of Stevens's most valuable suggestions. It is the only ground which will "tell" in the normal gloom of the dome; and the figures should, as far as possible consistent with the composition, silhouette upon it. The tint (at the commencement of the cupola, and in all lower parts) should be that of "old gold," because more beautiful in colour, and more in accord with the old stone, and also because, if the colour of new oil-gilding be taken, the mosaic remaining unchanged while the gilding became redder, in course of time the harmony would be lost. In the cupola the tint of the gold ground should be gradually modified to sea-green gold as it ascends.

*Decorative Colour.* — The colour of the decorative work should be on very simple themes, so as not to lose dignity and breadth. It should be more neutral, and the chiaroscuro more solid, in the lower parts of the cathedral below the arches; and gradually gain in fulness of colour and lose in solidity, as it ascends to the podium. This should be the richest band of colour in the whole building. Below there should be the gradual crescendo in richness from the stone-colour and neutrals; and above, the cupola would "lose colour" in a gradual decrescendo, till it became almost *golden*. Thus should we not take away the splendid mystery of Wren's crowning work.

*Mosaic.*—The cartoons have been designed and painted as if for execution in mosaic; and no attempt has been made to observe the technical limitations of the material, and to obtain the necessary simplicity and directness of composition shown at Sta. Maria Maggiore, Appolinare Nuova, Galla Placidia, and in some of the middle-period work in S. Marco.

*Relief.*—In my version I have shown the possibility of applying mouldings in actual (low) relief to the surface of the cupola: a practice which has been often done in Italy with the happiest effect, *teste* the small transept cupolas of St. Peter's. They have been made by Messrs. George Jackson & Sons in their "Fibrous plaster." They are very easily fixed, and, by giving true lines they materially simplify the setting-out of the mosaic, and make more manageable sizes for the cartoons. I am solely responsible for this suggestion of applying actual relief; but I wish it to be clearly understood that it is by no means a *sine quâ non*, as the design might as readily be executed entirely in mosaic; the relief would, however, give a more architectonic character by having a real potential value instead of mere chiaroscuro.

*Galleries.* — On the right-hand side of the sketch a suggestion is submitted for treatment of the quarter galleries, while the left-hand side shows their present form. On my return from Italy in December, 1878, fresh from studying the finest domes, I was more than ever struck with the unfortunate effect of these. It has been often alluded to by architectural critics, and various expedients have been suggested. After much consideration on the spot I arrived at the solution shown, which embodies five suggestions:—(*a.*) To carry the panelled archface over the galleries, with inner archivolt resting upon the stone break-forward under the railing; the panels to agree in treatment with the first rows of coffering in the adjacent barrel-vaults. I would strongly object to any tampering with Sir Christopher's construction; but this suggestion does not cut away a stone; it is added to the existing construction, and could be made, if desired, to give additional strength, both really, and (what is of importance) apparently. It would take away four or five available seats in each gallery; but it would destroy the eight axes and make only four, thus emphasising the Crux. It also gives opportunity for uniting the colour treatment of the four arms of the barrel-vault with each other, by the colour picked in the coffers of the arch-faces and in those of the vaults.

(*b.*) To add festoon ornaments, in gilt gesso, to the attic under the railings, in order to disguise the hard cutting lines which come down upon the curved pediments, and to lead the eye pleasantly to the horizontal lines. There are many precedents for this in Wren's work.

(*c.*) To add a thin baluster-column and garland, of gilt bronze, in each arch, for the purpose of "taking the eye across" and (apparently) filling up the void: this would not obstruct the view of any one in the galleries, as the garland would be above the line of sight. This intention,—to take away the effect of the gaping void,—has been often achieved by the expedient of a gilt grill in the opening; but I venture to think the above is a better method.

(*d.*) To remove those portions of the ornamental cornice projecting inwards, in order that the cornice and frieze of the main order may be carried from the horizontal over the curves without interruption, and to affix an inscription (John v. 39) in gilt bronze letters to that portion of the frieze on the four oblique faces; this is suggested because, by its easy division into four portions, it gives unity to the supports of the dome.

(*e.*) To sub-panel the four semi-domes under the galleries. At present each of these has a superficies of about 360 ft., while the spandrel-panels have only 240. They are thus more important by reason of their largeness than their adventitious existence would justify. I would therefore propose to cut off a row of horizontal panels, of the same height as the above-mentioned frieze, which should be axial with the arches below, as shown; and also to make a margin round the remaining space, leaving the best-seen portion for the pictures. By this expedient these soffits would be brought into scale with the rest of the building. The divisions may be executed either in mosaic or with relief mouldings. These pictures might be either scenes from the life of St. Paul, or, if a cycle of events from his life be reserved for some position nearer to the level of human life, with some of the "great company" of angels who are ever singing the song of the redeemed, and are come down to lead our lower anthems. These five suggestions were not asked for; and I am solely responsible for having devised them and for having shown them on the sketch. They might be tried experimentally very cheaply by chiaroscuro painting on thin boarding. It is with all admiration for the great genius who raised the pile, and in all humility that I venture to publish them, and to suggest that experiment might be made to determine if they be emendations or not.

*Time.*—In conclusion, for the information of those who take an interest in the work, I would beg to say that the best time for seeing the two versions of Stevens under equal conditions is when the sunlight comes through the windows on the west side of the peristyle, about five o'clock each afternoon, in a week's time.

HUGH STANNUS.

## PROPOSED MISSION-HOUSE AND PORCH, ST. AUGUSTINE'S, HAGGERSTON.

WE give an illustration of these intended buildings, from the drawings of the architect, Mr. R. A. Briggs. As no principal porch was designed when the church was built some years ago, it has been thought advisable that one should now be added.

The Mission-rooms will be used for parochial meetings, &c., and on Sundays the classes for girls will be held.

A sexton's house is provided, with a shop on the ground-floor, where books will be sold. The present entrance under the clergy-house will still be retained, but the inner court will be widened.

The Mission-house will be built of red Suffolk bricks and Portland stone dressings.

## THE PRIVATE BILL LEGISLATION OF THE SESSION, AND PUBLIC WORKS.

AN analysis of the private Bills which have been passed during the session just ended shows that about two-thirds of the entire number of Bills promoted have received Parliamentary sanction, the total number presented being 294, of which 203 were successful. The railway projects embraced about one half the total number of Bills of all kinds, being 149, for the construction of 1,045 miles of new railway, at an estimated cost of 60,968,195*l.* But in addition the Money Bill of the Hull, Barnsley, and West Riding Junction Railway and Dock Company, which was presented at a late period of the session, brings up the aggregate estimated cost of the whole of the Bills promoted to 62,468,195*l.* Of this class of Bills, 82 have been passed, being a little in excess of one-half of the whole, the capital expenditure sanctioned by the Bills amounting to 20,438,700*l.*, for the construction of 318 miles of new railway and other works. It should, however, be stated that 40 of the Bills sanctioned are in respect of extension of time, abandonment, or arrangements, leaving 42 Bills having reference to the actual construction of works. Ten of these successful Bills were promoted by companies to be incorporated for the construction of entirely new lines of railway, 123 miles in length, at an estimated outlay of 5,612,000*l.* The most costly of these is the Barry Docks and Railway project, involving an expenditure of 1,600,000*l.* for making a dock, with a lock, basin, an entrance channel, and breakwater, between Barry Island and the mainland of Glamorganshire, and for the construction of thirty-three miles of railway. The next in order of the new lines in amount and mileage is the new railway from Preston to Lytham and Blackpool, the estimated cost of which is 680,000*l.* for the construction of twenty miles. Amongst the other new lines is that from the Kingsbury extension of the Metropolitan Railway at West Hampstead to the Hendon Station of the Midland line, a length of four miles, at an outlay of 240,000*l.* The additional powers obtained by several of the great companies involves the expenditure of a very large amount in new works, that of the Midland Company being 1,600,000*l.*, which includes the construction of thirteen miles of new railway; the London and North Western Company, 1,437,500*l.*; the Manchester, Sheffield, and Lincolnshire, 1,066,000*l.* for the construction of twenty-eight miles of new railway; the North-Eastern, 660,000*l.*, for twelve miles of new railway; the London and South-Western, 660,000*l.*; the Caledonian, 634,000*l.*, for the construction of eleven miles of new railway; the London, Chatham, and Dover, 626,000*l.*, for seven miles and other works; the Great Western, 600,000*l.*, for twelve miles; the South-Eastern, 430,000*l.*; and the Lancashire and Yorkshire,

420,000*l*. The Mersey Company have also obtained powers for expending 400,000*l*. in the construction of two miles of additional lines in Birkenhead. The powers obtained by the Metropolitan District Company enable them to expend 180,000*l*. in forming a short junction line at Hammersmith, and also in the construction of a subway from the South Kensington Station to the Royal Horticultural Gardens. The Session has been remarkable for the rejection of an unusually large number of railway Bills connected with the metropolis.

Of the thirty tramway Bills promoted for the construction of 173 miles of tramways in different parts of the country, at an outlay of 3,747,910*l*., the number sanctioned is fifteen, or exactly one half of the Bills applied for. In these Bills the construction of seventy-seven miles of tramway is sanctioned, at an outlay of 2,003,300*l*. Seven of these Bills are in respect of tramways to be constructed within the metropolitan area, and include the West Metropolitan Company's Bill for the construction of tramways in the parishes of Acton, Hammersmith, and Norwood, fifteen miles in length, at the cost of 350,000*l*.; the London Southern Tramways Bill for the construction of tramways, five miles in length, in Lambeth, Newington, Clapham, and Brixton, at an outlay of 150,000*l*.; the North Metropolitan Company's Bill for the construction of six miles of additional tramways in East London, at an outlay of 125,000*l*.; also Bills promoted by the London, London Street, North London, and Lea Bridge, Leyton, and Walthamstow companies for constructing fifteen additional miles of tramway, at an estimated cost of 127,000*l*. The South Eastern Metropolitan (a new company) have likewise obtained powers to construct four miles of tramway in Greenwich, Deptford, and Lewisham, at a cost of 75,000*l*. Amongst the successful Bills under this head is one for constructing ten miles of tramway in the neighbourhoods of Manchester, Bury, and Rochdale, at a cost of 750,000*l*.

Twenty of the successful Bills were in respect of gas and water supply, six being in connexion with gas and fourteen with water supply. The Bills sanctioned for the construction of new waterworks authorise the expenditure for that purpose of 853,900*l*.

Seventeen Bills relating to piers, docks, and harbours were passed. Amongst them were Bills for the construction of piers at Gravesend, Folkestone, Ventnor, and Weston-super-Mare; also a Bill promoted by the London and St. Katharine's Dock Company for the construction of a new entrance to the Royal Albert Dock at Galleon's Reach; together with a Bill promoted by the North Sea Fisheries and Harbour Company, empowering the company to make a tidal harbour, dock, piers, and other works at Sutton, in Lincolnshire.

Nineteen town improvement Bills likewise received Parliamentary sanction, under which the several corporations and local authorities are authorised to widen existing streets, and construct new streets, with increased powers over the construction of buildings. The powers obtained by the Brighton Corporation under their Bill are of a very comprehensive character. They are authorised to construct a running wall, promenades, piers, and landing-places, with tidal, swimming, and other baths. They are likewise empowered to erect shelter arcades, conservatories, and other works on the seashore, in connexion with the construction of lifts for carrying passengers up the face of the cliff, from the seashore to the Marine Parade. The Bill likewise authorises the corporation to erect a wholesale provision market, new municipal offices, and an arcade or bazaar. It also transfers to the Corporation 105 acres of land known as Tenants' Down, to be laid down as a recreation-ground for the use of the public. The Dewsbury Bill empowers the Corporation to erect a new town-hall, municipal offices, court-house and gaol, and museum, together with the construction of public baths, and a public park. The Birkenhead Bill enables the Corporation to widen thirty-one streets, and to form other new streets; also to purchase and take down 131 insanitary houses.

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**Appointments.**—The Haverhill Local Board has appointed Mr. F. Kemp to fill their vacant office of Surveyor and Inspector of Nuisances; and the Town Council of the borough of Eastbourne have appointed Mr. W. T. Vale as clerk of the works to their new Town-hall and Municipal Buildings.

## THE FIFTH INTERNATIONAL CONGRESS ON HYGIENE.

THE present congress has been, perhaps, a little less brilliant, but certainly more business-like than its predecessor, held at Geneva two years ago, and which was fully described in these columns. Much good work has been done, and resolutions voted that will not fail to influence Continental Governments. The Governments of Belgium, Bavaria, Brazil, Spain, Austria, France, Italy, Roumania, Germany, Servia, Turkey, Switzerland, Bulgaria, the Argentine Republic, and the United States of America, have all sent special delegates. The French were as usual the best represented, and the English last on the list. This was all the more to be regretted on this occasion, as we have been strongly attacked and accused of sacrificing the health of Europe to the promotion of our commercial interests. The Dutch themselves, fortunately, were not so bitter against the English, and though on certain occasions they might advocate the establishment of quarantines, they, nevertheless, recognised how exaggerated the present outcry has been.

As affecting the preservation of health, almost every word said at the congress may be considered of interest by our readers; but the subjects that had a specific and direct bearing on the interests represented by this journal are far more limited. We will not reproduce the speeches of welcome, the eloquent harangues on the great mission of sanitary reformers. These we will leave to the imagination of the reader, or to those who choose to read the official report of the congress when it is published. Suffice it to say that all that could tend to make foreigners welcome, and to inspire them with a high and disinterested sense of their duties, was uttered with much feeling at the opening of the congress by its president, Dr. de Beaufort, Senator, and Dr. Overbeek van Meijer, its honorary secretary. These sentiments were repeated in the evening at a reception given by the Municipality of the Hague to its visitors.

On the following day the congress set to work in real earnest. The first section, after a stormy debate, invited the Dutch Government to take the initiative in convoking an international congress on the cholera question. This congress, it was further suggested, should appoint a permanent commission on epidemics, and proceed to codify in an international sense the laws affecting hygiène. To this latter proposal it was insinuated England would never submit, for fear her commercial interests might be compromised; and there being no Englishman present, it was the Russian delegate who took up our cause and sought to defend the honour of England. The Count Paul de Suzor, of St. Petersburg, objected that England, on the contrary, of all European nations, had made the greatest sacrifices for the preservation of public health. It had in spite of the cost, drained all its principal towns, and at the present moment if Englishmen could calmly contemplate the progress of the cholera, it was precisely because they had been such zealous promoters of public hygiene.

In the fourth section on the same day, Dr. H. Napias, Inspector of Factories, and delegate of the Municipality of Paris, read a lengthy and studious report on the duties of the State with respect to the health of the working-classes. Opening a voluminous manuscript, he remarked that he took his appointment as reporter to the congress on such a subject as a reward for his past labours. His object was to give some indications that might serve as a basis for industrial legislation of an international description. M. de Freycinet had laid down the axiom that all industries are insalubrious. Two centuries previously Italian reformers had argued in the same strain. The position, the air, the dust, the whole surroundings of the workshop, were unwholesome. The State was, therefore, bound to step in and see that what was bad in itself should not be made worse by neglect. In 1848 the Chamber of Commerce of Rouen had protested against unlimited freedom in such matters, and denounced the immoral effects of unconstrained competition. But at the same time it must be recognised that it was a manufacturer who first proposed a law on the subject, and that such motions had received the warmest support from M. Waddington and others, whose interests might be supposed to lead them into the opposite camp. The more enlightened among the employers recognised that it was their duty to limit the number of killed and wounded in the army of labour.

Dr. Napias then reviewed with admirable brevity and completeness the legislature of the different countries, rendering high homage to what had been done in England. The Austrian law watched the health, working hours, salary, and apprenticeship of the working classes. The German law affected the health of workshops, and limited the labour of children. The Belgian law only regulated unwholesome manufactories, and the work of children, except in mines, was not restricted. The Danish law only touched unwholesome industries; though Article 5 stipulated that manufacturers must submit to the health authorities. In Italy each province had a law of its own, principally to protect the work of women and children. In Portugal, Spain, Roumania, and Sweden, the law related to the outside of the factory, the harm it might do to the neighbours, and little was said of the workmen who toiled within. But Servia has given us an admirable law protecting workmen, which, with the legislation of Switzerland, deserves to be universally studied. In France, the law is drawn up to protect children; and, if a factory is unwholesome, the employer only need send the children away to legalise his position. Fortunately, the Consultative Commission of Hygiene and the Minister of Commerce were now engaged in preparing a better law. All European laws were open to criticism, and each nation should borrow the best clauses from the Acts of Parliament of neighbouring countries. A good law should not only protect the neighbours against dangerous or injurious industries, but the workmen themselves. Workshops should be rendered as wholesome as dwellings, and special precautions taken against special dangers, the Government offering every encouragement to health-saving inventions. With respect to accidents, Dr. Napias would only exercise severity with regard to measures of precaution, which he would render obligatory under harsh penalties. The law should also watch over the lodging of the workmen, which must perforce be rendered wholesome. It should be a penal offence to let a tenement unfit for habitation. It is no use reforming the workshop if the workman's home does not receive equal attention. Actually, sanitary authorities were nowhere armed with sufficient powers. At the same time, Dr. Napias thought that the State, having provided the workman with a good general and technical education, and having watched over his health during childhood, owed to the adult nothing else but his liberty.

To this, it was objected, that a large section of the population, that section precisely which caused the greatest difficulty to sanitary reformers, had not received these educational advantages. What with competition and lack of skill, this residuum could only obtain starvation wages, and it was impossible to expect them to pay the high rents charged for healthy dwellings. If the poor man is to live a wholesome life, some one must supply the money this would cost, and the money would only be forthcoming by trampling under foot the rights of property and the freedom of contract. The difficulty could not be overcome except by a law enacting that adult males should not work over a limited number of hours; that all private rooms where work was done should be placed under factory inspection; and finally that a minimum wage must be established, so that all who worked should earn enough to live in a healthy manner. These might be revolutionary proposals, and certainly they produced considerable sensation, but they were presented as the only possible logical outcome of the problem of the housing of the poor.

Several other speakers described various model dwellings, and M. Malherbe, an engineer, delegated from the town of Liège, repudiated all State intervention, claiming that absolute freedom was the true solvent for every difficulty. To this Dr. Napias replied that absolute freedom existed in Belgium, and that was why women and children still toiled below ground in the coal-mines. Thus concluded the debate on this portion of the proceedings.

At a subsequent meeting it was demonstrated by numerous experiments on animals that consumption is contagious, but that, the virus being principally confined to the sputa of the patients, the chief measures taken should be

adopted with a view to prevent the contamination of clothing and furniture by the expectorations. Spittoons charged with liquid disinfectants should, therefore, be used instead of handkerchiefs. In the same manner the congress insisted on the boiling of milk, the thorough cooking of beef, as cattle often suffered from tuberculosis; and that disinfection should not be limited to dry heat, but that a jet of steam must be introduced into the stove. A great deal was said against the danger arising in the trade of rags, and Dr. Roth, representing the British Society for the Prevention of Blindness, did good service in showing that more than half the cases of blindness now existing might have been prevented if taken in time. This is a question to which the attention of architects will be directed more and more every day. The supply of light to dwelling-rooms will not long remain an optional matter. Rules will ultimately be laid down stating per candle-power the amount of light necessary. Dr. Cohn, of Breslau, showed us how the light of the sky could be accurately estimated and compared with the amount of light existing in any part of any room. The complicated but most ingenious instrument employed for this purpose cannot be easily described without a drawing. We shall, however, probably return to the subject, and for the moment it suffices to say that now it is as easy to estimate in a moment the candle-power of light in any place or position as it is to ascertain the temperature. Hence in future it will be as practical to lay down rules with respect to the amount of light to be given as with respect to the temperature that should be maintained, and the facility of verifying as great in both cases.

M. Emile Trélat, in one of the afternoon general meetings of the congress, took up the question of the atmosphere and internal conditions of dwellings. Most of the members of the congress were present, being anxious to hear what the eminent Parisian architect had to say on this important topic; also vague rumours were floating about as to the strange and novel theories M. Trélat was about to propound.

M. Trélat commenced by alluding to Dr. Rochard's admirable lecture on the money value of human life. Dr. Rochard, he remarked, wished to increase the duration of human life by suppressing epidemical diseases. M. Trélat, on his side, proposed to economise life by reducing all lowering causes, all circumstances that tended to debilitate a population. Among these causes he must place in the foremost rank our homes. Our dwellings should shelter us, but they too often proved a mere snare, in which we were slowly poisoned. If we failed to obtain the necessary warmth with the required volume of pure air, our homes became a danger, a menace to our existence. His object, however, was not to deliver a lecture on warming and ventilating, but rather a lecture against what was done in this respect. It would be his painful duty to attack both Pecklét and General Morin, whose memory he revered, but whose science was now out of date. Pecklét had studied how things are burned. In his time very little fuel was used. The whole population was impoverished by long wars. They had large chimney-places, but very small fires. The trouble many people took to light a fire warmed them more than the fire itself. Pecklét calculated that under these circumstances the huge chimney absorbed 95 per cent. of the heat coming from the small fires then in vogue; for the chimneys had been built before the war, when people could afford to fill them. Pecklét then conceived the idea of bringing the air in from the outside, and warming it by making it travel behind the fireplace before it entered the room. This was the foundation of his great success, and the contrivance was all the more appreciated as it allowed the inhabitants to close up the windows. Having done this much, it then occurred to him that it would be even still cheaper to warm the air downstairs at one single fire, and then distribute it all over the house by means of flues. Thus the calorifère was invented, and for forty years these doctrines had been followed. For forty years experiments of the most minute and difficult nature were made. Mr. Rochard had blamed architects; but why did the doctors let the architects grope in the dark for forty long years? Why did not the medical profession discover at an earlier date what were the sanitary principles that should govern the warming of dwellings? He then related how various architects had tried model systems of warming and ventilating, and had failed, and condemned the breathing of warmed air, on the ground that it contained less oxygen. Also air-flues soon became dirty, the sun could not reach them, and the dust they contained helped to develop germs.

The most agreeable feeling was that experienced on a cold fine morning, when our bodies were warmed by the direct rays of the sun while we breathed cold air. Our rooms should be fed with cold pure air, taken direct from the outside, and warmed with radiating heat from an open fire-place. The walls should be warm and reflect heat, the windows should be warmed, all solid bodies in the room should receive and radiate heat; but the air that we breathe should not be warmed, and must come in direct from the outside. He remarked with pleasure that many of the English artisans' dwellings had small openings in the wall which allowed the cold street air to enter direct into the room.* It was astonishing how much cold the human body could stand if it also enjoyed counteracting heat. Thus the bivouac fire enabled the soldier to pass a comfortable night in the open air, and M. Trélat wished that rooms should be treated on the same principle,—a boundless supply of outdoor cold air, with radiated heat to counteract its chilling effects.

As discussion was not allowed at the public meetings these propositions could not be debated; but their general tenure was challenged. The matter was then referred to the second section, but M. Trélat was unable to attend, so that the point at issue is postponed to the next congress, when an attempt will in all probability be made to show that M. Trélat's proposals are not practical. The entrance of air taken direct from the outside during winter would be felt by many to such an extent as to lead the inhabitants of the dwellings thus treated to block up all the openings that supplied the air.

* Not by the will of the English artisan, certainly! Has M. Trélat's credulity been practised upon, or is this a grim jest?—ED.

## THE LIVERPOOL AUTUMN EXHIBITION.

THE Liverpool Corporation's eighth annual exhibition of pictures opened to the public at the Walker Art Gallery on September 1st is one of uncommon and, we might almost say, historic interest in the annals of English art. Never before has there been brought together under one roof a collection which represents in such an ample and generous manner the leading art institutions of the country. Eight large well-lighted and well-proportioned rooms have recently been added to the gallery, the *tout ensemble* of which now may be said to rival that of Burlington House. Of these new rooms some, and of the older ones some, have been severally and separately allotted to the following institutions and societies, viz., the Grosvenor Gallery, the Society of Painters in Water Colours, the Institute of Painters in Water Colours, the Hibernian Academy, the Institute of Painters in Oils, the Dudley Gallery Art Society, the Society of Painter Etchers, the Collection of Architectural Designs, and the Liverpool Academy. Each society or institute appointed its own executive committee to hang and arrange its special room, and in addition to the foregoing there are several spacious chambers devoted to what may be called the Liverpool Autumn Exhibition proper or ordinary.

We cannot attempt to do more than describe the impressions derived from a cursory run through the show. Entering Room A (the largest of the chambers devoted to the autumn exhibition ordinary), the first picture which catches the eye is Mr. C. Van Haanen's "Afternoon Coffee," a brilliant bit of Parisian life depicting a number of girls in varied colours gossiping and refreshing themselves in a dressmaker's work-room. This popular work has been given the place of honour on the far wall, and is for the first time seen to full advantage. Close by, and equally well hung, we come upon "Husband, Children, Home," Mrs. S. Anderson's striking and pathetic representation of a victim to the Ischian earthquake. For dramatic conception there are few pictures in the exhibition to challenge this. On the upper side of the door and well taken care of, is Mr. Frank Goodall's "A New Light in the Harem." As one of the popular works in the Academy, this will naturally attract considerable attention, and those who see it are not likely to overlook Wm. Stott's "*La Baignade*," which hangs just above it, a charming study by one of the younger school of impressionists. Mr. T. B. Kennington's merits have been previously recognised by the Liverpool Corporation, and in the present exhibition his "Lap of Luxury" is given a prominent place on the line. Another young and aspiring impressionist, Mr. Stanhope Forbes, contributes "Preparation for the Market," and no visitor can fail to enjoy "Autumnal Spoils," the restful picture of a girl in a boat picking bulrushes growing in a quiet creek. Before quitting Room A we desire to draw special attention to Miss M. Bernard Hall's "*Pauvre Père*," a somewhat painful subject powerfully executed, which might fairly have been hung a little nearer the line.

The central feature of Room B (also a portion of the ordinary exhibition) is Frank Goodall's gigantic "Flight into Egypt," which has been judiciously placed on the end wall, and, consequently, looks better than it did in London. We also note a great improvement in Mr. Holiday's "Dante and Beatrice." The artist must have done a good deal of work upon this picture since it was exhibited at the Grosvenor, although even now it is not quite what it might be. The Liverpool Corporation are purchasing "Lorenzo and Isabella" as a sample of Millais's earlier method. In doing so they are securing a very remarkable work, though in an eccentric style; a picture which makes us regret that the painter should not devote his wonderfully developed technical power to works of similar aim and equally intense feeling, instead of squandering it on portraits sometimes little worthy of his genius. They have also bought J. R. Reid's "Rival Grandfathers," from the Grosvenor Gallery Room. The latter promises to be one of the most popular pictures of the Liverpool season.

Room C is devoted to the water-colours of the ordinary exhibition, and contains a good deal of very nice work, notably R. H. Carter's "Nut-brown Maid," and Joseph Nash's gloomy but powerful dead duellist ("Satisfaction"), which attracted considerable attention at the Institute last spring. Immediately beneath "Satisfaction" hangs "La Belle Amour," a charming study by Mr. S. Melton Fisher. The room is strengthened generally by some pleasing landscapes of Cockram's, whose work is made rather a feature of.

Turning out of Room C we find ourselves in the portion of the exhibition devoted to the Royal Society of Painters in Water-Colours, who really seem to have managed to get together a wonderfully choice collection. Glancing round, one immediately recognises several old favourities. It is years since Boyce has been so strongly represented. He exhibits no less than five pictures, some of them (notably No. 648, "Hulton Castle") being exceptionally fine. Mr. Albert Moore has only one small and somewhat insignificant work in the exhibition (No. 512, "An Alcove"). This seems a pity, as he was appreciated in Liverpool earlier than anywhere else. Amongst other interesting pictures in the Old Water-Colours Room may be mentioned Basil Bradley's "Lost," a vigorous hunting scene in which the hounds are full of life; E. Buckman's pathetic "Home," a weather-worn sailor and his young children standing by the wife and mother's newly-made grave; and Chas. Gregory's "Adrift," some travellers resting in a country churchyard. A large room has been placed at the disposal of the Grosvenor Gallery executive, who exhibit an average collection of works,—mostly well known. On the end wall in the place of honour hangs Calderon's marvellous "Aphrodite." A prominent place has also been given to Gregory's fine portrait of Miss Galloway, and close by we noticed Herkomer's somewhat sinister likeness of the popular war correspondent, Archibald Forbes. Richmond's portraits look well, and Mrs. Jopling's "Ellen Terry" is as attractive as ever.

Mr. G. F. Watts sends a new and decidedly quaint picture under the inexplicable title of "B. C. * * *" A far better name would have been "The First Oyster," for the artist represents two nude figures (presumably Adam and Eve) kneeling on a sandy shore amidst sea-weed and shell-fish. Adam has just swallowed an oyster and holds the shell in his hand, while Eve watches apprehensively for the consequences. Mrs. Collier's "By the Tideless, Dolorous, Midland Sea," is on all hands pro-

nounced a remarkable picture for a lady to have painted, as we have already remarked when speaking of the Grosvenor Gallery in May; the flesh tints against the sand are put with a sympathy and subtlety beyond praise. Its only serious fault is a misleading and entirely unsuitable title. We were surprised to find none of Burne Jones's works in this room. Considering how much he owes to the Grosvenor, his absence is scarcely graceful.

The small room set aside for the works of the Liverpool Academy evidences that there are are several local artists of more than ordinary promise. In "Freja's Quest" (hung on the line), Miss Jessie McGregor has taken a distinct step; and marked improvement can be claimed for Mr. H. H. Stanton, who exhibits a breezy sea-piece. "Eventide," by Peter Ghent, also shows an advance on former work. Mr. Thompson Jones, on the other hand, fails lamentably to fulfil expectations. His "On the Guidecca" is not the sort of work that should emanate from an artist once considered so promising.

The Royal Hibernian Academy have sent a small collection of moderately interesting work. The President's (Sir Thomas Jones's) large picture of the Archbishop of Dublin attracts most notice, though connoisseurs in Irish beauty who go through the room thoroughly may not improbably prefer the same artist's "Molly Astore," a true daughter of Erin.

The Institute of Painters in Water-Colours have hardly made the most of the material available. Their collection requires inspection before you find out how good it is. During our somewhat hurried glance round, however, we were favourably impressed with "The Downs of Mount Harry," a tender, silvery landscape, by H. G. Hine; and some of Arthur Severn's work, notably a view of Edinburgh from the Nelson Monument, and the "Versailles" of Mr. Fulleylove, one of the most masterly painters of architecture of the day.

The great feature of the chamber appropriated by the Institute of Painters in Oils is Fantin's magnificent series of portraits of the French Impressionists. It is a pity this was not hung on the end wall, as it would then have given size and grandeur to the whole room. We were sorry too, to notice a pleasing landscape of Frank Walton's almost spoiled by being stamped upon by a heavy picture of Hacker's, which is, however, by no means destitute of merit.

In Chamber K we noticed a little landscape by R. A. Brockbank, which calls for a favourable recognition; and in L. I. Starr's "Oh, Sweet New Year," and Henry Schafers's "An Impromptu," should not be missed. "Sally in Our Alley," a clever bit of work, by E. Sherard Kennedy, has been rather cruelly skied; and a somewhat better place might fairly have been given to a carefully-painted portrait of a little girl, by Harold S. Rathbone.

## VENTILATING APPLIANCES AT THE HEALTH EXHIBITION.

Sir,—In the remarks under this heading [p. 274, *ante*], it is stated that I show a system of ventilating apartments by "supplying air direct from outside to assist the combustion in the fireplaces." Now this is a mistake, as the fresh air from outside referred to is for the ventilation of the apartment, and is let in near the fireplace, so that while ventilating the room by the admission of fresh air, such may be done without persons sitting round, or near, the fire feeling a cold draught at their backs.

W. P. Buchan.

## A PERIODICAL QUESTION.

Sir,—Can any of your correspondents kindly suggest anything that will rid a house of beetles, crickets, and cockroaches? I have some cottages troubled with these pests, and I am at a loss to know how to get rid of them. I shall feel greatly obliged for any practical suggestion. F. H.

**A Day's Outing.**—In connexion with Hampton's Home for the Blind and Aged Cripples, Webber-row, Waterloo-road, an excursion, in which some 150 sightless ones (representing nearly all branches of the building trades) with their guides took part, came off last week, under circumstances most favourable. The locality chosen by the authorities of the home was the ground attached to North Lodge, Morden, which the proprietor (Mr. T. North, of London-road, Southwark), kindly placed at the disposal of the excursionists.

## PROVINCIAL NEWS.

*Birmingham.*—The town of Birmingham is now in possession of several arcades. They are all noteworthy, but without exception are in the Classic or Renaissance style of architecture. A new arcade, however, has been commenced (for Mr. C. Ede) in the Early Gothic style, situated in the important thoroughfare of Snow-hill, and nearly opposite to the entrance of the Great Western Railway Station. A number of old and dilapidated buildings will have to be demolished to clear the site. The arcade will run between two streets, viz., Snow-hill and Slaney-street, but at present it is not contemplated to open a public entrance into the latter street, a private entrance for the shopkeepers only being formed. The frontage to Snow-hill will consist of large shops, four stories high, divided by a bold Gothic arched entrance. Into the elevation towards Snow-hill, buff glazed bricks, Minton's tiles, parti-coloured stone, ornamental red brickwork and terra-cotta, ornamental metal work, &c., will be introduced. A large enriched centre gable, filled in with panelling, tiles, &c., will emphasise this front. The elevation to Slaney-street will be of a plain Gothic character. The shops in the arcade will also be of a somewhat plain design, glazed white brick facings, gauged brick arches, moulded brick cornices, bay-windows, &c., being introduced. The architect employed is Mr. J. Statham Davis, of Birmingham.——New Assembly-rooms for Edgbaston, at the corner of the Hagley and Francis roads, are approaching completion. The building, which is being erected for a limited liability company, is expected to be ready for use in a month or six weeks. The architects are Messrs. Osborn & Reading, of Bennett's-hill, Birmingham. The principal frontage of the new building is in Francis-road. The entrance will be through an enclosed vestibule, communicating with ladies' and gentlemen's cloak-rooms on either side, and opening into a spacious entrance-hall, from which a broad central staircase leads to a suite of rooms, consisting of a ball-room, 70 ft. by 40 ft.; a drawing-room (with a smaller drawing or card room adjoining), wide galleries, refreshment-room, and other apartments. The ball-room has a gallery for musicians and a stage, with green-room, dressing-rooms, and other accommodation. The room will, therefore, be available for private and other theatrical performances, concerts, and other entertainments. On the ground-floor, in addition to the entrance and the apartments appertaining to it, there are an ante-room and a supper-room, with serving-room, butler's pantry, and other accessories. The basement contains kitchen, larder, scullery, pantry, beer-cellar, heating-chamber, bakehouse, and other offices, besides apartments for the custodian and attendants. The building, with furniture and other contingencies, is estimated to cost 11,200*l.*, making, with the amount paid for the site, 16,500*l.*

*Bristol.*—Plans have been prepared for the erection of a parsonage-house in connexion with St. Matthew's Church, Moorfields, by Mr. Vincent W. Voisey, F.R.I.B.A.

*Withington (near Manchester).*—A Local Government inquiry has recently been held at Withington by Mr. J. Thornhill Harrison, M.Inst.C.E., one of the Inspectors to the Local Government Board, in reference to an application from the Withington Local Board for sanction to borrow a sum of 16,761*l.* Mr. Joseph Swarbrick, Assoc.-M.Inst.C.E., Engineer and Surveyor to the Board, explained the nature of the works proposed to be executed, and stated that they consisted of works of private and public street improvements, and works of the sewerage and sewage disposal; and that 4,787*l.* of the amount required was for additional works at the sewage farm at Chorlton-cum-Hardy, the total cost of the works upon which had been about 12,800*l.*

*Oakham.*—The new swimming-bath for Oakham school has been opened, and will no doubt be found to be a great boon to the boys, who now number over 120. It is situated within a short distance of the cricket ground, is 80 ft. long by 30 ft. broad, the depth graduating from 3 ft. 6 in. to 6 ft. It is lined with blue brick, with a smooth concrete floor; and the boarded inclosure includes a large dressing-shed, water-closet, &c. There is a wide asphalte pathway all round the bath, and the water is brought in by iron pipes from a neighbouring spring, and is always flowing through the bath, which is fitted with filter and proper sluices for cleansing purposes. The cost has been about 500*l.*, and the works have been carried out by Mr. Dean, builder, of Uppingham, Mr. R. Winter Johnson, of Melton Mowbray, being the architect.

## SCHOOL-BUILDING NEWS.

*Sheffield.*—New Board schools at Huntsman's Gardens, Attercliffe, have just been opened by the Mayor of Sheffield. The school is on an entirely different plan from any previously built in the town. The Sheffield School Board has already in use one school building with a central hall, which is a parallelogram in shape, with class-rooms along the sides and ends. The school just opened has a central hall, but it is of polygonal form, with the class-rooms so arranged around it that they radiate from the eye of the head-master when he is at his desk. There are in the main building, which is a mixed department, twelve class-rooms arranged as above, and capable, by means of movable partitions, of being made to accommodate varying numbers of scholars, as those in the separate standards increase or lessen in number. The class-rooms, however, are square in themselves, in order that the desks may be of equal length; and another important feature is that left-hand lights are obtained for the classes at desks to a much larger extent than is generally the case. The school is fitted up with electric bells, and by an understood code the head master can, from either his private room or his desk in the school, signify his wishes to any of the teachers in the class-rooms and to the caretaker's house. The infants are placed in a separate building, which has a school-room and four class-rooms. In the lower part of the main building is an extensive gymnasium. The contract for the building amounted to 11,412*l.*, and the number of scholars accommodated is 1,250. Externally, the buildings are all of coursed stone, and covered with dark Westmoreland slates. The schools are warmed throughout by low-pressure steam apparatus supplied by Mr. W. Truswell, of Durham Foundry, Sheffield. The stone-carving, &c., is by Mr. Harry Hems, of Exeter; and the electric bells are by Messrs. J. Northam & Co., of Sheffield. The architect was Mr. C. J. Innocent (late Innocent & Brown), of George-street, Sheffield.

*Smethwick.*—New infants' schools are in course of erection in Crockett's-lane, Smethwick, for the Harborne School Board. The contractors are Messrs. Jeffery & Son; and the works are being carried out under the superintendence of the architects to the Board, Messrs. J. P. Sharp & Co., of Birmingham. The contract is about 3,000*l.* Drawings are being prepared for higher grade schools to be erected on a neighbouring site.

**The Beckenham Public Hall.**—A new public hall at Beckenham has just been completed and opened. The building has its main frontage to the Bromley-road, 65 ft. in length, 34 ft. in height to the parapet, and 55 ft. high to the ridge of a high-pitched roof. It is surmounted in the centre by an octagonal tower rising to a height of 74 ft. above the ground line. The principal entrance to the building is surmounted by an elliptical arch, with rich carving. The building, which contains two lofty main floors, with dormers in the roof, is faced with stock and red brick. Each floor has mullioned windows, those to the ground-floor being arched and deeply recessed. The return elevation is somewhat plainer in character. The building is approached along an entrance-hall 16 ft. in width and 34 ft. in width. The front portion of the ground-floor is intended to be let as offices. At the rear of this floor is a reading-room, also a billiard-room, besides coffee-room, cloak-room, and other apartments. A staircase, 15 ft. in width, leads to the upper floor, which contains the large public hall, 61 ft. long and 34 ft. wide, at one end of which there is a gallery extending the entire width of the hall, and at the opposite end a platform with space for the erection of an organ. The hall will seat an audience of 600 persons. In connexion with the hall there are ante-rooms, cloak-rooms, and dressing-rooms. In addition to the large hall there is another hall at the extreme rear of the building, 38 ft. long by 23 ft. wide. The cost of the building, which with the grounds, covers an area of 100 ft. by 80 ft., is about 5,000*l.* Mr. G. Vigers, of Frederick's-place, Old Jewry, is the architect, and Messrs. D. D. & A. Brown, of Camberwell, are the contractors.

## The Student's Column.

### HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—X.

FIFTEENTH-CENTURY GOTHIC.

IT might be supposed that, in a history of the typical styles of architecture, there is not sufficient distinction between the Gothic work of the thirteenth and of the fifteenth centuries to call for a separate article on each. Indeed, the change from the one to the other during the intermediate fourteenth century was, in England at least, so gradual, that the builders of that period were probably unconscious of the distinct results that they were producing.

The main difference lies in this: that whereas the earlier builders devoted their attention to the arrangement of the structural *bones* of the building, the later ones lavished theirs on its *skin*.

More than this: whereas a fully-developed thirteenth-century church has very much the same recognisable features in whatever country we may find it (with certain exceptions), the fifteenth-century churches in various countries differ from each other as much as they do from thirteenth-century work.

England exhibits, as has been mentioned in the last article, a thirteenth-century style of its own, and it is remarkable that when French influence was occasionally imported, as in the case of Westminster Abbey, the admixture of English art has produced a far more beautiful result than can be found in any French cathedral. Street, in his "Gothic Architecture of Spain," points out a somewhat similar result at Toledo, where, he says, the problem of vaulting a chevet has been more successfully solved than in any cathedral in France.

As a rule, however, thirteenth-century Gothic is very much alike wherever it may have been built under direct influence from headquarters, even in such a distant country as the island of Cyprus, as may be seen in Mr. Sydney Vacher's numerous illustrations to Mr. I'Anson's paper on that subject, to be found in last year's Transactions of the Institute. Where local peculiarities survive, such as in the triapsal plan of the church at Marburg in Germany (see p. 738 of Fergusson's Handbook), still the construction and details are French.

The Germans, indeed, were determined to outdo France itself by building a huge cathedral at Cologne. This building is illustrated in all the handbooks,—most profusely, of course, by Rosengarten, on p. 306 *et seq.*, and a view on p. 317. Fergusson tells us on p. 740 that it was begun about the year 1270-1275, and the choir completed by 1322. The entire church has only been completed within the last few years; fortunately from the original design, which has been preserved to work from. It has double aisles, and chevet of seven chapels, and transept and western towers crowned with spires,—everything complete and very correct. Surface richness begins to vie with constructional lines, the flying buttresses are pierced by monotonous rows of quatrefoils, the spires are covered with tracery, also pierced,—a treatment which is found in several German examples,—and the upper portions of the buttresses are also smothered with tracery. The change from the skeleton to the skin has set in.

The Germans ran their taste for open-traceried spires into the very extreme of tenuity, and insisted upon drawing them out to ridiculous lengths, as in the Sacraments Hauslein at Nuremberg, illustrated by Fergusson on p. 759, where the summit of its spire, being too high to stand upright under the vaulting, is bent round beneath it; a pretty fancy, but one at variance with strict architectural common sense; other spirelets, which have not to keep clear of obstructions, have nevertheless caught the infection, and bend their heads in meaningless fashion, until all notion of structural rigidity has disappeared from this piece of stonework. Simplicity, says Fergusson, is not the characteristic of the German mind. A difficulty conquered is what it glories in, and patient toil is not a means only, but an end, and its expression often excites in Germany more admiration than either loftier or purer art.

Soon the masons set themselves a more intricate task. At Chemnitz (see Fergusson, p. 760) there is a doorway around which the tracery is represented by the stems and branches of trees, some of the latter being chopped off. Here was another object in life. The idea was followed up in ordinary tracery, and the ends were duly chopped in every conceivable position. A mingling of these two crazes, such as may be found in many German interiors, gives one an uncomfortable admiration for their digestion of difficult problems.

The town-halls for which Belgium is more especially famous, retained, during the fourteenth and fifteenth centuries, much of the propriety of design that had been applied to them in the thirteenth century; the Cloth Hall at Ypres, of which the foundation-stone was laid in 1200, but which was not finished till 104 years afterwards, being a very grand and simple design, and even its elaborate successor at Louvain (1448-63), although somewhat crowded with dormer windows, is free from debasement in detail. A lofty central tower is a feature in most of these town-halls.

The Italians in the fifteenth century had begun to tire of Gothic. They erected two enormous churches at the end of the fourteenth century, St. Petronio at Bologna (only part finished), and the cathedral at Milan. The former with central bays, not only about 60 ft. across, but square in plan,—a huge dimension, unknown in true Gothic churches; the latter, said to have been designed by a German, but carried out under Italian influence, with a bastard result. The choir, says Fergusson, p. 780, is neither a French chevet nor a German nor Italian apse, but this part of the building, with its simple forms and three glorious windows, is perhaps an improvement upon both the methods of which it is compounded. The Certosa, near Pavia, also of the same date (1396), is internally worse than either. Externally, however, the galleries, of which we saw the beginning in the Lombard style, and other national features, render it a more successful building. When the façade was added in 1473, the Italians had said good-bye to Gothic; it is entirely in the Renaissance style, and the subject of this article is, in Italy, conspicuous by its absence.

Going on to Spain, where some remarkable churches were built during the fourteenth century with the buttresses brought inside to form side chapels and with the side aisles omitted, we find that the Gothic work of the latest period "became extraordinarily florid in its details, especially in the variety introduced into the ribs of the vaulting and the enrichments generally. The great cathedrals of Segovia and Salamanca were neither of them begun until the sixteenth century had already well set in. They are the two principal examples of this florid Gothic" (Smith's Gothic and Renaissance, page 140). The interesting element in Spanish Gothic is the infusion of Moorish (Saracenic) details which were skilfully combined with it. This may be seen in a survival of the cusps which we saw at Cordova in the eighth century, and they sometimes repeated a very satisfying feature of Moorish work, namely, the habit of inclosing an arch within a rectangular frame. The church at Batalha, in Portugal, is an extremely rich example in which this treatment is observed.

In France, after the first few years of the fourteenth century, which had produced the beautiful Church of St. Ouen, at Rouen, architecture was much neglected on account of the wars in which she was engaged; however, we find that she burst forth with pent-up vigour in the fifteenth. Like all other countries, she became florid in her architecture, her particular weaknesses, perhaps, being for "flamboyant," —or flame-like,—tracery and extravagant dormers. See the Palais de Justice at Rouen illustrated on page 852 of Gwilt's Encyclopædia. There is an amount of *abandon* in the compositions and details of this period that has won the admiration of a no less fastidious critic than Ruskin, who compares it favourably with our more formal English work; nevertheless, it is with something of the comfortable feeling of coming home after a holiday that we now turn to the study of our own styles.

We have already alluded to the Early English period, which is also called the Lancet style from the form of the separate windows, which were, for a long time, used singly or grouped in couplets or triplets. Soon they came under the protection of an inclosing dripstone, and then circles and other forms began to peep through the remainder of the inclosed space, and, by degrees, the window lights and these piercings became fused into tracery, such as may be seen at Westminster Abbey. Perhaps the finishing touch of the system was given by the French designer of this building, for tracery had been used in France long before we adopted it.

The study of tracery is an interesting one, and may be followed in Sharpe's "Windows." From circular and other "geometrical" forms, it gradually became blended into "curvilinear" lines, after which a taste set in in favour of "perpendicular," or rather "rectilinear" lines (often in connexion with depressed four-centred arches), which were not confined to the tracery of the windows, but were spread all over the surface of the buildings from floor to roof, thus fulfilling the distinction, pointed out at the beginning of this article, between the attention to the bones and the skin of architecture.

On the subject of roofs Fergusson repeats his pet regret that we adopted the double covering, —stone inside and wood over it,—instead of making a thorough job of one or the other; especially as we became so proficient in the construction of open-timber roofs (see Brandon's work on these), culminating in that over Westminster Hall (see Gwilt's "Encyclopædia," p. 181), 68 ft. internal span and 238 ft. long, erected in the reign of Richard II.

Viollet-le-Duc points out the danger of cracks or settlements in a stone-covered vault, and the convenience afforded by an upper wooden roof in obtaining access to all parts of the back of a stone vault below it for repairs, &c. However glorious the English open-timber roofs were, our stone vaults were no less beautiful. Indeed, while the French seemed satisfied with their plain quadripartite vault when they had got it, the English soon began to introduce intermediate ribs, and gradually made our vaults richer and richer, until it become a question of carving these ribs out of the same stone as the filling-in instead of the filling-in being supported by the ribs.

Then, again, the unequal lengths of these ribs (the diagonal being longest, and the wall-ribs shortest, with ever so many intermediate lengths between them), was felt to be an objection that must be overcome; hence the invention of fan tracery, in which all the ribs are of the same length and curvature. Then came the ingenious contrivances for suiting fan tracery to oblong bays, the culmination of which may be seen in Henry VII.'s Chapel at Westminster. An internal view will be found in Rosengarten (p. 335) and Smith (p. 57). Willis's paper on vaulting contains a back view of this structure showing the wonderful manner, in which the stones are keyed together.

Another peculiarity of English Gothic, during the whole Middle Ages, lies in the square eastern ends of our churches which were adopted when we had become quite free from French influence: by this means we obtained grand east windows, such as that at Gloucester Cathedral. Lastly, the general external proportions of our cathedrals and other churches are far more beautiful than those built by the French. They, with their frequent double aisles, raised their naves to an immense height. We were content with a low and long proportion, which gives full value to the height of our towers, and which admits of double transepts in several examples. The play of perspective is thus much improved. An excellent idea of our cathedrals may be obtained from a plate in the "Quarterly Papers" of the Institute, in which block models of several of them are represented in perspective to the same scale.

Domestic architecture went hand in hand with Ecclesiastical, houses being designed in the same style as churches (it is reserved for our day to pronounce that one style is fit for the one, and another style for the other), and yet there is no danger of mistaking these Mediæval houses for churches.

Sculpture became more formal and square in its treatment in the fifteenth century. In connexion with the chancel screens an excellent school of figure-painting on the panels prevailed, especially in Norfolk. Drawings of some of these were purchased by the Institute. Generally the same works may be consulted in fifteenth-century Gothic, as were referred to in the last article: and Burges's "Architectural Drawings" should have been added to the list.

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**Stratford-on-Avon Water Works.**—Mr. E. Willcox, A.-M. Inst.C.E., of Sutton Coldfield, has been appointed Resident Engineer for these works.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*Aug.* 15.—11,313, G. T. Harrap and F. C. Hawtin, London, Fans for Ventilating.—11,315, G. H. Jennings, S. Jennings, and J. Morley, London, Controlling, &c., Supply of Water for Sanitary Purposes, &c. (June 28, '84.)

*Aug.* 16.—11,332, W. Triffitt, Bradford, Window Blinds.—11,335, M. Cohen, Liverpool, Method of Heating.—11,348, J. Harris, London, Venetian Blinds.—11,349, J. Hill, London, Window-sash Appliances, &c.

*Aug.* 19.—11,417, E. G. Cotton, London, Stench Traps. Com. by R. T. D'Heureuse, New York.—11,444, E. Homan, London, Fireproof Construction.

*Aug.* 20.—11,452, T. Hughes, Birmingham, Cord-holders for Blinds.—11,455, R. H. Evans, Manchester, Metal Tie-rods. — 11,464, J. Burford, London, Cooking and Heating Apparatus.

*Aug.* 21.—11,494, H. Harrison, Leeds, Regulating Supply of Water to Closets, &c.—11,496, W. Russell, Manchester, Cooking and Kitchen Ranges.—11,509, A. J. Boult, London, Monumental, Architectural, and similar Work. Com. by F. M. Nichols, United States.—11,515, J. Eaton, London, Fastening Sashes, &c.—11,516, J. Eaton, London, Blinds, &c.

*Aug.* 22.—11,533, J. Parker, London, Sash-fasteners, &c.—11,541, J. H. Keyser, London, Stoves.—11,544, H. J. Haddan, London, Revolving Shutters. Com. by J. Auderle, Vienna.

*Aug.* 23.—11,573, A. Skinner and C. H. Thompson, London, Furniture Castors.

*Aug.* 25.—11,598, W. Poore, London, Heating Apparatus, &c.—11,589, A. Seward and H. G. Walton, Liverpool, Flushing Apparatus.

*Aug.* 26.—11,640, J. Jameson, London, Trap for Pipes.—11,658, J. Robbins, London, Manholes for Sewers, &c.—11,659, H. H. Lake, London, Street and other Pavements or Floorings. Com. by K. Kühn, St. Johann-on-the-Saar.—11,665, J. Atterton, London, Stench Traps.—11,666, J. Edwards and A. Rogers, London, Fireproof Doors, &c.

*Aug.* 27.—11,680, W. R. Maguire, Dublin, Washhand Basins, Baths, &c.—11,700, C. D. Abel, London, Stoves or Fireplaces. Com. by C. de Choubersky, Paris.—11,703, J. N. Peake, London, Securing Ties to Walls, &c.

*Aug.* 28.—11,718, R. Stanley, Nuneaton, Chimney-pots or Ventilators.—11,727, H. Trott, London, Ball Valve for High and Low Water Pressure.

### SPECIFICATIONS ACCEPTED.†

*Aug.* 19.—3,878, J. Smeaton, London, Water Waste-preventing Apparatus for Water-closets, &c.—3,972, G. A. Harvey, Lewisham, Chimney-pots and Ventilators.—10,270, W. Harrison, Sheffield, Spindles for Door-handles.

*Aug.* 22.—1,164, W. A. Gill, London, Securing Door-handles to their Spindles.—7,452, W. Sanderson and T. A. Moffitt, Gateshead, Blind Furniture.—8,217, A. J. Boult, London, Manufacture of Parquet Floor-plates, &c. Com. by C. Wittkowsky, Berlin.—10,454, H. Trott, London, Ball-valve for High and Low Pressure Water.—10,460, E. Newton, Hitchin, Trap for Water-closets, &c.

*Aug.* 26.—469, E. Verity, J. N. Verity, and B. Banks, Leeds, Leeds, Opening, Closing, &c., Windows, Skylights, Dampers, Ventilators, &c.—5,923, J. E. Doughty and P. Kranich, London, Builder's Stage.—9,061, W. Clutterbuck, London, Ventilating Tunnels, &c.—10,605, G. D. Peters, London, Spring Rollers for Window-blinds.

*Aug.* 29.—881, T. R. Shelley, Birmingham, Glazing Conservatories, Roofs, &c.—1,022, E. Edwards, London, Louvres for Church Belfries, &c. Com. by A. Cheneval, Maffe, Belgium.—1,439, J. Parry, Birmingham, Fastener for French Windows, &c.—8,773, J. H. Johnson, London, Heating Apparatus. Com. by E. Körting, Hanover.—8,919, T. F May, Liverpool, Flue-mouth for the Flues of Dwelling-houses, &c.—10,742, S. B. Goslin and J. J. Brown, London, Water-closet Apparatus.

### ABRIDGMENTS OF SPECIFICATIONS

*Published during the week ending August 23, 1884.*

5,861, G. Hand-Smith, London, Sinking or Fixing Colours, &c., into or on Marble, Wood, &c. (Dec. 26, '83. Price 3d.)

This is an improvement on Patent No. 3,610 of 1879 and 5,616 of 1880, in placing the article to be treated in a closed vessel, and subjecting it to a heat of about 140 deg. Fahr. Air is also heated in a separate saturator in conjunction with a solution of the colour required, and this highly saturated and intensely heated air is then forced in under a heavy pressure to the vessel in which the article is, and the colour is fixed thereon.

5,897, R. Lofthouse, Manchester, Creating Currents of Air, &c., for Ventilating Purposes. (Dec. 28, '83. 6d.)

Inside a stationary tube is a rotating cylinder, and in the smaller sizes an Archimedian screw-blade or blades are contained within this cylinder, while in the larger size the blades may be outside the rotating cylinder.

5,971, W. Brindle and T. Brindle, Upholland, Dressing, Ornamenting, or Polishing Stone, Concrete, &c. (Dec. 31, '83. 6d.)

The apparatus consists of a rapidly revolving or reciprocating surface of metal, which is brought to bear against the surface of the stone, &c., while sand and water are placed between the two surfaces.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

## Miscellanea.

**A Memorial of the Landing of St. Augustine in England.**—Mr. John Roddis, architectural sculptor, Birmingham, has just completed a monument to commemorate the landing of St. Augustine in this country and his meeting with King Ethelbert. The spot where this meeting took place is believed to be Cotmanfield, now known as Cottington. It appears that Lord Granville, occupying the office of Lord Warden of the Cinque Ports, has become the owner of the land on which these events took place. According to the *Birmingham Post*, in consequence of reading the historical description of the Isle of Thanet, written by Mr. Robert Bubb, of Minster, in Hutchings and Crowsley's guide to the island, Lord Granville was induced to entertain a plan of erecting a memorial on the spot. He communicated this project to Mr. Bubb, and Mr. Bubb sought the advice of Dr. Freeman, of Birmingham, who is a native of the Isle of Thanet, and is intimately acquainted with its historical legends. Dr. Freeman referred to Mr. Roddis for practical suggestions as to the nature and cost of the memorial, and afterwards engaged in a correspondence with Lord Granville on the subject. In the end it was determined, on the original suggestion of Lord Granville, that the memorial should take the form of a reproduction of one of the famous crosses at Sandbach, near Crewe. Having consulted Messrs. Hardman and Powell, Mr. Roddis prepared his design, which was approved by Lord Granville. The west front exhibits the Christian legend. On the encircled cross at the head of the shaft are four emblems of the evangelists, the lion, the eagle, the man, and the bull. On the panelled shaft below are represented the Annunciation, the Virgin and Child, the Crucifixion, and Transfiguration, with demi-figures of saints and angels. On the north side the theme is continued by figures of the twelve apostles. On the south side is a series of fourteen figures of early Christian martyrs. The east front of the circular cross is filled in with runic ornament, which continues nearly halfway down the shaft, when the design breaks into diamond-shaped panels, filled with figures in the following order:—St. Alban, the proto-martyr of England (A.D. 303); St. Augustine, attended by monks; and Ethelbert, king of Kent. The date of unveiling the memorial will be fixed by Lord Granville.

**The Hospital for Diseases of the Chest, City-road.**—The Hospital for Diseases of the Chest, in the City-road, is at present being greatly enlarged by the erection of a new block of buildings on the north side. The enlarged structure is 74 ft. wide, and is carried to a height of 84 ft., having a ground floor and three lofty floors above. It is faced with stock bricks, each floor having spacious and lofty two-light mullion windows made of Lascelles' patent concrete. The elevation is surmounted by pediment dormers, and at the south end of the structure there is a tower rising to a height of 114 ft., which will form a central feature in the hospital when the present building is connected with that now in course of erection. The ground-floor of the new building will have a large projecting bay window about 18 ft. in height. The two buildings as connected will be approached by a Gothic entrance under the tower. We understand that the sashes of the several windows will be constructed on an entirely new principle, invented and patented by the foreman of the works. The invention consists of the iron framework and glazing of each sash being reversible, so as to open both ways, thus providing increased facilities for cleaning and ventilation. The basement will contain a kitchen, 32 ft. by 18 ft., together with scullery and other culinary offices; also the officers' dining-room; whilst in the rear will be the machinery for a hydraulic lift connected with the several floors. The ground and first and second floors will each contain three wards, 31 ft. by 18 ft., the third and dormer floors being set apart as dormitories for the matron and servants. Mr. J. O. Abbott, of Charing-cross, is the architect, and Mr. W. Brass, of Old-street, is the contractor. Mr. T. Abbott (nephew of the architect) is clerk of the works, and G. Harris the foreman. The estimated cost of the building is about 14,000*l.*

**The Electric Light at the Law Courts.**—The installation of machines and engines has hitherto been only temporary, being in an iron shed on the waste ground to the west of the building. The permanent plant will be placed in the crypt under the great hall. This change involves a considerable amount of labour, as the existing steam boilers, which were only designed for the ventilation of the building, will have to be removed, as also will nearly all the existing steam and exhaust pipes as well as several large tanks. When completed there will be two 100-horse power Galloway patent boilers, two single-cylinder horizontal engines, each indicating 105-horse power at sixty revolutions, either one being capable of doing the whole of the lighting. The requisite speed for the dynamos, about 1,100 revolutions, will be obtained by two sets of shafting, with friction clutches on the first, so as to allow either or both the engines to be worked, as necessary. Six Crompton-Burgin compound wound 10-unit machines, all coupled parallel, will produce the current for the general illumination, lighting about 650 twenty-candle-power Swan lamps. A small Willans high-speed engine, with electric governors, will drive a 6-unit machine for lighting an all-day circuit of about forty-five lamps. There will also be two Burgin series machines, each lighting a series of three 4,000 candle-power Crompton-Crabb arc lamps, in the central hall. The engines, boilers, &c., are being fitted by Messrs. Galloway & Sons, and the dynamos, cables, switch-boards, &c., by Messrs. R. E. Crompton & Co., who fitted and wired the building, and under whose supervision the lighting was carried on until May last, when it was taken over by the Government, under the control of Her Majesty's Office of Works.—*The Electrician.*

**The Dundee Institute of Architecture, Science, and Art.**—The programme for session 1884-5, includes the following syllabus of papers to be delivered during the session, viz.,—Nov. 20th, Professor G. Baldwin Brown, on "Architectural Art"; Dec. 18th, Mr. Henry Pattullo, on "The Law of Building Contracts"; Jan. 15th, 1885, the Rev. George Mure Smith, on "Church Bells"; Feb. 18th, Professor Carnelly, D.Sc., on "Some Chemical Facts Connected with Plumber Work"; March 19th, Mr. Geo. S. Aitken, F.S.A. Scot., on "Ecclesiastical Architecture"; April 16th, Professor Ewing, B.Sc., F.R.S.E., on "The Sanitary Inspection of Dwelling-Houses"; May 21st, Mr. J. G. H. Spindler on "Art Work in the Middle Ages." The *conversazione* will take place early in October, and the business meeting for election of office-bearers, &c., on June 21st. Prizes for designs, &c., are offered, and particulars of the conditions may be had from the hon. secretary, Mr. Charles Ower, architect, 104, Commercial-street, Dundee.

**The Royal Princess Theatre, Edinburgh,** has been reopened, after a thorough overhaul as regards decoration. The mouldings which used to divide the centre of the ceiling have been taken away, leaving an unbroken circular space, on which is painted a design on a light blue ground, formed by Cupids supporting festoons with musical emblems. The enriched moulding round this panel is bronze and gold, and the remainder of the ceiling is powdered with paterœ of a brownish tint on a yellow ground, giving relief to the centre. The proscenium-opening and fronts of balconies are also bronze and gold, and on the space over the proscenium are painted two winged figures in the spandrels of the arch. The walls of the whole auditorium are covered with a soft blue damask paper, which gives a cool effect to the interior. The work has been done by Messrs. Geo. Dobie & Son, 23, George-street, and Messrs. W. R. Clapperton & Co., Princes-street, respectively.

**The Drainage of Cape Town.**—The *Cape Argus*, just received, contains the report of the three engineers appointed to adjudicate upon the competitive schemes for the efficient drainage of Cape Town. By their unanimous award, the premium of 250*l.* is accorded to the scheme under the motto "Sanitary," sent in by Mr. Isaac Harpur, son of Mr. Samuel Harpur, the engineer and surveyor to the Merthyr Tydfil Local Board. It would appear from the report of the adjudicators that one of the chief merits of Mr. Harpur's scheme lies in his selection of the outfall. Mr. Harpur is now engaged in superintending, under the resident engineer, the reconstruction of the Molteno reservoir at Capetown.

**An Electric Lighthouse in Brazil.**—An electric lighthouse has recently been erected on the island of Raza, at the entrance of the Bay of Rio Janeiro. The lighthouse proper is 85 ft. high, and is put upon a rock 230 ft. in height, so that the focus of the light of the apparatus is fixed at an elevation of 315 ft. above the sea. The electric current is produced by a continuous current Gramme machine, working at the rate of 700 revolutions, and feeding a light of 2,000 candle-power. The Gramme machine referred to is worked by a stationary surface-condensing steam-engine, this arrangement being inevitable owing to the want of fresh water. All the fittings are double, so as to prevent interruptions by unforeseen accidents; and, to make assurance doubly sure, an oil-lamp is always kept in readiness. The light is revolving, having two white discs and one red one, succeeding one another at fifteen minutes' interval, and the light is visible at a distance of about thirty-five statute miles.—*Iron.*

**The Sunday Society.**—On Sunday last Grosvenor House was open for the last time this season to the members of the Sunday Society. In July last the Duke of Westminster, as president, authorised the honorary secretary, Mr. Mark H. Judge, to issue tickets of admission to the members of the Sunday Society and to the Sunday League. Each ticket admitted the bearer on any day in August, between the hours of two p.m. and six p.m., so that it is interesting to note how these tickets were used. The following figures give the highest number of visitors on the different days of the week:—Mondays, 28; Tuesdays, 35; Wednesdays, 33; Thursdays, 39; Fridays, 84; Saturdays, 99; Sundays, 494. It is claimed that this result corresponds with the results of Sunday opening wherever it has been tried, whether in this country, the United States, or on the Continent.

**Ulverston.**—The great west window of Holy Trinity Church, Ulverston, has just been filled with stained glass, by way of memorial of the late Mr. Miles Kennedy, of Stone Cross. The window is of three lights, the centre light being 23 ft. by 5 ft. and the side lights of somewhat less dimensions. The subjects selected for illustration are excerpt from the *Te Deum*. The work is in the style of the thirteenth century. Messrs. Powell Bros., of Leeds, are the designers and painters, and the work has been carried out under the superintendence of Mr. J. W. Grundy, architect, Ulverstone.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Municipal Hall and Offices, Bombay | Municipal Commissnrs. | Rs. 5,000, 3,000, 2,000. | Nov. 6th | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| New Station at Bradford | Lan. & Yorks. Ry. Co. | *Official* | Sept. 9th | |
| Stables at Bromley-by-Bow | Lon. Gen. Omnibus Co. | do. | Sept. 11th | xx. |
| Asphalte Carriageway Pavements | Commissioners of Sewers | do. | Sept. 12th | ii. |
| New Street Work | Vest. St. Giles, Cambwl | do. | Sept. 16th | xxi. |
| Erection of Houses, Edmonton | | Whitmore & Reeves | do. | ii. |
| Brick and Pipe-Sewers, &c. | Willesden Local Board | *Official* | Sept. 16th | xxi. |
| Sanitary Works | Poplar and Stepney Asylum District. | A. & C. Harston | do. | ii. |
| Sewering, &c., Chiswick New Town | Chiswick Local Board | *Official* | Sept. 17th | ii. |
| Do. Bedford Park Estate | do. | do. | do. | ii. |
| General Paving Works | Westminster B. of Wks. | | do. | ii. |
| Gasfitter's Work | Com. of H.M. Works | *Official* | do. | ii. |
| Bellhanger's Work | do. | do. | do. | ii. |
| Caterham Asylum Alterations | Met. Asylums Board | do. | Sept. 18th | xxi. |
| Girders, &c. for Bridge | Midland Railway Co. | do. | do. | ii. |
| Aberdeen Pitchers | Gravesend U. S. A. | do. | Sept. 19th | xx. |
| Post-office at Stroud | Com. of H.M. Works | *Official* | Sept. 20th | ii. |
| Police-court and Offices at Stratford | West Ham Local Brd. | do. | Sept. 23rd | xxi. |
| Bridge, Marshgate-lane | do. | do. | do. | ii. |
| House for Medical Officer | South Met. School Bd. | Not stated | do. | xxi. |
| Main Drainage Works | West Bromwich Cor. | *Official* | do. | ii. |
| Brick Sewer at Grove Park, Lee | Met. Board of Works | do. | Sept. 25th | ii. |
| Enlargement of Station, Perth | Perth Gen. Statn. Com. | Blyth & Cunningham | Sept. 26th | xxi. |
| New Waiting-Rooms, Newhaven Harbour | L. B. and S. C. Ry. Co. | *Official* | Sept. 29th | ii. |
| New Offices, Berwick-street, Newcastle | Tyne Improvement Com. | R. J. Johnson | Sept. 30th | xxi. |
| Portland Cement | Improvemnt Commisnrs Port of Calcutta | | October 8th | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Engineer and Surveyor | Aston Union R. S. A. | Sept. 11th | 200*l.* per annum | xviii. |
| Inspector of Nuisances and Surveyor | Mkt. Har. Un. R. S. A. | Sept. 18th | 130*l.* do. | xviii. |
| Surveyor | Northampton Cor. | Sept. 22nd | 200*l.* do. | xviii. |

### TENDERS.

For constructing a jetty, with landing-stairs and slip-way, and dredging the foreshore, and other works in connexion, at Flathouse, Portsea, for the Corporation of the Borough of Portsmouth. Mr. H. Percy Boulnois, Borough Engineer. Quantities supplied by Mr. H. F. Foster, John-street, Adelphi, London:—

| | |
|---|---|
| Lucas & Son, Kensington | £45,067 0 0 |
| J. Mackay, Hereford | 40,180 15 9 |
| T. B. Hayter, Stanshaw | 34,470 0 0 |
| W. R. & C. Light, Landport | 32,000 0 0 |
| J. Mowlem & Co., Westminster | 30,800 0 0 |
| T. P. Hall, Buckland | 29,926 9 0 |
| F. Bevis, Kingston-crescent | 26,731 4 6 |

For the enlargement of gas-works in connexion with the Asylums for Imbeciles, at Darenth, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied:—

| | |
|---|---|
| Cutler & Son, Millwall | £8,685 0 0 |
| G. Bower, St. Neot's | 5,541 0 0 |
| J. T. B. Porter, & Co., Lincoln | 5,507 10 0 |
| Holmes & Co., Huddersfield | 5,200 0 0 |
| Willey & Co., Exeter (accepted) | 5,014 0 0 |

For taking down the Berkshire Brewery, King's-road, Reading, and erecting eight houses and six cottages on the site, using in the old materials, for Mr. Wm. Bailey. Mr. Joseph Greenaway, architect and surveyor, 19, Duke-street, Reading. Quantities supplied:—

| | | A* |
|---|---|---|
| Blake | £5,500 0 0 | £80 0 0 |
| Simonds | 5,423 0 0 | 76 0 0 |
| Sheppard | 5,231 0 0 | 70 0 0 |
| Searle | 4,817 0 0 | — |
| Kingerlee | 4,695 0 0 | 100 0 0 |
| Woodroffe | 4,700 0 0 | 52 10 0 |
| Margetts | 4,650 0 0 | 74 1 6 |
| Bourton | 4,639 10 0 | 79 0 0 |
| Higgs | 4,6 0 0 0 | 83 0 0 |
| Denton | 4,344 0 0 | 67 0 0 |
| Botfrill | 4,350 0 0 | 50 0 0 |
| Pilgrim | 4,250 0 0 | 50 0 0 |
| G. Winter | 3,865 0 0 | 70 0 0 |
| Wernham | 3,860 0 0 | 67 10 0 |
| Poffley | 3,840 0 0 | 68 0 0 |
| Goodchild | 3,768 0 0 | 79 0 0 |
| Newberry | 3,600 0 0 | 65 0 0 |
| Hawkins | 3,503 0 0 | 70 0 0 |
| Taylor | 3,400 0 0 | 50 0 0 |

* Amount offered for sundry cast-iron work, &c.

For proposed system of sewerage, at Dorking, for the Dorking District Local Board. Messrs. Smith & Austin, engineers.—

| | |
|---|---|
| McCrea & McFarland, Westminster | £21,329 0 0 |
| Jas. Young & Co., Hereford | 17,848 0 0 |
| J. W. & J. Neave, Stratford | 16,962 0 0 |
| J. Mowlem & Co., Westminster | 16,390 0 0 |
| Falkner, Redhill | 15,850 0 0 |
| Bottoms Bros., Battersea | 15,275 0 0 |
| Putney, Dorking | 14,395 0 0 |
| Battens & Blackmore, Clapham | 14,203 0 0 |
| Cook & Co., Battersea | 14,169 0 0 |
| Woodham & Fry, Greenwich | 13,630 0 0 |
| Iles, Wimbledon | 13,678 0 0 |
| Beadle Bros., Erith | 13,427 0 0 |
| J. Roberts, Stratford-on-Avon | 13,244 0 0 |
| Dickson, St. Alban's | 12,797 0 0 |
| T. P. Hall, Portsmouth | 11,912 0 0 |
| Cardus & Bowse, Acton | 11,243 0 0 |
| Etheridge, Croydon | 10,203 0 0 |
| Crook & Smith, Southampton | 9,228 0 0 |

For nine houses at Stratford-green, for Mr. Bigg. Mr. Stimpson, architect:—

| | |
|---|---|
| Carnow | £2,924 0 0 |
| Castle & Son | 2,695 0 0 |
| Boulton & Lee | 2,473 0 0 |
| Baxter | 2,412 0 0 |
| Bricknal | 2,250 0 0 |
| Ellis | 2,175 0 0 |
| Rogers | 2,115 0 0 |
| Smith | 2,115 0 0 |
| Watson | 2,070 0 0 |
| England | 2,070 0 0 |
| Thompson & Tweed | 2,043 0 0 |

For alterations, &c., Westminster Bridge-road, for Mr. D. S. Woolf. Mr. Lewis Solomon, architect, Gray's Inn-square:—

| | |
|---|---|
| Roberts | £1,195 0 0 |
| Jeffreys | 1,168 0 0 |
| Beale | 1,160 0 0 |
| Palmer | 1,130 0 0 |
| Salter | 1,112 0 0 |
| Jennings | 1,031 0 0 |

For alterations and additions to the White Horse public-house, Fore street, Edmonton, for Mr. Jas. Foan. Mr. A. J. England, architect:—

| | |
|---|---|
| Lascelles | £1,533 0 0 |
| Harris & Wardrop | 1,288 0 0 |
| J. Beale (accepted) | 1,274 0 0 |

For the construction of drains, shafts, and sewage-tank, &c., for the Board of Management of the Royal National Consumption Hospital, Ventnor, Isle Wight. Mr. Wm. Greenhill, St. James's-row, Sutton, engineer. Quantities supplied by Mr. H. A. Foster, John street, Adelphi, London:—

| | |
|---|---|
| Ingram & Sons (accepted) | £1,354 0 0 |

For the erection of new premises in the Kentish-town-road, for Mr. Charles Wilson. Mr. H. H. Bridgman, architect. Quantities by Mr. F. Thomson:—

| | If Portland Stone. | If Beer Stone. |
|---|---|---|
| A. Drew, Camden-town | £6,200 | £6,150 |
| E. Lawrence & Sons, City-road | 5,619 | 5,593 |
| Richardson Bros., London Wall | 5,598 | 5,538 |
| M. Manley, Regent's Park | 5,547 | 5,521 |
| B. E. Nightingale, Lambeth | 5,454 | 5,424 |
| Dove Bros., Islington | 5,390 | 5,325 |
| J. R. Hunt, Bow-common | 5,356 | 5,336 |
| S. R. Lamble, Kentish-town | 5,294 | 5,254 |
| Wall Bros., Kentish-town | 5,290 | 5,235 |
| W. Scrivener & Co., Regent's Park | 5,263 | 5,203 |
| W. Shurmur, Lower Clapton | 5,247 | 5,210 |
| Gould & Brand, Camden-town | 5,200 | 5,150 |
| E. Toms, Camden-town* | 5,119 | 5,059 |

* Accepted, with an addition of £575 for party-wall, fittings, &c., making a total of £5,694.

For re-instating No. 41 and 42, High-street, Uxbridge, after fire, for Mr. H. J. Grainge. Mr. George Eves, architect:—

| | |
|---|---|
| Hardy | £785 0 0 |
| Taylor | 756 0 0 |
| Hall | 748 0 0 |
| Kearley | 648 0 0 |

For shops and mineral water factory, for Mr. James Cox. Messrs. Whitmore & Reeves, architects and surveyors, 14, Devonshire-square, Bishopsgate:—

| | | Old Materials. |
|---|---|---|
| E. Conder, Kingsland-road | £5,359 | — |
| Langmead & Way, Gray's Inn-road | 5,100 | £10 |
| Jarvis & Sons, Hackney-road | 5,044 | 46 |
| F. & F. J. Wood, Mile End-road | 5,047 | 60 |
| F. G. Higgs | 4,936 | 20 |
| G. W. Beale, Cambridge-heath Bridge | 4,898 | 15 |
| B. E. Nightingale, Lambeth | 4,890 | 30 |
| J. Walker, Limehouse | 4,533 | — |
| C. Forrest, Victoria Park | 4,585 | 100 |
| Steel Bros., Dalston | 4,277 | 30 |
| C. Wyman, Edmonton | 4,233 | 50 |
| Wyman (reduced) | 4,105 | — |
| Steel Bros. (reduced)* | 4,050 | — |

[Architect's estimate, £4,300.]

* Accepted.

For making new road, to be called Fitzroy-road, E, leading out of Marsh-hill, Homerton, and sewer, for Mr. James Chambers. Mr. Francis W. Searle, surveyor, Tottenham:—

| | |
|---|---|
| Taylor | £490 0 0 |
| Pound | 478 0 0 |
| Potter | 418 0 0 |
| Porter | 369 0 0 |

For additions and renovations to St. Barnabas's Church, South Kensington. Mr. Charles Moore, architect:—

| | | Renovations only. |
|---|---|---|
| Andrew & Nanson | £1,293 | £436 |
| Higgs & Hill | 1,057 | 399 |
| Allen | — | 323 |

For new schools and master's house, at Crumlin, Newport, Mon. Mr. E. A. Lansdowne, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| John Linton, Newport | £2,499 | 0 | 0 |
| Wm. Jones & Son, Newport | 2,287 | 0 | 0 |
| Thos. Williams, Newbridge | 2,280 | 0 | 0 |
| Henry Parfitt, Pontnewydd* | 2,075 | 0 | 0 |
| John Burgoyne, Blaenavon | 2,040 | 0 | 0 |

* Accepted.

For new stables and coachhouse, at York-place, Newport, Mon., for Mr. H. A. Huzzey. Mr. E. A. Lansdowne, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| Fore, Bristol | £351 | 0 | 0 |
| Wm. Jones & Son, Newport | 290 | 0 | 0 |
| W. Blackburne, Newport | 280 | 0 | 0 |
| Moulton & Bromscombe, Newport | 275 | 0 | 0 |

For the erection of warehouses in Banner-street, St. Luke's, for Mr. R. Scully. Mr. J. Groom, architect:—

| | | | |
|---|---|---|---|
| S. Sabey & Son (accepted) | £3,553 | 0 | 0 |

For rebuilding No. 125, High-street, Southampton, for Mr. John H. Cooksey. Mr. W. H. Mitchell, architect, Southampton:—

| | | | |
|---|---|---|---|
| Jonas Nichols | £3,235 | 0 | 0 |
| Stevens & Sons | 3,124 | 0 | 0 |
| H. J. Sanders | 3,117 | 0 | 0 |
| Bull, Sons, & Co., Limited* | 2,929 | 0 | 0 |

* Accepted.

For the erection of new house at Little Chart, Kent, for Mr. J. D. Blount. Mr. W. Farenscroft, architect, Reading:—

| | | | |
|---|---|---|---|
| Hughes, Ashford | £935 | 0 | 0 |
| Baker, Ashford | 925 | 0 | 0 |
| Barden, Maidstone | 879 | 0 | 0 |
| Vaughan, Maidstone | 719 | 0 | 0 |
| Steddy, Joy, & Steddy, Ashford* | 710 | 0 | 0 |

* Accepted, subject to a few modifications.

For the erection of two houses with shops, Vicarage-lane, Stratford, Essex, for Mr. Geary. Mr. Alfred Birt, architect:—

| | | | |
|---|---|---|---|
| D. D. & A. Brown | £750 | 0 | 0 |
| G. J. Hosking | 589 | 0 | 0 |
| North Bros. | 577 | 0 | 0 |
| A. Saunders (accepted) | 551 | 0 | 0 |

For the erection of shops and dwelling-houses, at King-street, Ramsgate, for Mr. W. Marcoolyn. Mr. E. L. Elgar, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| Duckett | £2,333 | 0 | 0 |
| Newby Bros. | 2,141 | 10 | 0 |
| Martin | 2,065 | 0 | 0 |
| Miller | 2,030 | 0 | 0 |
| Smith | 1,964 | 0 | 0 |
| J. & H. White | 1,910 | 0 | 0 |
| Bowman | 1,920 | 0 | 0 |
| J. Newby | 1,920 | 0 | 0 |
| Port | 1,850 | 0 | 0 |
| Home | 1,793 | 0 | 0 |

For the erection of two cottages, at Hunne, Ramsgate. Messrs. Hinds & Son, architects:—

| | | | |
|---|---|---|---|
| Paramor | £400 | 0 | 0 |
| Newby | 351 | 10 | 0 |
| Smith | 350 | 0 | 0 |
| Bowman | 348 | 0 | 0 |
| Miller | 338 | 0 | 0 |
| Duckett | 320 | 0 | 0 |

For the construction of the Erdington Extension Tramways, Birmingham, comprising about two miles of double and single line, for the Birmingham and Aston Tramway Co., Limited:—

Jacob Biggs, Birmingham (accepted at schedule of prices).

For re-instating the Chequers Hotel, Uxbridge, after fire, for Messrs. Harman & Co. Mr. George Eves, architect, Uxbridge:—

| | | | |
|---|---|---|---|
| Hardy | £1,133 | 0 | 0 |
| Taylor | 1,105 | 0 | 0 |
| Kearley | 993 | 0 | 0 |
| Passmore & Son | 980 | 0 | 0 |
| Hall (accepted) | 819 | 18 | 0 |

For erection of a confectionery factory, at Uxbridge (ovens not included), for Mr. Blackwell. Mr. George Eves, architect:—

| | | | |
|---|---|---|---|
| James | £610 | 0 | 0 |

For additions and alterations to No. 1, Newland-terrace, Kensington, for Mr. Buckle. Mr. George Eves, architect:—

| | | | |
|---|---|---|---|
| Parks & Roberts | £489 | 10 | 0 |

Accepted for four houses in Denby Dale-road, Thornes, near Wakefield, for Major Barker, J.P. Mr. G. H. France, architect, Wakefield. Quantities by the architect:—

*Brickwork, Slating, and Plastering.*

| | | | |
|---|---|---|---|
| Flower Bros., Wakefield | £547 | 16 | 4 |

*Carpenter and Joiner.*

| | | | |
|---|---|---|---|
| N. Ibbottson, Belle Vue, Wakefield | 214 | 11 | 9 |

*Plumber and Glazier.*

| | | | |
|---|---|---|---|
| F. Stafford, Wakefield | 53 | 18 | 6 |

*Painter.*

| | | | |
|---|---|---|---|
| J. Rayner, Wakefield | 17 | 4 | 0 |

For the erection of a washhouse, &c., New-row, Thornes, near Wakefield, for Major Barker, J.P. Mr. G. H. France, architect:—

| | | | |
|---|---|---|---|
| Flower Bros. (accepted) | £234 | 17 | 0 |

For the whole of the work required for erection and completion of "Salvation Army barracks," in Darlington, for "General" Booth. Mr. E. J. Sherwood, architect, Queen Victoria-street, E.C.:—

| | | | |
|---|---|---|---|
| Wm. Thompson, Chester-le Street | £3,500 | 0 | 0 |
| Wm. Holt, Cheetham, Manchester | 3,070 | 0 | 0 |
| W. E. Gent, Darlington | 3,042 | 10 | 0 |
| John Hewett, Darlington | 2,946 | 0 | 0 |
| J. W. & M. McKenzie, Darlington | 2,910 | 0 | 0 |
| J. Hope, Darlington | 2,800 | 0 | 0 |
| R. T. Smith, Darlington | 2,767 | 0 | 0 |
| G. Marshall, Darlington | 2,720 | 0 | 0 |
| F. J. Coxhead, Leytonstone | 2,681 | 0 | 0 |

For new windows to Female Wards, and new roof to Cook-room, at the Uxbridge Union, for the Guardians. Mr. B. Freeman, architect:—

| | | | |
|---|---|---|---|
| Garrett, Uxbridge | £222 | 0 | 0 |
| Bell, Southall | 173 | 0 | 0 |
| Kearley, Uxbridge | 157 | 12 | 0 |
| Taylor, Uxbridge | 157 | 0 | 0 |
| Hardy, Cowley | 144 | 0 | 0 |
| Quinn, Southall | 136 | 13 | 0 |
| Pearse, Southall | 129 | 0 | 0 |

For building mansion, Branston Hall, near Lincoln, for Mr. A. S. L. Melville:—

| | | | |
|---|---|---|---|
| E. Lawrance & Sons (accepted) | £18,601 | 0 | 0 |

*Special Notices.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

J. A. S. (both communications received).—L. McL.—F. B. (it is perfectly possible to construct such strap-tanks so as to be absolutely impervious).—J. P. Madrid.—B. and P. (sydney photograph received, shall appear).—D. and L. and Son.—W. J. E. (write to Batsford, Bookseller, High Holborn).—M. H. J. (we require amount of Trade Rate stated).—"L.—" Carlo Null. (we are obliged to decline recommending books, see "standing order" to that effect below).—C. H. H. (next week).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

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Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.

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Ilminster. [ADV

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# The Builder.

VOL. XLVII. No. 2171. SATURDAY, SEPTEMBER 17, 1884


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### *The Archæology of Homer.**

WHEN Dr. Schliemann laid bare the foundations of Hissarlik, high hopes were raised; these hopes we know were, so far as Homeric scholarship was concerned, doomed to disappointment. Something was added to our knowledge of barbarian races centuries before the days of Homer; but no necklace of Helen, no breastplate of Achilles, could reward the search. Happily this search did not end at Hissarlik; not only Mycenæ but Thera, Ialysus, Sparta, Athens herself, and, farther afield, Syracuse, Etruria, Latium, and the valley of the Po, have yielded up their buried evidence. We are conscious now that questions of Homeric terminology have to seek their answer not merely in textual criticism, but in the added witness of archæology; that the form of the "aspis" of Æneas, or of the "amphikupellon" from which Telemachos drank, may have to be determined by the buried relics of some hero's tomb at Cymæ or at Thera.

We are conscious of this, and most of us probably conscious of an unpleasant vagueness in the matter of this archæological evidence, which makes us timid of opinion. We do not feel any assuring certainty what discoveries are legitimate for our purpose, what again are chronologically *hors de combat;* we know that we may not put our trust in the Troy of Hissarlik; we are not clear why we are allowed to put confidence in Dipylon vases, and other types from Etruria. We have been all waiting till some one should speak with authority on these matters, put in order the mass of scattered evidence, give us at least an approach to some chronological landmarks; in a word, establish some well-defined relation between the literary testimony of Homer himself and the archæological evidence of recent excavations.

This, in a masterly manner, Dr. Helbig has done in the book before us. His work falls into two parts. His object is to give as full and complete a picture as possible of the Homeric age, the dwellings of the Homeric heroes, their clothing, the jewels and adornments of their women, the arms of their men, the implements and vessels of their households, their decorative art. This is the second part of his work, but in order to make this picture real and reliable he has first to give a *résumé* of the evidence on which it is based, to summarise the material which has made the drawing of such a picture possible. In summarising this material he is necessarily obliged to pass in review all the excavations which have yielded objects which could in any way illustrate Homeric art or Homeric custom; he must give his opinion as to the date of these objects in order to show whether they may or may not be reasonably connected with Homer; he gives, therefore, incidentally a whole survey of recent archæological discovery. It is to this survey, rather than to its application in detail to Homeric technology, that we shall turn.

The "sources" (*Quellen*, as the Germans happily call them) of Homeric criticism are, of course, two-fold,—first, literary; second, monumental. As regards the art and industry of Homeric times, the literary sources are necessarily very inadequate. The poet describes what he is sure is familiar to his hearers; he wants just to recall to their minds a picture, to touch its salient points, hit off its characteristic features, not to describe with detailed precision: hence it is often difficult for us, to whom the object, be it beaker, shield, or necklet, is unfamiliar, to recover its outline; we have lost the clue. Works of art of classical date, vase paintings and sculptured reliefs, are of no service if they depict Trojan scenes. They do it in no historical spirit. Trojan heroes are clothed and armed after the fashion of sixth-century garb. The scholars of Alexandria are no help. Aristarchos and Dionysius Thrax, with all their critical acumen, never look for a moment to monumental evidence; indeed, Alexandria was a city barren of antiquities, as Dr. Helbig suggests. Had the ancient school of philology had its seat at Ephesus or Samos, or any site charged with historical association, we might have had some valuable help to archæological criticism. To gather, then, any just notion of Homeric antiquities we must look for monumental evidences; most happily, however, the Homeric poems themselves give us the clue where this monumental evidence is to be sought.

Very few Ionic towns in Asia Minor have undergone systematic excavation, but, fortunately, we need not circumscribe our evidence to the strict limits of the scenes that Homer describes. The "Iliad" and the "Odyssey" show clearly enough that the Hellenic people on the east and west of the Ægean were, practically, in character and customs, one. We may argue, then, from excavations in the West, of the civilisation of the East. This is, then, the first important *literary* evidence, the oneness of the Hellenic people; the fact that in dress, customs, dwellings, implements, the Trojans and their allies were one and the same with their foes; a local peculiarity, indicated by an epithet here and there, only confirms the general impression. Further, we learn that one nation, accounted barbarian in classical times, was in Homeric days conspicuous for its advanced civilisation. Priam offered, as part ransom for the body of Hector, the goodliest of his possessions, a Thracian drinking cup. Achilles prized above others his splendid Thracian sword. The causes of this early prosperity are not far to seek. There is abundant evidence, archæological and philological, that Thrace was in close and constant contact by land with Asia Minor, by sea with Phœnicia. We may take it generally that this artistic predominance of Thrace subsided with the rise of colonisation from Greece proper.

A third point, most clearly evidenced by Homer, is that works of art and objects of use were produced rather by individual craftsmen than by local industries; we do not hear in the Homeric poems, as we do in classical times, of Beotian bucklers, of Chalcidian swords. This prepares us for the further important fact that the Hellenes of the Homeric days were a people who imported rather than exported manufactured and artistic objects. They bartered their raw produce for the finished manufactures of the East. This carrying trade between the East and Hellas lay, of course, principally in the hands of the Phœnician. We need only recall for a moment the breast-plate of Agamemnon, gift of a king of Cyprus; the mixing bowl which the king of the Sidonians gave to Menelaos; the gold and amber necklace which the Phœnician trader gave to the mother of Eumaios. Literary evidence then bids us look to Phœnician remains for analogies to those articles of import, descriptions of which occur in Homer; and not only to Phœnician remains found in Hellas, but to those scattered far and wide in the tombs of Etruria and of Latium. Shortly to recapitulate, the poems of Homer themselves bid us look for evidence, not only, as we should naturally presuppose, to the earliest Greek remains, but also to the antiquities of Phœnicia and the North.

Dr. Helbig begins with Phœnician art industry, and no chapter of his work is fuller both of well-ascertained fact and fruitful suggestion. He opens with a polemic against Professor Brunn. It has been supposed by

* Das Homerische Epos aus den Denkmälern Erläutert. W. Helbig. Leipzig, 1884.

Brunn that the famous silver and bronze bowls, so well known for their curious and mechanical mixture of Assyrian and Egyptian elements, are not the work of Phœnician artists, but of Cyprian Greeks. Brunn believes that the Phœnicians were mere traders, incapable of artistic effort. He further thinks that the freedom of style, the naturalism displayed in some of these bowls, can only be due to Hellenic impulse. Helbig brings a mass of evidence to show, and we think conclusively, that this view is mistaken, and that the Phœnicians were, in the early stages of their art development, abundantly capable of such naturalistic work as we see on these bowls; *à priori*, we should, indeed, expect their work to be nearer akin to Hellenic than to Oriental style. Their civilisation was developed under conditions wholly different from that of Egypt or of Chaldæo-Assyria. The artists of the Nile valley and of Mesopotamia were bound down by a strict despotism, which necessitated a severe conventionalism, which hampered all individual freedom; the Phœnicians, on the other hand, had a land whose physical conditions prevented centralisation, a climate that was variable, a coast-line that invited trade; every impulse was at work that could stir and prompt individual artistic effort. To this *a priori* argument we can add the testimony of fact. Both at Mycenæ and in Cyprus works of art have been found of undeniably naturalistic tendency. Dr. Helbig instances from Cyprus the portrait statue of a man; from Mycenæ, certain figures of Astarte; at Idalium, in Cyprus, a bronze bowl was found, the naturalism of the design of which is surprising, when we compare it to the typical conventional stereotyped forms that appear on vessels of similar workmanship. Clearly there is only one possible conclusion. If the stereotyped work and the naturalistic work be both Phœnician, then Phœnician art must have known two distinct periods and styles. This is precisely what Dr. Helbig holds. He believes that Phœnician art started, as we may believe Assyrian and Egyptian did, in naturalism. That in this stage it came in contact with, and influenced the art of Homer's days: hence the marvellous realistic wonders that Homer describes, the writhing fawn, the lion and the ox, and the like. This period passed; Phœnician art, always dominated by that of Egypt and Assyria, became stereotyped and conventional. This is the style we get in the greater number of the bronze bowls, and this style in its turn influenced Hellenic art in post-Homeric days. When this period set in Dr. Helbig does not decide; the transition was, of course, gradual. —indeed, in some monuments, *e.g.*, a silver cup from Amathus, we have the two principles, naturalism and conventionalism, at work side by side. This view about the twofold character of Phœnician art plunges Dr. Helbig necessarily into perhaps the most exciting controversy going on at present in the archæological world. Every one has been in turn puzzled by this phenomenon of early naturalism, succeeded by, and in part contemporary with, conventionalism. We have Dr. Langbehr maintaining that it is due to the influence of the Asia Minor Dorians; Dr. Milchhoeffer that it is the outcome of Aryan and opposed to Semitic impulse; and finally Dr. Helbig, whom ourselves we believe to be right, maintaining that the Phœnicians themselves are responsible. Dr. Helbig promises that the battle shall be fought out in his still unpublished work on the early art of the Italian peninsula.

To the testimony of Phœnician we have to add the testimony of archaic Italian and Greek art. The necessity of such evidence scarcely needs demonstration; it is enough to point out that down to the middle even of the fifth century B.C. Greek art went on producing conventional Oriental types, some of which may have been familiar to the art of Homer's days, and that Italian art, being of less independent inspiration, bears the impress of antique convention down to even later days. The trade of Latium and Etruria with Phœnicians, Chalcidians, and Phocæans made the West but the feebler echo of the East: hence we look for evidence of the art of Homer to types preserved in the wall paintings and tomb slabs of Etruria, and with even more confidence to the remains of the always backward and conservative culture of the countries east of the Apennines, to the graves of Tolentinum or Aufidena. To the evidence of archaic Greek and Italian art we add the testimony of the North; fragments of vases of Corinthian style have been found in an island of the Steinberger-see, an archaic bronze Hydra at Grachwyl in Switzerland; types superseded in the rapid development of the southern seacoast linger on in the hardier North.

Our material thus collected from Phœnicia, from Greece, Italy, and the North, it remains to arrange and date the available material. Dr. Helbig divides his "Fundgruppen" into Eastern and Western. Beginning with the East we have the discoveries at—1. Hissarlik; 2. Thera; 3. Ialysos; 4. Mycenæ; 5. the Dipylon find. We have placed them at once in the order Dr. Helbig establishes, an order which will scarcely now be disputed. He shows that the remains of Hissarlik belong to a period long before the time of Homer, a period when an early and barbarian state of society was as yet almost untouched by Oriental culture. Thera comes next and shows a marked advance; the simple geometrical decorations of Hissarlik pottery develope a more complicated syntax; metal-work appears, but stone weapons prove that the remains are still pre-Homeric. Next Ialysos,—ceramic ornament here approaches the conventional style,—a scarabæus of Amenophis III. is distinct evidence of Egyptian influence, and gives us also as a terminus the sixteenth century. Fourth and of the highest importance comes Mycenæ. The remains here found are still pre-Homeric; they show a condition almost wholly dominated by the East, a richness, a splendour, and in some respects a technical dexterity, which outdoes, though it precedes, the skill of Homer's time. From the civilisation of Mycenæ to that of Homer there is then in the matter of splendour and luxury, a marked decline, although in others, such as by the use of iron and the absence of obsidian, a marked advance. Was there, we naturally ask, between the time of the great impulse from the East and the date currently assigned to Homer, any event which could have caused this difference, this decline? Dr. Helbig unhesitatingly answers there was,—the Dorian invasion. Before the onset of the Dorians, the old civilisations, rich with the traffic of the East, ruled by princes half Oriental, declined, and a new civilisation, ruder, harder, simpler, more indigenous, set in. Such is the civilisation of Homer. It bears the traces, cherishes the memories, of a splendid all-golden, half-Oriental past; but its richest works of art are from the East. Its own conditions of life are simple and Hellenic. The Mycenæ remains fall then, before the tenth century B.C., the date currently given to the Dorian invasion. They touch closely on the times of Homer, but are not identical. Closer, but on the post-Homeric side, comes the find of "Dipylon" vases at Athens. Found though they were at Athens, they were probably not made there. Vases of similar type have been discovered at Melos, Thera, Asia Minor, and North Africa. Their designs are, perhaps, the most Homeric works of art we possess, only the ships that appear, furnished with rostra, make us suspect that their date is post-Homeric. Beaked ships do not, according to Dr. Helbig, appear till the eighth or seventh century B.C.; also the wide distribution of vases of the "Dipylon" style makes us suppose a regular local industry, which seems a post-Homeric notion.

We have been able only to indicate in the roughest way the method employed by Dr. Helbig and some of his conclusions. The arguments he employs it is impossible for us even to enumerate. Nor can we follow him through the second portion of his book, a portion less instructive, perhaps, to the general reader, but of supreme importance to the Homeric scholar. In this second portion Dr. Helbig takes up one by one each detail of Homeric life, and considers what light is thrown on each by the material we have been considering, how far this corrects, how far it confirms, current literary interpretation. He has provided, in fact, an archæological handbook for the Homeric scholar,—a handbook so complete and so profusely illustrated, that the ordinary educated public will scarcely need to seek information farther afield. He can learn here all that archæology can tell him of the building and furnishing of the Homeric house, of chariots and ships, of the cut and colour of Homeric clothing, and pins and necklaces and spirals and earrings, of armour and drinking-vessels, and of art proper as seen in the decoration of houses, in the great shield of Achilles, in the images of the gods. Literary scholarship may possibly be at issue with some interpretations offered by Dr. Helbig, but no literary scholar and no teacher of literary scholarship can afford to remain in his ignorance. The book must surely appear before long in an English garb.

## LONDON WATER SUPPLY.

THE London Water Companies have reason to congratulate themselves on the expenditure which they have incurred in employing three such distinguished analysts as Professors Crookes, Odling, and Tidy to make so complete and thorough an examination of the water which they respectively supply to the metropolis; for the results, as given in their Report* just published, are satisfactory evidence of the goodness of the article they undertake to supply, and of a progressive improvement in the methods adopted to free the water from those impurities which it is alleged must necessarily be more or less present in river water. It is likewise a satisfaction to the public to be informed, on such distinguished and reliable authority, that the fears with which they have had reason to be exercised, by the Reports addressed to the Registrar-General, and published by him in the Weekly Returns on the Water Supply of the Metropolis, have been groundless. "Moving organisms" is a term sufficient to make poor "Mrs. Brown's" hair stand on end, especially when the advent of cholera is so confidently predicted, coupled with the comforting assurance that its "germ" finds its habitation in water. That fear predisposes the human frame to contract disease more readily than it would otherwise do is a well-observed fact, and therefore as matter of policy, apart from humanitarian considerations, the circulation of reports by even irresponsible individuals is much to be deprecated. Much more is the employment of vague and indefinite expressions in actual official statements prepared for public information by those whose scientific attainments ought to be a guarantee for strictness of accuracy, to be deplored. The protest, therefore, with which the general observations in their Report is prepared against "the peculiar expressions and modes of statement" found in the Registrar-General's Weekly Returns is quite justified.

The presence of colour in water is ordinarily taken to indicate a certain degree of impurity, though, as in the case of peaty water, there is not necessarily any noxious ingredient in it,—but the use of the colorimeter has shown that there exists "a close relationship between the organic carbon present and the colour of the water," and therefore the natural instinct which leads us to prefer a colourless liquid to one at all tinged with colour is not altogether unfounded. It is scientific observation and investigation only that can pronounce as to whether the substance that produces the colour is really harmful or not. "As a general rule," this Report tells us, "the degree of brownish tint in the same supply of water is found to vary with the proportion of organic matter present in the water, and is strikingly illustrated in the diagrams on which the mean Thames water curves are depicted. To this general rule, however, occasional exceptions are presented by individual samples of water; doubtless because the fluviatile conditions affecting the constituent colorific organic

* "Report on the Composition and Quality of Daily Samples of Water supplied to London during the year 1883." By Drs. Crookes, Odling, and Tidy.

matter of the water and its entire organic matter are not identical, and because the effect of filtration upon the constituent and the entirety are also not identical." The mechanically-suspended substance, which may give the colour in particular samples of water, it is quite possible to remove by the aid of filters,—but the chemical impurity necessitates different treatment. Of the former there are excellent illustrations to be seen at the Health Exhibition, and there are likewise some descriptions of filters capable of absorbing even matters held in solution,—but none of those can possibly be as effective as, or prove a substitute for, air, which the late distinguished Professor Angus Smith demonstrated to be the greatest and most rapidly purifying of all the agencies that could be employed.

Another of the qualities tested was that of clearness, and the results obtained redound to the credit of the water companies' operations; for out of 2,224 samples tested, only 35 were found to be at all turbid, all the rest being "perfectly bright, clear, and well filtered." In three out of five samples recorded as "slightly turbid," the turbidity was confined to the locality from which the samples were drawn, and was dependent on the carrying out of work in connexion with the supply of the neighbourhood. That increased care in the filtering processes has been taken is evident from the proportion of bright samples having increased from 91·4 per cent. in 1881 to 97·6 per cent. in 1882, and 98·3 per cent. in the past year.

But one of the most important results obtained by the analysts was in regard to the amount of free oxygen which the river water was found to contain. It is stated that "practically the water has been found throughout the year to be fully aërated or oxygenated." If so, then the outcry which has been raised against the Thames water as unfit for potable purposes may be utterly disregarded; and if, as the Report asserts, chemists generally "are beginning to make use of the process of free oxygen determination in their study of questions relating both to water supply and to the remarkable self-purifying power of running water which has now become more than ever a matter of positive demonstration," it is to be hoped the controversy regarding the best sources of supply for the metropolis will cease; and common sense taking the place of imaginative theories, will lead to a speedy practical issue in the provision of the requisite quantity, which is the principal question now that the doubtfulness of the quality can be no longer disputed. This is the point, then, to which public attention should be more especially directed; and, as we have before and more than once urged, the most obvious and simplest means of obtaining the supply required for the inhabitants not only of London, but for the greater portion of the Thames basin, will be to store the surplus rain-water where it falls in the upper feeders of the river, whence it can be so conducted, with the full quantity of aëration required, to wherever it is needed.

## A PALESTINE MUSEUM.

A PROPOSAL for the foundation of a Museum devoted to the antiquities of Palestine has recently been attracting attention. A room in the Louvre is now devoted to the display of objects of this class, which, however, in 1879, did not exceed eighty-three in number: to these about 100 more have recently been added, including between fifty and sixty vases and lamps in terra cotta. In the British Museum exist between fifty and sixty similar objects; and a much larger collection, belonging to the Palestine Exploration Fund, is partly in the possession of that association, either in London or in Jerusalem, and partly at the South Kensington Museum. The whole collection, in these several detachments, does not exceed, perhaps, 1,000 objects. It is, however, worthy of remark that the proposal, which is evidently made *con amore*, makes no reference to what, in the eyes of many persons, are the most interesting of all the objects as yet recovered in the Holy Land,—a class of objects of which the increase may be with the utmost confidence anticipated, if once such a nucleus for discoveries and stimulus to research as a museum would form were established. These are the coins of Palestine, a large number of which, unassorted and unarranged, were among the objects displayed by the Exploration Fund some years ago. These coins are either silver or copper. Gold Jewish coins are said to be in existence; but the fact, if such it be, has yet to be proved. Apart from the Crusading, Byzantine, and Arabic coins, each of which belongs to a separate chapter in the chequered history of the Holy Land, exist coins of undoubtedly Jewish type, coins of the Maccabean and of the Idumean dynasties, and coins of the Roman domination. In speaking of Jewish coins (if not of all classes of reputed antiquities from the Holy Land), it is necessary to allot a comparatively large space to the subject of forgeries. Thus coins exist which to a cursory inspector would appear accurately to fulfil the descriptions given in the Talmud, and which purport to be of the reign of David or of Solomon. Unfortunately, however, these productions bear square Hebrew characters, and thus carry their own condemnation on their faces. The subject of Jewish coins has been discussed at length by M. de Saulcy, and by Mr. Madden, of the British Museum; but a considerable amount of correction has since been applied to views which were hazarded by writers but very imperfectly acquainted with the Talmud.

There exists a class of silver coins, on none of which occurs the name of any sovereign or pontiff, but which bear numbers which have been taken for dates, none of which, however, are higher than four. At least twenty-eight types of this kind of coin in silver are known, besides seventeen in copper. It has been pointed out recently that these coins present all the features proper to the "Jerusalem money" of the Talmud, which was a coinage issued at Jerusalem for the express purpose of the payment of the annual poll-tax, and of the second tithe, as to which, for ritual reasons, the ascertainment of the year of the week of years to which the coin belonged was a requisite. Numbers 1 to 4 would be adequate to denote seven years, by the use of the same coin for the first and fourth, or for the first and fifth years, and so on; and a system not so very different from that of our own Hall-marks may be thus denoted. This explanation avoids the obvious anomaly which, by the attempt to refer all these coins to the same regnal or sacerdotal years, would limit the issue of some 30 per cent. of the known coins to four years out of at least a couple of centuries.

On this view the coins in question may be of various degrees of antiquity; which, in fact, they appear to be. The oldest coins as yet distinctly ascertained are those of the reign of Johanan the High Priest (John Hyrcanus), B.C. 204. Of this prince four copper types exist. These are followed in regular order by the coins of Judah the High Priest (Aristobulus I.), and Jonathan the High Priest (Alexander I). Their coins, eight in all, bear inscriptions in Aramean characters, somewhat like those of the Moabite stone. There are also four coins of Jonathan with bilingual legends, and six, also bilingual, of Queen Alexandra, Alexander II., and Mattathiah the High Priest (Antigonus). Of the seven kings, Ethnarchs, and Tetrarchs, of the Idumean line, the coins of all have been recovered, viz., those of four of them of Jewish types, thirty-eight in all, and those of the remaining four of Pagan types, forty-one in all, all bearing Greek legends. There are also coins of the Roman Emperors and Procurators after A.D. 70. It is evident that a series of this nature, comprising ninety-seven types, of which twenty-eight are in silver, is in itself matter of no little interest; nor is it very doubtful that it may be considerably extended. Even more interesting than this regnal series are two small copper and one silver coin, bearing the names "Eliashib the Priest," and of "Eleasar the Priest," which remount, if authentic, to 435 and 281 B.C. Here is a very important and interesting starting point for a numismatic collection of the utmost value.

The fauna and flora of Palestine, the gorgeous birds and beautiful butterflies, the little crocodile of the Zerka river, the relics and memorials of the Latin kingdom of Jerusalem, the crests and arms of the crusading nobles, the illustrations of the earliest developments of the pointed arch, and of the stilted or horseshoe arch so gracefully developed by the Saracenic builders, the splendid stained glass of the windows of the Dome of the Rock,—specimens, casts, photographs, and drawings of all these are attainable. These, which occur to the mind on the spur of the moment, are only a few of the objects the collection of which, mutually illustrative as it would be, would throw so much light on the history of Palestine, and on the study of the Scriptures. Hardly a year would pass, hardly a traveller would visit Jerusalem, without adding to the stores of a museum for the founding of which we can hardly permit the doubt that the requisite funds will be readily forthcoming. Local research, in the present state of our Eastern relations, is arrested. To review and place in order the treasures we have actually gained, with the aim of filling up the gaps, and extending and completing the series, is thus the best work that we can now accomplish. It is difficult to assign the historic value of the discovery of a single authentic coin previously unknown to collectors.

## NOTES.

ENGRAVED mirrors of Etruscan workmanship are already counted by thousands; those of Greek workmanship now known to us number sixteen. An interesting specimen found at Corinth, and preserved in the Bibliothèque Nationale, is published in the current issue of the "Bulletin de Correspondance Hellénique." The mirror itself is engraved, the cover decorated with a design in bas-relief. The engraved design represents Artemis just descending from a rudely-indicated mountain, and standing before Apollo seated on a rock. Apollo is of the type which came in about the time of Scopas, *i.e.*, the long-robed priestly figure, crowned and playing on the lyre. The style and conception of the design is,—as we so often find in works of this sort,—fine; the execution somewhat poor. The bas-reliefs of the cover are much better work. Cast as they were for a number of impressions it was worth the artist's while to take more pains. A winged Eros is seated opposite a winged female figure. There is little doubt that we have in the winged female figure a Nike. The juxtaposition is frequent in the third century B.C., when the love-god began to dominate mythology. In fact, we have in the bas-reliefs of the mirror a charming toilette text in plastic form: "Omnia vincit Amor."

IT is a pity that the Trades' Union Congress does not confine itself more to the practical objects for which it was presumably instituted, instead of running off into disquisitions on subjects which have really nothing to do with those objects. Half a day seems to have been spent at the first meeting in discussing the Peers and the Franchise, in the course of which the proceedings were further complicated by the efforts of some irrepressible feminine preachers of women's rights to be instant in season and out of season, or, rather, altogether out of season. Matters were not mended at a subsequent meeting, when much time was taken up in foolish talk about demanding the system of payment to members of Parliament as a step towards the more direct representation of the working classes. It is our rule to abstain from politics, but we cannot help warning the Trades' Union Congress that they are wasting their time and making an absurd figure in discussing such a proposition, which, were it possible to establish it, would, at once lower and degrade the whole tone and feeling of representative government to an extent which those who themselves propose it are probably far from realising. The most practical suggestions of the Congress were in regard to the need of more efficient inspection of mines and machinery; and in the line they

take in regard to co-operative labour we are entirely with them. But the Congress will certainly not make its proceedings the more respected in the eyes of even its best friends by spending so much time over ill-judged digressions into subjects wide of its proper objects, and over which much has been said which, to borrow a phrase of Kingsley's, might be catalogued as "pure bosh."

IT is to be hoped that the people of Manchester will not sanction the proposal to raise a sum from the rates towards the expenses of the Manchester Ship Canal Bill. We are willing to assume that the canal will be successful, and that it will be of great commercial advantage to a portion of Lancashire. But the funds of a city corporation are not meant to be paid into the coffers of a trading company, or to aid in its foundation, however advantageous such company may prove to the place. If once the principle is admitted, that the rates of a town may be used for the purposes of assisting a limited company, it will open wide a door to all sorts of applications from companies and promoters,—good, bad, and indifferent. It will cause every kind of improper means to be used in order to influence persons who have a voice in the government of a town, and a place in a city council will have a direct commercial value. It will strike a distinct blow at the purity of municipal life and municipal management. The great railways of England were made with private capital, and if the promoters of the Manchester Ship Canal are unable to raise funds to carry on their campaign, it is obvious that they do not thoroughly satisfy capitalists that their project is a sound one. We should certainly be disposed to say that any Select Committee which found that the scheme was being helped on by the rates of a town would be inclined to feel a prejudice against its commercial value.

FROM a letter in the *Leeds Mercury* it appears that in the competition for the Leeds and County Conservative Club-house, Mr. Corson, who was called in as professional referee, awarded the first prize to Mr. G. B. Bulmer, the second to Messrs. Chorley & Connon, and the third to Messrs. Smith & Tweedale; but that the directors of the Club-house Company have reversed the first and last decisions, and offered Mr. Bulmer the third prize, giving the first to Messrs. Smith & Tweedale. Mr. Bulmer, who writes the letter referred to, refuses under these circumstances to accept the third premium; and on the face of the facts as stated he is unquestionably acting in a very proper spirit in doing so. There is only the question, did the Directors commission Mr. Corson to award the premiums, or only to advise? If the former, they were bound to accept his decision, or else the calling in of a professional referee is a mere farce. But a professional adviser may be and has been sometimes engaged to report upon designs and assist a committee in coming to a decision, without necessarily being commissioned to make the award. It is very important that all architects who are invited to act as judges in a competition should ascertain clearly first whether they are asked to advise or to award, and if the latter they should not enter upon the office without a clear understanding that the committee or owners will abide by their decision. In any case, the directors in this instance will probably hardly have done a wise thing in overthrowing the decision of Mr. Corson, who is in every sense an exceedingly well-qualified judge.

THE idea of a conference on the subject of industrial remuneration and the distribution of wealth has been started by the offer of a gentleman in Edinburgh, who prefers to remain anonymous, to devote 1,000*l.* to the expense of inaugurating a thorough inquiry into the subject. Trustees have been invited to act on his behalf, and to prepare a plan for giving effect to his proposal, among whom are Mr. Thomas Burt, M.P., Mr. Frederic Harrison, the Earl of Dalhousie, and Sir Thomas Brassey. The inquiry is to be opened on the lines of the main questions: "Is the present system or manner, whereby the products of industry are distributed as between the various classes and persons of the community, satisfactory?" and "If not, are there any means by which that system can be improved?" The "inquiry" would take the double form of a conference of representative men, to be held, if possible, in January of next year, and of the subsequent publication of a volume containing a report of the discussions, accompanied by special papers and statistics. As to the first part of the question, we should say at once the answer is an "eternal *no*." The system by which the products of industry are distributed never was satisfactory to all classes of the community, and never will be, in the very nature of things; and if we ever get to the point when it were, the social clock would stand still. "Scipio was not as rich as Lælius, Lælius was not as rich as Crassus, Crassus was not as rich as Lucullus, and Lucullus was not as rich,—as he wished to be." So the world goes, and no conferences will make any fundamental difference in that tendency of humanity, any more than in other tendencies equally broad and simple, so simple that they are overlooked, which lead to the unequal distribution of wealth. However, the idea of the conference is a thoroughly benevolent one, and we have no doubt light will be struck out on some points in the course of the discussions, but we fear they will also give occasion for a good deal of somewhat wild and utopian speculation, and "oppositions of science falsely so-called."*

THE river and sewage question seems to get more and more persistent. The Cam and the Lea are now the prominent sufferers, next to Father Thames himself. The Lea has at length fairly made his complaints heard, and the Local Government Board, following up a report of their inspector, have called on the Edmonton Local Board to provide other means of disposing of their sewage than into the river. In regard to the Cam it appears that between 1869 and 1871 the University Boat Club have spent more than 4,000*l.* in deepening and improving the river (a poor one at best for their purposes), but has filled up since to a depth of 3 ft. chiefly from sewage deposit. A preliminary step seems to have been at last taken in getting the assent of the University and College authorities to a scheme for apportioning properly the liability for new works as between the University and the town, and it is to be hoped we shall before long hear of some satisfactory practical result.

FROM the *Gazette des Architectes* we learn that it is proposed to institute in Paris a special "service d'hygiène municipale," to unite under the control of one chief, having the grade of "sous-directeur," all the services concerned in the sanitation of Paris. These include the management of the water-supply, of the sewers, the overseeing of "ordures ménagères," and of the cleansing of the public streets, the cleansing of brooks and of the street channels, the sanitary treatment of the Seine, the control of all dangerous or insanitary structures, the medical inspection of schools, of lodging-houses, and of the municipal laboratory, &c.

SOME time ago we mentioned the new refuse destructor invented by Mr. Stafford, the Borough Engineer of Burnley,† and which had been brought into use with great success in that town. We are glad to learn that this invention has been brought into operation at Richmond; not that Richmond is especially in want of it more than other places, but that all progress in the systematic destruction of rubbish is a step gained in a sanitary point of view. The accumulation of *débris* which is done with, which no one wants, and which is left to lie festering in gutters and on roadways, is one of the most serious obstacles to keeping inhabited places in a sanitary condition; and the difficulty increases, of course, with the density of population. Those who have noted the aspect of East London streets on Sundays, with the roadways covered with what can only be called "garbage" of all sorts, the leavings of Saturday's crowds and street business, must have wished that all this could be burned up by a happy despatch, instead of (at the best) being swept up to fester in a more concentrated manner elsewhere. We hope it will not be long before every parish and district in London will have its refuse-destructor.

* We give elsewhere the list of suggested subjects for discussion.

† A short description of it will be found in the *Builder* for June 21 of this year, p. 912.

WITH the other diversions of the silly season, the game of architect-baiting is, of course, revived in the *Times*. The periodical anti-restorationist writes his letter describing the removal of some old tomb, and this is enough hint for an article in which the public are informed that when an architect is called in to restore a church, "he is compelled by the conditions of his profession to make work for himself," and with this noble object proceeds to cut away old ornaments and old glass, and to strip the building of everything that gave it a history. This delightful way of putting it was protested against in a sensible but much too mild letter from "An Architect who loves Old Work," which was duly inserted as a reply to the statements of the "leader-writer." But why do not the scribes of the *Times* proceed to apply the same charitable reasoning to other professions? Why do not they point out how physicians, in the interest of their pocket, will prolong the patient's disease; how solicitors endeavour to beguile every one into lawsuits; and so on? It would be just as logical, and give them more matter to fill their columns when Parliament is up. Probably, however, this sort of thing is the result of pure ignorance rather than of malice *prepense*, if one may judge from the insertion in the *Times* last week of the ridiculous letter from "A Country Architect" (very far in the country we should imagine), who asserted that architects had no means of preventing builders from removing the excavated material from a building site! The simplicity of the "leading journal" in inserting such a letter, and actually founding an article upon it, is only equalled by that of the country architect himself, who must be one of the persons who have eaten largely of that commodity called "flap-doodle," defined by Marryat as "the stuff they feed fools on."

A VERY different specimen of *Times* correspondence is the letter from "An Express Engine-driver" on railway brakes which appeared on Wednesday. It is interesting to have a look into railway experiences from the driver's point of view; and the "Express Driver" has had some experiences. He has twice had his engine run down an embankment, and eight times had crank-axles break under him (those crank-axles again!), and he has had practical trial of the working of four of the brakes most in use, and he declares emphatically for the Westinghouse. With that he feels safe; with the others he is not sure whether they will act or not; but the Westinghouse never fails, and has saved his life and limbs five times. Three others have failed more than once, and did not prevent accidents. This evidence, coming from such a quarter, seems to be practically conclusive of the brake question. As the "Express Driver" very truly says, the drivers not only see danger first, but are in it first, and it is a matter of life and death to them; and, therefore, it stands to reason that what they feel to be safest for themselves, and wish to have adopted, is safest for the passengers, "no matter what chairmen may tell gentlemen at meetings."

**Westbourne.**—A stained-glass window has been recently placed in Westbourne Church, Hants, to the memory of the late vicar, the Rev. J. Mee. The window is a two-light one, the subjects illustrated being Feeding the Hungry and Visiting the Sick, surmounted by architectural canopies. A brass tablet, with memorial inscription, is placed on the cill of the window. The work was designed and executed by Messrs. Warrington & Co., of Fitzroy-square.

## THE TIMBER OF THE UNITED STATES.

THE question of forestry and the best means of cultivating that study is at last beginning to assume the importance that it deserves; and a knowledge of what is taking place in other countries can scarcely fail to be useful, more especially to those who are interested in the preservation of timber for building and ornamental purposes. The Americans have been gradually awakening to the extreme necessity of looking after their forests and checking the reckless waste that they have sustained at the hands of pioneers and settlers. In the early days of the continent, the primæval woods, through which the wandering tribes of Indians tracked their way with such marvellous skill, covered a large proportion of the land; but from the moment that the white man appeared, the work of their destruction proceeded with great rapidity. The first arrivals made their settlement along a heavily-timbered coast, and, for the better part of a century, literally hacked their way towards the interior, until the great plains were reached; and, in fact, it seemed to be the aim of the settler to destroy as much as he could of the American forests. The woodman's axe was the symbol of civilisation, and the State seal of Indiana still bears the figure of a wood-chopper. Indeed, the idea that a forest tree was of any value, except to be used up for posts and rails or burned for pearlash, is quite of modern origin. If the colonist lived near the borders of a forest that skirted the streams, he cut the trees down for cordwood, as though the supply were inexhaustible, nor did he ever dream of planting groves about his house, which should at once yield him fuel and give him shelter from the fierce winds. This reckless waste, combined with the incessant demand created by the lumber trade, has in many cases entirely altered the appearance of the country, and, worse than that, materially modified the climatic conditions by interfering with the rainfall.

For several years past, however, a salutary change has come over public opinion in the matter of forestry, and many of the States, especially the younger ones, are as earnest about tree-planting and preservation as the earlier inhabitants were careless. Of course the damage that has been done in many of the older States is practically irremediable, but a great deal of good has resulted in those of more recent constitution, in which the public lands of the United States are situated, by the Timber Culture Act, which applies to nineteen States and eight Territories. The purpose of this law, which was passed in 1873, and amended in 1878, is to promote the growth of forest trees on public land. It gives a right to any settler who has cultivated for two years as much as five acres in trees, to an eighty-acre homestead; or ten acres, to a homestead of 160, and a free patent for his land at the end of three years instead of five. The limitation of the homestead laws to 160 acres for each settler is extended in the case of timber culture, so as to grant as many quarter sections of 160 acres each as have been improved by the culture for ten years of forty acres of timber thereon, but the quarter sections must not be immediately contiguous. Unfortunately this law, excellent in principle, has been made comparatively worthless, and its intention avoided; for non-residents and speculators have taken claims under the Act merely for the purpose of selling them to persons who wished to take them as homesteads or pre-emptions. An amendment should be made, so that when there is a filing under the Timber Culture Act, the land should be withdrawn from entry under either the Homestead or Pre-emption Act, and the title should never be perfected, except in compliance with the letter and the spirit of the Timber Culture Act. Since the passage of the original Act, in 1873, there have been 93,246 filings, covering 13,637,146 acres. Of this amount, there have been entered since the amendment of the Act, in 1878, about 11,177,510 acres. Of the first-named acreage, at least one-third has, from various causes, been cancelled or entered under other Acts, leaving over 9,000,000 acres held for the present under the provisions of the Timber Culture Act.

Taking the eastern half of the States, the two great classes of timber which prevail most and furnish the material for the lumber trade, are pine and hardwood. The former consist, for the most part, of the long-leafed pine (*P. Australis*), the short-leafed pine (*P. mitis*), the white pine (*P. strobus*), the lob-lolly pine (*P. tæda*), the scrub pine (*P. Banksiana*), together with the spruce (*Picea alba* and *P. nigra*). The hardwood comprises, roughly speaking, the hemlock (*Tsuga Canadensis*), white, red, and burr oak, sugar maple, poplar, birch (*Betula papyracea*), tamarack, white cedar (*Chamæcyparis sphæroidea*), yellow cedar (*Thuya occidentalis*), &c. The following table shows what was the quantity of merchantable pine standing in 1880 in sixteen of the principal timber States, together with the amount cut during the year in board-measure feet:—

| State. | Variety. | Pine standing. | Pine cut. |
|---|---|---|---|
| Maine | Spruce | 5,475,000,000 | 439,845,000 |
| Vermont | Black spruce | 755,000,000 | 205,591,000 |
| New Hampshire | ,, and white pine | 1,510,000,000 | 252,584,000 |
| Pennsylvania | Hemlock and ,, | 1,800,000,000 | 280,010,000 |
| Michigan | White pine | 35,000,000,000 | 4,297,201,000 |
| Wisconsin | ,, | 41,000,000,000 | 2,097,299,000 |
| Minnesota | ,, | 6,100,000,000 | 540,997,000 |
| North Carolina | Long-leafed and loblolly | 5,250,000,000 | 155,591,000 |
| South Carolina | ,, ,, | 5,316,000,000 | 124,492,000 |
| Florida | ,, ,, | 6,615,000,000 | 208,054,000 |
| Louisiana | Long and short-leafed | 48,213,000,000 | 84,591,000 |
| Alabama | ,, ,, | 21,192,000,000 | 245,306,000 |
| Georgia | Long-leafed | 16,778,000,000 | 272,743,000 |
| Arkansas | Short-leafed | 41,315,000,000 | 129,780,000 |
| Mississippi | Long and short-leafed | 23,975,000,000 | 115,775,000 |
| Texas | ,, and loblolly | 67,578,500,000 | 274,410,000 |
| | Total | 327,581,500,000 | 9,927,360,000 |

This does not, of course, imply that no other timber exists than these kinds, but simply that they form the bulk of the forests. Each State has its various species of trees, according to its geographical situation. Florida possesses a typical tree flora, such as cypress, sweet bay, palmetto, live oak, mastic, &c. Georgia is stated by Dr. Little, in his "Eclectic Geography," to have no less than 230 kinds of wood; while parts of Virginia are timbered from the valleys to the mountain tops with white oak, walnut, maple, tulip-tree, hickory, bass-wood, cherry, chestnut, buckeye, cucumber tree, dogwood, white and black pine, &c.

A most interesting epitome of the timber resources of the southern states is given in a valuable report on the agriculture of Alabama. The list of trees has been compiled by Dr. Charles Mohr, of Mobile, and shows not only the characteristics of the timber of the South but the kinds of soil affected by the various species. The lower pine region, or coast pine belt, includes—(1.) The maritime plain, with saline marshes and flats, and dunes of drifting sands on the islands near the coast. The trees most prevalent here are live oak (*Quercus virens*), a typical form on inlets and bayous; willow oak (*Q. Phœllos*), water oak (*Q. aquatica*), *Vitis incisa*, *Lycium Carolinianum*, and *Yucca aloifolia*. (2.) In the open grassy river swamps and wooded alluvial bottoms, more or less inundated, are red cypress (*Taxodium distichum*), tupelo gum (*Nyssa uniflora*), cotton-wood (*Populus monolifera*), *P. heterophylla*, ash (*Fraxinus viridis*), *F. platycarpa*, hickory (*Carya aquatica*), wahoo (*Ulmus alata*), elm (*U. Americanus*), dwarf palmetto (*Sabal Adansonii*), holly (*Ilex opaca* and *I. decidua*), *Catalpa bignonioides*, *Persea palustris*, &c. (3.) Low flat pine barrens or pine meadows, with pine-pitch (*Pinus Cubensis*), and long-leafed pine (*P. Australis*). (4.) The ever-green glades of the hummock lands and wooded bottoms, more or less peaty, with the open swamp bordering them. Here flourish the bull-bay (*Magnolia grandiflora*), the bay (*M. glauca*), the juniper (*Cupressus thyoides*), lob-lolly pine (*P. tæda*), *P. Elliottii*, the sour-wood (*Oxydendron arboreum*), and the prickly ash (*Zanthoxylum clava-Herculis*). The principal timber of the (5) rolling pine lands, which are almost devoid of undergrowth, consists of high-ground willow-oak (*Quercus cinerea*), black-jack (*Q. nigra*), turkey oak (*Q. Catesbœi*), mockernut hickory (*Carya tomentosa*), and the saw palmetto (*Sabal serrulata*).

The next zone is a region of mixed tree-growth, known as the upper pine regions. The lowland, with its heavily-wooded river valleys and creek bottoms, abounds in the white spruce and loblolly pines, the white cedar, swamp chestnut oak, red and over-cup oak (*Quercus lyrata*), shell-bark hickory, sycamore, red and ash-leafed maple, linden, and umbrella-tree; while the uplands and so-called wooded prairies are covered with black, Spanish, and post oak-trees. In the cretaceous plains the growth is much the same as in the last-named belt, but many of the trees and shrubs, such as *Illicium Floridana* and *Magnolia grandiflora*, find their northern limit here. The mountain region includes the oak forests of the metamorphic district, while on the high lands of the carboniferous sandstones grow the long and short-leafed pines, the mountain pine (*P. inops*), the scarlet and tan bark oaks, the slippery elm, and the black walnut. On the limestone belts of the valleys and slopes bordering on them are groves of red cedar (*Juniperus Virginiana*), and on the deep rich soils are large poplars black walnut, ash, and white oak.

The forest growth of Indiana and Illinois, and especially those of the Lower Wabash and White River valleys, is hardly surpassed by any other State, both for the number of species contained, and the magnificent development of individual trees. Nearly all the most valuable and largest broad-leafed trees are there found associated, and in a single square mile of wood, seventy-five species of trees, nearly all first-class, were tabulated by Mr. Ridgway. The tallest specimen measured, a tulip-tree, was 190 ft. in height, while individuals of ten other species exceeded 150 ft. Numerous small prairies, which were common in the Wabash basin at the time of its first settlement, have been transformed into woodland, and the area of the forest ground greatly increased.

To the west of the Mississippi lies a vast district, quite different in its tree riches and its requirements. It extends westward as far as the Rocky Mountains, and southward from the British possessions to the warm waters of the Gulf of Mexico, the great river itself being lined throughout its length by forests, which increase in width as the number and size of its tributaries increase in volume. The Missouri is also bordered with forests for the last 200 miles of its course, above that running through a comparatively disforested region. The woods keep up a gallant fight for existence along the streams that flow east, such as the Platte, the Kaw, and the Arkansas, but finally diminish to a thin winding fringe of cottonwood or willow, and the eye for hundreds of miles sees no more, until the pine-covered slopes of the Rockies appear dimly in sight. Iowa, one of the prairie States, was once fairly well wooded, especially on the banks of the Desmoines, but it has been so recklessly maltreated by the settlers, that native timber has almost ceased to exist. In 1875 the forest area of Iowa was estimated at 2,300,000 acres out of a total of 35 millions. Nebraska, when first settled, was almost entirely destitute of timber, the chief bulk being found along the line of the Missouri, composed of willow and cottonwood, a considerable body of the latter existing also at the mouth of the Platte, together with groves of white and burr oak. But of late years Nebraska has shown a most commendable activity in forest operations, having adopted laws which provide that the increased value of lands from live fences, fruit, and forest trees grown thereon, shall not be taken into consideration in the assessment; also exempting from taxation for five years 100 dollars valuation for each acre of fruit planted, and 50 dollars for each acre of forest-trees, together with some other clauses tending to encourage forestry. In this State arose also the institution known as "Arbour Day," which was designed with the object of fixing one day in April, when everybody is expected to keep holiday, and to devote it to tree planting. It is universally observed, not only in Nebraska, but in Min-

nesota, Kansas, and several neighbouring States, and millions of trees are annually planted on that occasion. Between the passing of the Kansas-Nebraska Acts 1854 and 1882, there have been planted in the latter State 244,356 acres of forest trees, while spontaneous indigenous growth is estimated to be equal to half the area planted, since fires have been kept from borders of streams and prairies. Kansas was, at the beginning, more timbered than Nebraska, the Kansas river from its mouth to 135 miles west, the banks of the Neosho, the streams of East Kansas, and the tributaries of the Republican running to the borders of Colorado having been all covered with forests. After the ravages of twenty years the area is estimated at 2,560,000 acres, or 4·92 per cent. of the whole. When the mines of Colorado were first worked, some twenty-five years ago, large bodies of spruce pine and fir covered its mountain sides, and it was estimated in 1870 that nearly one-half had been destroyed by reckless cutting and fires. Within the shadow of these forests rose the head-waters of the Rio Grande, Platte, Arkansas, &c., and as the snow in the deep woods melted slowly, the rise of the streams was gradual and uniform for a long period. Now that these mountains are left peeled and bare, the hill-sides are converted into a bald and bleak desert, the springs are drying up, and the great rivers now rise with sudden violence, and then sink as suddenly in their dry and diminished beds. Miners and railroad tise cutters have inflicted on these mountain region-evils the effect of which it is impossible to over-rate.

New Mexico has likewise suffered in the same way, although in this territory there are still vast regions covered with pines and piñons; and, further west, in Arizona, along the line of the South Pacific Railway, is found a good deal of iron-wood, one of the hardest woods in existence, which will turn the edge of an axe, and can scarcely be cut by a well-tempered saw. The mountains of Montana were originally covered with forests of spruce, pine, cedar, fir, and balsam. A quantity of this has disappeared, and it has been noticed that, in this territory, timber, once destroyed, is not followed by a second growth. Idaho is remarkable for containing the finest body of red cedar on the continent.

The most characteristic indigenous timber throughout the prairie districts is the cotton wood (*Populus monolifera*), a tree of quick and long growth, living a long time on water alone, planting itself in the most unexpected places and sowed by the wind, although time has proved that on the high prairie it requires very careful nurture. Then come the black walnut, the soft maple, the catalpa, the hickory, the box-elder, and the red cedar. A valuable willow, called the diamond (*Salix cordata*), grows on the banks of the Missouri, and there are also many indigenous oaks, including the chinquapin oak, which grows in profusion on the bluff lands adjacent to the Missouri river, and is an abundant bearer, with nuts almost equal to chestnuts, greedily eaten by swine, deer, and antelope.

On the Pacific side of the Rocky Mountains, are forests of a different type and growth, affording enormous supplies of red wood (*Sequoia sempervirens*), of which in California there were accessible in 1880 over 25,825,000,000 board-measure feet. The chief characteristics of these magnificent Pacific forests are age, height, and exuberance of growth. The nut-meg-tree (*Torreya Californica*) towers in the coast forests to over 100 ft. with a clear trunk of 40 ft., straight as an arrow; the great Washington cedars (*Sequoia gigantea*) are the loftiest trees in the world, rising from 275 ft. to 400 ft. aloft, and sometimes 40 ft. in diameter, with a marvellously clear shaft from 80 ft. to 150 ft., as true and straight as if laid by a plumb-line; the Douglas spruce (*pseudo-tsuga Douglassi*), an abundant tree in Oregon, 200 ft. or 300 ft. in height; the great sugar pine (*P. Lambertiana*), 300 ft. or more,—all these and many others have deservedly contributed to obtain for California the name of the Land of Big Trees. The oaks, sequoias, and junipers, are as remarkable for age and picturesque aspect as some of the others are for height. The western juniper is one of the most venerable trees of all the higher mountain regions of California, venerable as to appearance and for the vast antiquity of the larger trees, which date back to the great Sequoian age, while hundreds and even thousands of miles may be traversed without meeting with a single perfect tree. All seem to be more or less dismantled, or the top altogether carried away by storms and the ever-recurring snow-slides. When viewing these veterans, we should remember that they have braved the eventful cycles of time, measured by many thousands of years, with a most astonishing vitality. If killed from any cause on one side, the other side still continues its journey of life, excentrically developing, until the investigator finds it convenient to take bearings in order to find the original centre.

From the foregoing remarks, it will be seen how great has been the neglect and waste throughout the United States of one of the most valuable sources of wealth that the country contains. Not only has reckless cutting, but the loss by fire, to be taken into consideration,—the latter contributing very largely to the national destruction. In 1825, a fire passed from Maine into the adjoining New Brunswick, which destroyed 6,000 square miles of territory, including about a million acres of forest land, although nature repaired the damage with wonderful celerity, and clothed the district with a finer forest than before. What will, perhaps, act most stringently in the matter is, that the price of pine lands in many parts has greatly advanced, and this will materially check the timber trade, the vastness of which may be estimated by the statement that upwards of 5,000,000 ft. of timber, principally white ash, are used in the manufacture of oars alone. Another check, which will be greatly increased as time goes on, is that more and more stone is daily being used for building purposes throughout the American cities and towns, and more especially in the Far West and Pacific States, where at present the greatest waste of timber is to be found.

The demand for wood throughout the States is very large, if only for fuel alone, and notwithstanding the increasing area of the coalfield. But, on the other hand, there are vast regions which are not only destitute of coal, but where the cost of transport would entirely preclude its use. The lumber trade is on a scale that is unknown in any other country, the statistics of the census year showing that there were 25,708 establishments for the production of sawn timber, representing 181,186,122 dollars of capital, and employing 147,956 hands. The amount and character of the produce for the year was as follows:—

| | | |
|---|---|---|
| Value of logs | | $139,836,869 |
| Board measure feet sawn | 18,691,356,000 | into |
| Laths, numbering | 1,761,788,000 | |
| Shingles | 5,555,046,000 | |
| Staves | 1,248,526,000 | |
| Sets of headings | 146,523,000 | |
| Spool and bobbin-stocks, ft. | 34,076,600 | |
| Value of total product | | $233,268,729 |

## THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT TENBY.*

*(From our own Correspondent.)*

On Wednesday, the 3rd inst., the party proceeded by special train to Pembroke Station, at which place they found the brakes in readiness. In passing through Pembroke we heard one stranger express great surprise that so small a place was inscribed in such large letters on the map; but when this scoffer came within sight of the castle, with Monkton Priory as a background, he subsided. Passing the ruins we drove through the pretty wooded valley of Coits-water (*coed*, a wood) past Orielton, the old home of the Owens, now the seat of Mr. M. A. Saurin. Near the road are a cluster of round bronze-age barrows. Passing on we reach Brownslade, the seat of Colonel Lambton, where a large barrow had been opened by the kindness of the colonel. From its shape and construction a careless observer would pass it by as a blown sand hillock, many of which are to be seen in the neighbourhood, but in reality it is an assemblage of human skeletons (some hundreds) lying two and three deep, all oriented. In the centre was a kistvaen, containing human and animal bones, a small slab of limestone about the size of a sheet of note-paper, on which was roughly described a cup in a circle, and a doubly-cupped stone on which a pivot had turned. Among the outer skeletons were found two bronze rings and a small stoup cut from red sandstone. In the immediate neighbourhood are the foundations of a tiny chapel. The place is called Churchways, and the farm Bullibar,—Pwly Pur, Pur's Bar. The supposition is that the primary interment was that of a man whose rank or sanctity cast a reflected glory on the many obscure dead who rested round him; these latter were brought from a distance, for the country must always have been very sparsely inhabited. After lunch the party proceeded to Angle, from which a grand view of the Haven was obtained, and from which place Henry II. sailed for the conquest of Ireland. Here a curious castellated building was examined, which is supposed to have been used as a rectory; if so the divine must have indeed been a member of the Church Militant. Thence to Eastington, a fine specimen of an Edwardian house; then on to Rhoscrowther, and home by Pembroke.

Thursday, Sept. 4th. "Demetia (Pembrokeshire), with its seven cantreds, is the most beautiful, as well as the most powerful district of Wales; Pembrock, the finest part of the province of Demetia; and the place I have just described (Manorbier), the most delightful part of Pembrock. It is evident, therefore, that Maenor Pirr is the pleasantest spot in Wales." So said Giraldus Cambrensis in the twelfth century, and though some of our party considered the old chronicler slightly prejudiced in favour of his own home, all admitted there was a good excuse for his somewhat exaggerated extollation. Manorbere has not the proud strength of Pembroke, it lacks the architectural beauties of Carew, the historic associations of Lamphey, and the fairy-like beauty of the Episcopal palace of St. David's, but no Mediæval building in Pembrokeshire excites a greater interest. It originally stood in a walled park of some 150 acres, in which were signal towers (part of the chain that extended through Tenby). The castle and its precincts was divided into three wards. The outer ward is entered from the north-east. There are slight remains of the barbican, which seems to have been square, a semicircular bastion (see illustration) is nearly complete, although the walls in its immediate neighbourhood have been mined, most likely in the Parliamentarian wars. A deep ditch divides the outer from the inner ward; the digging of this moat appears to have destroyed a square tower adjoining the gate-house. A draw-bridge spans this ditch, working in one of the original sockets, but the other socket is a restoration. Entering the middle ward through the gate tower, on each side are small chambers which have been rendered habitable by the tenant, Mr. J. R. Cobb; to the north will be seen a semicircular tower, still known as the Bull Tower, because the parish bull had his residence there in the last century. On the south is the round tower, which is still covered by its original stone dome; the woodwork has been restored, and it is now inhabited. A building standing due east and west is imagined to have been the kitchen; over it is a room supposed to be the banqueting-hall. Some, however, maintain that they were both chapels, one of earlier date than the other. Portions of Manorbere were erected about 1100. It was no doubt nearly rebuilt in the Edwardian period, again altered during the Glyndwr rebellion, strengthened in Elizabeth's reign, and dismantled in 1648. Mr. Cobb has laid bare many old foundations, and cleared out the well, in which were found a number of bolts made of lead, resembling clock weights. He also found the keys (Jacobean) lying in the moat, and an episcopal gold ring was among his spoils.

Leaving the castle we sought the church, over which the good vicar, the Rev. A. Wratislaw, conducted our party, and Mr. Loftus Brock gave a lucid and excellent description. Many churches in Pembrokeshire are worthy of note, but not one exceeds Manorbere in interest. The church would seem originally to have consisted of a nave. This was added to, and lighted by long Norman windows; then the aisles were added, and arches cut,—one had almost said quarried,—through the walls; the head of one of these windows having been left apparently for a tell-tale. After nave, chancel, and tower were completed, a northern transept was added as a mortuary chapel for the De Barri family. In the chancel lies the effigy of a cross-legged knight in mixed mail and plate armour; on his shield he bears the four bars of the De Barris, and tradition declares him to be the uncle of Giraldus Cambrensis.

After leaving the church a small crom

* See page 318, *ante*, and illustrations in this number.

was visited, which Mr. Laws declared was the original "Parr stone," from which the place derives its name of Maen-y-pur. Then to lunch, and on to Lamphey Palace, past the little church of Hodgeston, which was restored through the liberality of the Cambrian Society some years ago. Lamphey Palace lies low. We drove through the park-like grounds of Mr. C. Mathias, passing under a curious arch with a Decorated niche, and then along a shrubbery, in which, by the way, hemp palms were flourishing, and had flourished unprotected for the last twenty years. We crossed a walled garden and reached the ruin, which consists of two blocks of building, detached from each other, and certain smaller works dotted about. The eastern block, which seemingly contained the residential apartments, is remarkable for its crown of arched parapet, resembling that which surrounds the Palace of St. David's, and has been attributed to Bishop Gower, though the wood is rougher than that which is the glory of St. David's. The western block is little better than a shell of the outlying buildings. The chapel is of most importance, and stands on a small cloister. It has a fine Perpendicular east window in good preservation, and is generally attributed to Bishop Vaughan,—1509 to 1523. Rawlins, when bishop, was visited at this house by Leland, the antiquary. Bishop Barlow was the last ecclesiastic who held it; from him it passed to the Devereux family, and the three Earls,—Walter, Robert I., and Robert II.,—made it their home.

From Lamphey the party made their way home; some turning off at Penally to examine the cross, ruins of St. Terlo's Chapel, and assist at a bazaar for the restoration of the church.

On Friday, the 5th, our indefatigable shepherd, Mr. Wright, the Congress Secretary, collected his flock of B.A.A. lambs at Pembroke. After a long drive through a somewhat dreary country we reached the coast, and a line of cliff and crag opened out to view which well repaid us for the journey. Eastward and westward as far as eye could reach stretched the iron-bound coast of Pembrokeshire, carved into a thousand fantastic bays and headlands by the ceaseless roll of the Atlantic breakers which find no land to curb their might between St. Govan's and South America. The immediate object of our search was not, strictly speaking, archæological; though Norsemen gave their name to the Stack Rocks, they have never been inhabited by man, nor, for the matter of that, ever will be, but they are not tenantless, thousands upon thousands of guillemots (called in the Pembrokeshire dialect elegugs) come here to breed, arriving in May and leaving in August; unfortunately we were, therefore, too late to see the birds. From the Stacks we drove along the coast, and passing several ancient earthworks (which are said to be Danish, though as all that have been examined contain flint chips they would seem rather to be Neolithic), we arrived at St. Govan's Chapel.

This little church stands across a narrow gully which gives access to the beach. It is a very rude structure built into the live rock, 20 ft. long by 12 ft. broad. The entrance is by a door in the north-west angle, and the exit by the west; both of these doorways are arched. A limestone slab forms the altar, and under the northern wall is a small hot well, which formerly enjoyed a great reputation for curing diseases of the eye. On the left hand of the altar a doorway leads into a sort of grotto in the limestone rock, somewhat resembling a human form; this, no doubt, was the original sanctum sanctorum. From the vaulted arch of the roof, the pointed arches, and the style of masonry employed, Mr. Loftus Brock came to the conclusion that the building is of comparatively modern date, but that it was erected on a site deemed holy when Christianity was first introduced into South Wales. St. Govan finds no place in the Welsh hagiology. Some will have it he is no other than

"Gawain, surnamed the Courteous, fair and strong."

Walwyn's Castle, an earthwork lying between Haverfordwest and Dale, is said by some to take its name from the same hero, while others think the name is derived from a Latinised Irish word Gobanus, which simply means an eremite. Many wonderful tales were told of St. Govan. It is said that when he was pursued by Pagan persecutors he hid himself in his grotto, which miraculously closed around him. Hence the mark of ribs on the limestone, and if (having full faith in the legend) you get into the cleft, express a wish, and turn around, your wish assuredly will be granted. These wicked persecutors, not being able to find the saint, stole his bell, which they placed on a stone outside; the bell, like its master, slipped into the stone, and there it remains. If you doubt, hammer the stone and you will hear it ring.

From St. Govan's we drove to Bosherston, where is a rude cross in the churchyard, the Saviour's head only being carved at the intersection of the limbs.

Thence we proceeded to Stackpole Court, the fine seat of the Earl of Cawdor, examined his gallery of pictures, many of which are very good (unfortunately the Hirla's Horn is at Golden Grove). Thence to the Warren, where are some curious prehistoric remains, broken cromlechs, bronze-age barrows, and strange low walls forming circles, lines, squares, &c., which led to a long discussion, but no definite conclusion. Flint flakes and iron slag lie on the surface. In the immediate neighbourhood, cinerary urns, bronze weapons, and a gold fibula, now in the British Museum, have been discovered. Passing by the swannery, which excited great admiration, we drove to the church of Stackpole Elidur, which lies within his Lordship's grounds. This church was restored by Sir Gilbert Scott, and consists of nave, chancel, and two small aisles on the south side. On the north side of the chancel lies a mailed cross-legged knight, his right hand on his sword, and his left resting on a plain shield. This is believed to represent Elidur de Stackpole (twelfth century). In the aisle are two other effigies, and a tomb to Roger Lort (1613), a former owner of Stackpole. On the south side of the chancel in a small chantry is preserved the original stone altar, on which is the following inscription:—

CAM . . . . ORISI.
FILI . . . . FANNUCI.

This seems very early, — perhaps seventh century.

On Saturday we got under weigh in the town of Tenby. Up to this we had been favoured with splended weather; but on this occasion we were treated to a fine specimen of what Pembrokeshire can do in the way of wind and rain. The local secretary was asked what he thought of the weather, and stated that rain from the south-east usually lasted twenty-four hours. He proved to be right. However, some fifty ladies and gentlemen stood by the programme, and we proceeded. We first passed Scotsborough, a ruined manor-house, once belonging to the Perrots, thence up a terrible hill to Gumfreston, a charming little church, about two miles from Tenby. It consists of nave and chancel, with a tower at the junction, and on the northern side a small mortuary. The date seems early in the fourteenth century. The only entrance is by a west door, under a porch, in which is a very archaic stoup. A stone bench runs along its walls. In the chancel is a fine Decorated piscina. The baptistery consists of a semicircular chamber in the north wall. The tower, a good typical specimen, is 60 ft. high, 20 ft. square at the base, and 14 ft. at the top. On the north-west of the nave are the remains of fresco-paintings, very rude,—apparently instruments of torture are depicted. The bronze sanctus bell preserved at Gumfreston is 8 in. in height, quite plain, but of good workmanship.

Then on to Carew. We stopped to examine the fine interlarded cross before entering the Castle; on it is an inscription that defeated the antiquaries until two years ago, when Professor Sidebotham obtained a photograph, and, after consultation with Professors Sayce and Rhys, deciphered:—

MARGIT
IUT DE
CETT FX
} Margitent Decett fecit X.

Margitent is an archaic form of the modern "Meredith"; "Decett" is a Gaelic name not uncommonly found in old Welsh inscriptions. This translation has effectually destroyed one error; it used commonly to be said that the scroll crosses of Carew and Nevern were Runic. Now Carew, at all events, proves to be early Welsh. Having admired the cross we passed into Carew Castle, which lies on the shore of Milford Haven. Caerau, in Welsh pronounced Cary, is the plural of Caer, an earthwork, and that, no doubt, is the derivation of the name. One of these camps forms the site of the Mediæval castle; the lines of the other may be discerned across the water. Carew was given as a dower to Nest, daughter of Rhys ap Tudor (when she married Gerald de Windsor, castellan of Pembroke), by her brother Griffith ap Rhys, Prince of South Wales. Nest was a celebrated beauty. She had previously borne a child to King Henry I. Her descendants took the name of Carew, and still own the castle (Carews of Crowcomb, Devon), but several interlopers have been in possession. Sir Rhys ap Thomas, who raised Wales for Henry VII., added immensely to it, and Sir John Perrot, Lord Deputy of Ireland, did even more. Perrot is said to have been a son of Henry VIII. The western front is a grim Mediæval fortress, flanked by two round towers. The northern portion is a grand Elizabethan mansion, with ranges of large windows and oriels running up the whole height. This last was Perrot's work. The inner western portion, of Late Perpendicular, is attributed to Sir Rhys ap Thomas.

From the castle we adjourned to the Parish Church, consisting of nave, chancel, two aisles and north transept, with a well-built lofty tower. The church is Decorated, the tower Perpendicular. In the south aisle is the effigy of a chain-mail clad knight cross-legged, and with his head on one side. Fenton considers that it represents Sir Roger de Melyn, *temp.* Edward I. There is also a monument to an ecclesiastic. From Carew we proceeded to Upton. This has been rebuilt, and is simply a modern house of a castellated form.

When are we going to Pembroke? had been asked over and over again. We had driven through its dingy streets twice, and admired the frowning fortress from afar. But a closer inspection was reserved for Monday, the last day of the Congress (the expedition to St. David's being an extra, and to some extent not official). Although the Mediæval castle was founded by Gerald de Windsor in the reign of Rufus, some sort of fortification existed on the spot for centuries before his time. Mr. Cobb, in his excavations, found Roman coins of Carausius and Constantine the Great.

Pembroke Castle stands on a limestone rock, from which, indeed, it seems to grow; both are draped with ivy, so that it is difficult at first sight to say which is natural and which is artificial. Beneath is a great cavern, which has been enlarged by man, and faced with masonry. This is known as the Wogan. The most striking features of this magnificent fortress are the flanking towers above the Wogan and the keep. This last seems to stand as a sentry over an inlet of Milford Haven, and from its position assumes an appearance of even greater massiveness than it really possesses. Its chief architectural features are two couplets of windows, in one of which are two pointed lights under an obtuse arch, in the other two rounded ones under an acute: a small human head is inserted in both. In a wall near this tower is a blocked door, which looks strangely like Saxon work. Pembroke Castle was the birthplace of Henry Tudor, the founder of the royal line. Here, too, Col. Poyer, the drunken Mayor of Pembroke, held Oliver himself in check for two long months, and then yielded to famine alone. From the Castle we passed on to a curious old building, which used to be known as the Prior's House, but in reality was probably the Shire-hall. This had fallen into a sadly dilapidated state, from which it was rescued by Mr. Cobb, and generously handed over by him to the Vicar of Monkton, who now uses it as a residence; the vaulted roofing is well worth close attention.

The Priory of Monkton next was visited; this building takes a sort of middle position between the ruins and the parish churches. It consists of a nave, which was intended for the use of the laity, and which still serves that purpose, and a choir, in former days allotted to the ecclesiastics. The monks are gone, and their choir is roofless. A fine southern porch with a vaulted roof of Early English work remains. A little Norman window, which seems to have been the only light on that side, is blocked up; the western window is lost. The choir is roofless; the east window, of which only the opening remains, from its size must have been very fine; the remains of a triple sedilia on the south side must also have been very grand, but the ashlar has all been removed, and a recess for a tomb on the west side blocked up. There is a large chapel on the north side of the chapel, and the remains of the domestic portion of the monastic buildings may still be traced, with the cloisters that lead to them. This building led to a long debate. Mr. Bowen, the vicar, is anxious to

remove the wall dividing the parish church from the ruined choir; but the feeling of the Association was decidedly against him, as a beautiful Norman arch must in that case be sacrificed, and the chief characteristics of the building irretrievably lost.

On Tuesday last a number of the party went by train to Narberth,—"Arberth, the high grove,"—a place celebrated in the mythology of Wales as the court of mythical kings, now an interesting Irish-looking little town. We examined what small remains are left of the castle founded by Sir Andrew Perrot in the reign of Rufus, and thence proceeded to the picturesque Castle of Llawhaddon. Of the many Mediæval fortresses we had seen none surpass Llawhaddon, standing as it does on a wooded hill, overlooking the sparkling river Cleddau (a sword), with the pretty church nestling by its waters. The grand entrance, a view of which will be found on another page, is very striking. On either side are bastion towers; above the arch in which the gate hung is another, whence the portcullis descended, above which is a window with a label moulding. To the right of the gateway are two octagonal towers; the first was divided into two apartments, with little retiring-rooms attached, each having its own garderobe. The interior of the building must have been very magnificent in its day, and contained many splendid rooms. The chapel was erected by Bishop Vaughan; of it but three windows remain. At Llawhaddon the Bishops of St. David's lived as feudal lords; indeed, they took their title of Baron from this property, and as such were charged with military service. The castle was terribly mutilated in the last century, being used as quarry from which material for metalling the roads might most readily be obtained, and its present condition reflects but little credit on its owners, the Ecclesiastical Commissioners. From Llawhaddon we proceeded to Picton, which is the only castle in Pembrokeshire which was never dismantled. Here we were met by the owners, Mr. and Mrs. Phillips, who most kindly entertained the Association. Picton would seem originally to have been an oblong flanked by six bastions, three on each side. At the east end was the grand portcullised entrance, now unfortunately replaced by a modern Norman doorway. It was originally moated. Its general appearance has been greatly spoiled by additions made at the beginning of the century by the first Lord Milford, but these, we were glad to hear, Mr. Philipps thinks of removing. After enjoying an excellent luncheon provided by the owner, we quit Picton, and proceed to Haverfordwest, the county town of Pembrokeshire, a queer old-world place. Its inhabitants boast that Haverford, like Rome, is built on seven hills. To us it appeared they under-estimated the number, or, perhaps, the severity of gradient led us astray; for every street appeared to be a mountain path, except Hill-street, which is flat.

There are the remains of a grand old castle at Haverford, but as this has been completely gutted, and was until lately used as the county gaol, it is of no great interest. The remains of the priory are also little worthy of notice. On the whole, we were glad to get under sail again for St. David's.

On Wednesday the first object of interest we came across during a long dreary drive was the little rock fortress of Roch. Balanced, rather than built, on a crag, this little towerlet overlooks an immense range of country; this was clearly the purpose of its foundations, as it lies on the boundary between the English and Welsh speaking peoples. It consists of a D-shaped tower with prolonged sides, and may be of the reign of Henry III. The tower floor was most likely a barrack; a straight stair leads thence past a garderobe to the front floor and chapel. Leaving Roch, we proceed onwards to St. David's, leaving Solva to the left; this little fishing village rather reminded us of South Devon, and was the prettiest thing we had seen on this side of Haverfordwest. Soon afterwards we arrived at the city of holy Dewi, the patron saint of Wales. There may possibly be in America very newly founded cities as small,—such as Eden, described by Dickens,—but for its age I have no hesitation in declaring St. David's to be the smallest city in the world; we were told its population was 600, but, if so, they must pack very closely. The good Bishop had prepared a capital luncheon for us in his little city, and there can be little doubt the British Archæological Association were the first batch of pilgrims who have enjoyed episcopal hospitality in the halls of St. David's since the Reformation; for Barlow, the first Protestant bishop, hated the place, and is said to have stripped off its leaden roof that he might dower his daughter with the spoil. Barlow was the destroyer, Gower the creator of the palace. It has four fronts, of Early Pointed architecture, with superb decorations, more particularly the staircase porch. The grand entrance was through a beautiful gateway; immediately opposite is a porch, with a flight of steps leading into the great hall. The archway of the hall affords a rare example of an inverted ogee, and above it are two niches. This great room is 96 ft. by 33 ft., and is lighted by side windows with a beautiful circular rose-window at the southern end, with mullions and tracery. At the south-west end of the hall is the drawing-room; further to the west a suite of state bed-chambers. The chapel has a freestone spire, and is connected to the drawing-room, though it also has a porch and staircase of its own. The parapet of the outer walls, however,—the most remarkable thing at St. David's,—is made out by a succession of small arches resting on octagonal pillars, with ornamental capitals. The arches are built of alternate blocks of purple and yellow stone, and the sweep of each arch is adorned in a similar fashion to the door-frames of the porches. This is the finished result of the 'prentice work we saw at Lamphey, and it is also to be observed in Swansea Castle. Gower was builder of both.

Some of us attended Divine service in the cathedral, others wandering about the little city. The next morning we visited St. David's Head, where the scenery equals that we saw at St. Govan's, though here it is igneous, there limestone rock.

Then back to Haverfordwest, where the forty-first Congress of the British Archæological Association dissolved, after a most enjoyable ten days' tour. Their pilgrimage, we may hope, was not in vain, for in addition to the pleasure derived certain suggestions were thrown out which we must hope will bear fruit. In the first place, Mr. J. R. Cobb was publicly thanked for the tender care he had bestowed on the castles of Manorbere and Tenby. The castles of Carew and Narberth, on the other hand, were found to be in such a sad plight that it was decided to draw the attention of their owners to their state, while Llawhaddon, which, being held by the Ecclesiastical Commissioners, should be a model, was found to be more neglected than any other edifice visited; they, too, were adjured to take measures for the preservation of an invaluable building which had been committed by Parliament to their care.

## THE TRADES' UNION CONGRESS.

THE seventeenth annual Congress of representatives of the trade unionists of Great Britain and Ireland commenced on Monday last at Aberdeen. The chair was taken in the first instance by Mr. A. W. Bailey, chairman of the Parliamentary Committee, who in the course of his address observed that notwithstanding the distance of this year's place of meeting from the centres of trade unionism, no fewer than 140 delegates had already sent in their credentials and subscriptions.

Subsequently, the officers of the Congress were elected, Mr. James C. Thompson (president of the Aberdeen Trades' Council) being elected president, Mr. James Swift (of Manchester), vice-president, and Mr. J. W. Annand (of Aberdeen), secretary. Mr. Thompson having taken the chair,

Mr. Broadhurst, M.P., read the report of the Parliamentary Committee, from which we make the following extracts:—

*Employers' Liability Act* (1880) *Amendment Bill.*

We regret that little or no progress was made with this measure during the past session. Mr. Burt, not being fortunate enough to secure a first place in the ballot, took the next best at his disposal, but when the day came for second reading, the bills in front of it occupied the whole of the sitting. No subsequent opportunity occurred, so that no debate took place.

The Parliamentary Committee did all that lay in their power to promote the interest of the Bill. They prepared about six thousand petitions, with the corresponding number of instructions to petitioners, and despatched them to the branches of the various trades. The return of the petitions to the members of the House of Commons created a considerable interest, and had we been able to obtain a division, this interest would, no doubt, have been evinced in the list of votes.

We have increasing evidence of the necessity of preventing employers contracting out of the Act of 1880, and hope that at no distant period we may be able to do so.

The working of this Act continues to progress, and we now give some figures from a Government return made up to December 31st, 1883.

*Employers' Liability Act: Causes entered in County Courts in* 1883.

| | |
|---|---|
| Number of actions brought | 343 |
| Number of actions in which damages were obtained | 116 |
| Total amount of damages obtained | 2,342*l.* 13s. 9d. |
| Average amount of damages recovered | 79*l.* 13s. 6d. |
| Cases standing over to following year | 41 |
| Cases withdrawn and settled out of court | 50 |

*Enginemen's Certificate Bill.*

Mr. John Morley very kindly undertook the charge of the Enginemen's Certificate Bill, but no opportunity was obtainable for a debate on it.

There were various other questions which formed the subject of resolutions at the last Congress, but which the committee have been unable to deal with during the year.

*Canal Boats Act* (1884), *Amending the Canal Boats Act* (1877).

We are glad to note the passing of this amending Act, which has for its object the bettering of the condition of our canal population. The Act of 1877 made provisions for registration of canal boats where families lived aboard of them, and also provisions for the education of the children. The working of the Act was left to local authorities, which, in a great many cases, proved to be ineffectual. The amending Act gives increased powers to the local authorities, and makes the Educational Department responsible for the instruction of the children. The Local Government have now appointed an inspector to see to the enforcement of the Act, and we hope the result will be beneficial to this hard-worked and hitherto much-neglected part of the industrial population.

Mr. Burt had charge of the Bill, and your secretary's name was also on the back of it. The promotion of this legislation was mainly due to the efforts of Mr. George Smith.

*Employers and Workmen Act* (1875).

Mr. Crawford brought under the notice of the Committee a case in which 1,126 workmen had to take out separate summonses against one employer for the recovery of wages, although the plaint was the same in each case.

The Committee brought the incident under the notice of Sir Farrer Herschell, the Solicitor General, and he and the Lord Chancellor at once agreed to remedy this great hardship, by making new rules under which one summons will be sufficient, if all the names of the complainants are given on it. This will effectively remedy a great evil.

*Increased Inspection of Industrial Operations.*

It will be remembered that at the last Congress resolutions were passed in favour of increasing the number of factory and workshop inspectors, and also of inspectors of mines.

A careful consideration of these resolutions led the Committee to decide to concentrate their efforts in favour of the increase of inspectors for mines. Mr. Burt and the Secretary both balloted for a day for a motion on this subject, and ultimately Mr. Burt succeeded in getting the first place on July 4th. In the meantime the committee organised a large deputation of the trades, which was very kindly and favourably received by the Home Secretary and Mr. Hibbert (the Under-Secretary for the Home Department), on July 2nd.

In the debate on the motion, Sir William Harcourt's statement was so hopeful that Mr. Burt did not take a division on it. On July 25th, in reply to a question put to him by your secretary, Sir William Harcourt said that the Government had decided to appoint a number of sub-inspectors. We believe that the number will be about half a dozen or so, and that they will be practical miners. Amongst the conditions required for these posts will be one that the candidate shall have worked underground for at least two years, within five years of his appointment.

We congratulate the trades on this further signal success of their efforts for the protection of the lives of the industrial population.

The discussion of the report was adjourned to Tuesday morning.

*Joiners' and Carpenters' Associations.*

In connexion with the Congress, a meeting of carpenters and joiners was held on Monday evening, in the Northern Friendly Society's Hall,—Mr. Samuel Cocker in the chair,—for the purpose of hearing addresses by Mr. Murchie, secretary of the Amalgamated Carpenters' and Joiners' Society; and Mr. Beveridge, secretary of the Associated Carpenters' and Joiners' Society of Scotland.

Mr. Murchie gave an account of the formation and progress of the society with which he was connected. Established in 1860, the society at the end of that year had enrolled 618 members, but the number had now increased to 26,000. At the end of the year 1860 there were twenty-one branches, only two of which were outside of London, and to-day there were 415 branches, 367 being situated in England and Scotland, and others in the United States, Canada, New Zealand, Australia, and South Africa. He spoke of the advantages of the society in the case of losses by fire and theft, and in times of fire and sickness, and illustrated the progress they had made by showing that at the end of 1860 they had only 321*l.* at their credit, while at the end of 1883 they had 61,617*l.* 18s. 11½d. They had paid to their members 450,000*l.* in the form of benefits. It had been said that a large amount of prejudice existed in Scotland among the well-to-do class against such societies, on the ground that they spent money recklessly on strikes. Now, to show that their money was not spent recklessly

in this way, he would mention that the total sum expended on strikes was 66,000*l.*, a little over 14 per cent., and fully one-third of that amount had been spent on the formation of boards of arbitration, committees, boards of conciliation, &c. If they admitted that the principle of strikes was wrong they had better return at once to the old condition of things and work for 3d. per hour, for that would be the result, if such an admission were made. He would recommend to their attention the recently-published article of Mr. Howell in the *Contemporary Review*, which dealt with trades' unions, and which contained more information on that subject than anything the speaker had ever read. The article in question stated that six societies between 1876 and 1881 had received from their members no less a sum than 1,784,410*l.* 17s. 11d., and within that time they had paid out to their members 1,984,003*l.* 0s. 1d., so that they had given away more than they had received. Mr. Murchie concluded by appealing to non-society men who wished not only to help themselves but their fellow-workers as well to come forward and join the society.

Mr. Beveridge made some remarks on the general question of trades' unionism. One of the most remarkable circumstances of the present day was the energy with which the principle of combination was asserting itself. Everything was being done by societies. Experience had taught men what wonders were accomplished by union, it had shown them that they could do jointly what they could not do singly, and that success in any enterprise whatever lies and depends very much on the hearty co-operation of those interested in it. To what did they owe the Saturday half-holidays, the reduction of hours of labour, and fair remuneration, if not to the hearty co-operation of members of societies such as theirs, backed up by the funds of this and other societies? Some of their non-society friends who might be present might think that they were justified in combining against such contingencies as sickness, accident, or death, but could not see the force of combining for the protection and advancement of trade interests. Why? Because they said that was regulated by the law of supply and demand. That, no doubt, has a very important bearing on the price of labour, but was it through the exclusive operation of that law that wages rose and fell? Had not the will and action of the buyers and sellers something to do with it? He thought they had, and the price of labour depended as much on the will and action of the employers and employed as on the operation of that so-called law. The machinery of trade societies, if properly wrought, would drive oppression from the market-place of labour, and force its way onward for the benefit and well-being of the sons of toil.

Mr. A. C. Telfer, president of the Edinburgh Trades' Council, next addressed the meeting, and he was followed by Mr. Beaddie, Aberdeen, and Mr. P. Esslemont.

On Tuesday the President of the Congress, Mr. J. C. Thompson, delivered his opening address, in the course of which he said that, had it not been for the well-directed and persistent policy of the Congress from time to time, they should have been without many of the enactments which were now on the Statute-Book. It was heartrending to find from the newspapers that so large a number were at present unemployed, more particularly in the iron trade. Was it too much to ask employers of labour to wisely consider their modes of dealing with their employed? They should NOT be in haste to get rid of those who in times past had added by their busy hands and brains to their wealth, and surrounded them with comforts. In times like these, employers were called upon to make the greatest possible sacrifices, Nay, more,—as employers of labour had their privileges, so also had they their duties to perform. While sympathy was a good thing,—and they honestly thought it should take some practical shape in striving to modify at least those seasons of depression,—much lay to their hand in the way of directing the minds of men in certain directions, with the view of relieving the glutted labour market, such as a thorough revision of our land laws. One other thought on the subject of depression. It must be a patent fact to all that in alcoholic liquors they nationally spent by far too much. It did reflect very heavily upon them that so many were living on the barest necessities, sadly lacking the comforts of life, while they had so many anxious to supply them. At the best their wage would no more than allow comforts of a very common kind, and why there were so many spending their earnings in the direction indicated was most astonishing. It was casting aside the chance of a better and nobler useful life, simply to satisfy the abnormal appetite. Governed, they were not governing. It became them, as leaders of public opinion among their fellows, to urge the principles of sobriety. The relationship between employer and employed seemed to be as strained as ever. Interests that were said to be identical were eyeing each other with continued jealousy, taking the catch who could. This working relationship would never consolidate, but disintegrate. Both sides had expressed themselves very strongly that it was ruinous to be so circumstanced, and that it was a great hindrance to the common weal, yet no satisfactory basis was being asked for on the one hand, nor being held out on the other. The present system, it was clear, had not wrought well, as there was distrust all over. Why? Because employers of labour had generally acted on the principle, not of how much they could offer for labour, but how little. This being the case, new questions arose in the minds of men, and the cry "to be content with thy wage" would never meet them. As every new question thus raised had an ultimatum, it was for men to consider what it might be, and shape themselves accordingly. His opinion was that it must give way to something of a broader kind that would affect and leaven the whole labour community, giving them a grander motive to perform, and that principle was productive copartnership. Such a principle extended would create a living interest, and take away much of the harshness of the burdens that were borne by labour. It was a principle which they would advocate strongly, because, if generally adopted by the employing class, it would disturb the least possible existing machinery; and the more they could take advantage of this the better. Other modes presented greater difficulties, for this reason, that in starting a new movement they had to make headway against the large vested interests which by far too often crushed those new aspiring movements. It was a principle that would likewise distribute wealth more fairly among all classes, and that was a matter to be desired. A great many employers had strong convictions as to the necessity for a principle of the kind, but they had not the full courage to strike out and set at rest what was believed to be the goal between labour and capital. He could assure those employers of a co-operative spirit among working men ready to fall in to some such plan; and they looked to them to open the door. In prosperous times they would prosper together; in seasons of depression they would suffer together. The counterfeit for honest labour would soon disappear. In the meantime, however, they purposed standing truly by their unions, knowing what good they had accomplished in the past; and, wrought now judiciously and wisely, what a great amount of good they would accomplish in the future.

On Wednesday the proceedings commenced with the presentation of a sum of 1,200*l.* and an illuminated address from the workmen of the United Kingdom and other friends to Mr. Henry Broadhurst, M.P., for his services in the cause of labour, and especially in his capacity as secretary of the Parliamentary Committee.

We defer until next week further notice of the proceedings of the Congress.

## THE SOCIETY OF ENGINEERS AT THE SIEMENS TELEGRAPH WORKS.

THE practice which the Society of Engineers has followed for many years of paying, from time to time, special visits to some of the great works and industries which contribute to the commerce, wealth, and reputation of Great Britain, had a happy illustration on Wednesday, in the selection of the famous establishment of Messrs. Siemens at Charlton, on the banks of the Thames, near Woolwich, where the manufacture of a very fine specimen of an ocean telegraph cable was in full progress, part being put on board the fine steamship *Faraday* (specially built and adapted for the service of cable-laying), and part still being fabricated in the manufacturing machines and passing under electrical test into the store-room, ready for shipment. Some 5,000 miles of the Mackay-Bennett cable have been laid, and the one line is working through from end to end. It would scarcely accord, however, with either engineering or commercial principles to risk the possibilities of interruption of a single electrical conductor, and the provision of a duplicate line would be certainly dictated by prudence, if not, indeed, deemed an actual necessity. The portion of this duplicate line now nearly finished is about 1,500 miles in length, and will be laid between Newfoundland and the American continent. The shore ends are very stout, and strongly defended by hemp servings and iron-wire sheatings, a diameter of 2 in. being attained by the cable when finished. The deep-sea cable itself is much less protected, having to lie without disturbance on the ocean bottom. It is, of course, hemp-covered and wire-protected, but it is in total diameter only 1 in. over all in its full construction. The finished portions of both shore and deep-sea cables were in process of shipment on the arrival of the party,—which was a very numerous one,—and an inspection of the *Faraday* was the first item on the programme. The ordinary steam-winch of the vessel was employed for hauling the cables on board, and they were at the same time passed forward as they were hauled in through guides into their respective holds, where they were coiled round large central drums or bosses ready for paying out. The deck was one continuous mass of machinery and testing and recording apparatus,—a veritable electrical engineers' establishment on a very extensive scale. The cable in the process of its delivery into the sea is to be hauled by the steam winch out of the hold, and thence it will pass over and under a series of pulleys in order to maintain an easy hold upon it. The required rate of paying out is regulated at the steam winch, which is made to haul faster or slower according to the judgment of the officer in charge, who has the records of speed of delivery and strain always automatically recorded by the instruments around him. The passage of the cable into the sea is illuminated at night by a powerful arc light on each side of the bow.

After this inspection, the manufacturing department ashore occupied long and well-deserved attention, the dimensions and powers of the machines, and the skill and knowledge of requirements shown in their design, being such as are not be seen in any other class of rope or cable making. First there is the copper conductor in the very heart of the telegraph cable. For this, india-rubber has to be prepared for its electrical insulation. This rubber is made plastic, and manipulated with the other ingredients required to form it into sheeting by two heated steam rollers or cylinders. The sheets are then cut into narrow strips by grooved wheels. Following the wire, which has been coated with a solution, the strips of rubber are pressed on to it as it is drawn through the grooved rims of two narrow wheels working one above the other, the excess of rubber being sheared off on each side in the operation. Over the central core huge machines, each containing a number of reels of hempen thread, wind the threads evenly and closely round, one in one direction from left to right, the other in the opposite way from right to left. As these servings pass on from the machines each serving receives the flow over it of hot insulating material, and then passes through a die which presses the insulating material into the substance of the hemp and gauges the size of the cable in every stage. The steel wires are in like manner coiled spirally over the hemp servings by machines carrying reels of wire of as much length as is practicable, in order to have as few joints as possible. In the smaller wires these joints are made by soldering. In the shorter wires welding is performed. It is a curious feature in these machines that the reels are kept perfectly horizontal, notwithstanding the revolution of the machinery which carries them. The reels are placed in frames hung upon gimbals, which are so actuated by an eccentric ring working on the same spindle as the other revolving parts that the connexion between them is always maintained in a vertical line.

The electric lighting department was also viewed with deserved interest, dynamo machines of many dimensions and capacities being in progress, the smallest susceptible of being put in a space of a 6-inch cube, whilst others were of great size, developing high and powerful currents. One very striking illustration was given by the fusing of an iron wire, 5 millimètres in diameter; the machine which performed the experiment absorbed 40-horse-

power from the steam-engine in the act. The wire being galvanised, a very pretty and remarkable effect was produced by the blazing of the zinc over the red-hot iron long before the fusion of the iron itself took place; the flames of the zinc extending along the whole length of the wire, 18 ft., and rising to a height of 6 in. or 8 in. in the air, with numberless curls of white smoke. Finally, the incandescent wire broke and fell on the floor, dashing pieces and sparks in every direction.

An inspection of the Land Telegraph Department, with its poles, insulators, sending instruments, recorders, transmitters, railway signals, testing instruments, galvanic batteries, and other numberless details connected therewith, terminated the rapid survey of the visitors, who might have been well and usefully entertained for as many days as they spent hours in these remarkable works.

Amongst the members present were Mr. Jabez Church, past-president, Mr. Alfred Williams, treasurer, and Mr. Gandon, Mr. Perry F. Nursey, Mr. Berridge, and Mr. Schönheyder, members of council.

## Illustrations.

### PROPOSED ADMIRALTY AND WAR OFFICE.

DESIGN BY MESSRS. E. INGRESS BELL AND ASTON WEBB.

WE give this week a view and the two principal plans of this design. In compliance with our request, the authors of the design have sent in the following explanatory memorandum:—

1. "As a primary condition of the problem, we endeavoured to arrange the plan in conformity with the latest sanitary knowledge, feeling it to be of the first importance that the civil servants of the Crown should be enabled to perform their duties under healthy conditions. Accordingly, we resolutely abandoned all small, close, damp, and gloomy courts, and ranged our buildings on the perimeter of the site, around one central courtyard of magnificent proportions, and open on all sides to sun and air. This courtyard would be 250 ft. across both ways in its widest part, the large courtyard at the Foreign Office being about 250 ft. by 175 ft.

2. The privacy of all the office rooms was obtained by removing from their side of the main corridors all staircases, lifts, messengers' lobbies, water-closets, and sanitary and other services,—the water-closets being taken up in vertical series in projecting side-ventilated towers facing the courtyard: their water services, wastes, and drainage all passing away from the site without underlying any portion of the building.

3. Quiet for the rooms facing Whitehall was secured by recessing the frontage to that thoroughfare,—the only arrangement, moreover, by which so great a length of façade could be properly seen from so narrow a street.

4. The proper relation of the heights of the several rooms to their horizontal dimensions was secured by the interpolation of a partial mezzanine. The want of some such expedient for harmonising the dimensions of large rooms and small rooms *en suite* is severely felt at the new Foreign Office, and due warning was taken from this and similar public buildings. That this expedient did not necessarily add greatly to the height of the building is shown by the fact that the height to the parapet is precisely the same in this and in the selected design.

5. By the introduction of large glazed halls at the interior angles of the courtyard, the principle of block corridors on a modified scale was introduced, the areas being glazed and utilised as magnificent entrances to the Admiralty and War Office respectively, and they also enabled us to provide congeries of rooms for subordinate officials in the immediate neighbourhood of their chiefs.

6. Provision was made for the occasional increase of the clerical staff by giving all the rooms a larger area than required by schedule, so that instead of there being a number of normally unoccupied rooms, getting damp and stuffy from disuse, every room would accommodate, when needed, a few additional clerks, 'more room rather than more rooms' being the principle adopted throughout.

A distinctive feature of the plan is the provision of a central Council-chamber, in which the chiefs of the two great departments of the State and their advisers could confer, where in time of war maps and models could be exhibited, and where, by special telegraph arrangements, the latest movements of troops and war vessels in any part of the world could be recorded. The various branches connected with the 'Intelligence' Departments of both services were accommodated in the neighbourhood of this chamber. In peace time it would be available for levées. Beneath it a separate entrance to the building enabled officers of the army and navy to have access to the Adjutant-General and Quarter-Master General's Departments on the one side and the naval lords on the other, without threading their way through the Civil departments of the building; and could also have been used for levées. Great care was taken to remove the printing establishment and the kitchens and their accessories to the topmost floors, for the sake of quiet to the Office generally, and for immunity from dinner smells.

So far as possible, the traditions of the old offices were preserved. The fittings of the old Admiralty Board-room, designed by Sir C. Wren and executed by Grinling Gibbons, were intended to be re-used in the new Board-room. The justly-admired screen, enclosing the present Admiralty forecourt, was to have been re-erected across the new Admiralty court facing Spring-gardens, and forming a picturesque termination to the Mall, and the excellent statue of Lord Herbert was intended to occupy in the forecourt of the new War Office a similar position to that which it now holds in the present one.

These notes will, it is hoped, show the care and thoroughness with which the whole problem was treated.

It only remains to speak of the style of architecture selected. It was desirable that the building should be dignified and discreetly ornate as befitting its imperial purpose. It was necessary for the proper accommodation of a multitude of varied requirements that the style adopted should not only possess the reserve and gravity of the Classic manner, but also something of the flexibility of Gothic design. The union of the two was thought to be found in the early and pure phase of Renaissance, the details of which we had made our especial study. It had at least the advantage of combining dignity with picturesqueness; and, moreover, both the constructive and decorative schemes were thoroughly sound and rational. Not a single feature was constructed as mere ornament, while the ornament, sparingly applied, was intended to be throughout original in design, appropriate, relevant, and of high excellence as art."

We may add a word of appreciation on our own part of a quality which is certainly not shown in all the designs, viz., the feeling for the artistic as well as the practical element in the *plan* which this design shows. The interior laying out of the quadrangle lends itself to effect as well as to arrangement, and the three large glazed courts would have formed very striking architectural centres in the interior cosmogony of the building, besides serving their practical purpose as centres of meeting for the internal traffic of the building.

*Key to References on Plans.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. " Supplies.
  B 3. " Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. " " "
  C 2. " " "
  C 3. " " "
  C 4. " " "
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office, Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office, Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

### "THE GRANGE," BROOK GREEN.

THE illustration of the above shows the garden front of Mr. Henry Irving's house at Brook Green,—an old one recently altered and added to under the direction of Mr. Fred. Pinches. Whilst the work was going on, evidences of former alterations, dating probably in the early part of George II.'s reign, were brought to light. Owing to the method adopted of adding a wing on each side of the main and older portion of the house, access to the rooms in the east wing can only be had by going through other rooms. The service accommodation being inadequate, it was found necessary to build out offices at the back, and also to provide a servants' common room. By removing a partition, and building out a bay window, the entrance-hall has been considerably enlarged, and the old staircase opened up to view. Sundry alterations have been made in removing partitions, enlarging rooms, providing bath-rooms, &c., on the first and second floors. With the exception of adding a porch and bow-window, the front which faces Brook Green has been but very little altered. Unfortunately, owing to damp, it was found necessary to remove the ivy which had grown nearly all over it. An enclosure-wall and carriage-gates have been added, in place of the open railing which formerly existed.

Mr. Irving's desire being to retain the unpretentious character of the house, care has been taken not to introduce any feature likely to give it the appearance in any way of a mansion.

The garden attached to the house is nearly an acre in extent, with a large lawn, and containing some good old trees. Here Mr. Irving is able to get the rest and fresh air which the demands of his profession render so necessary.

The works were carried out by Messrs. Stimpson & Co., under the personal direction of the architect.

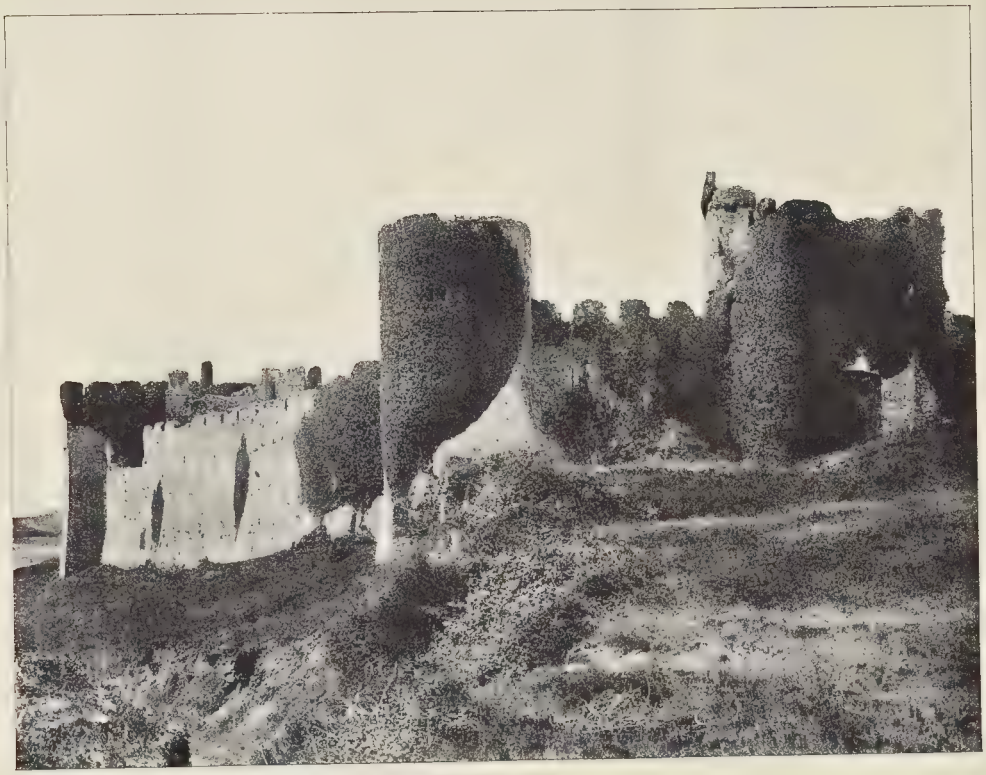
### ST. GEORGES DE BOSCHERVILLE: ENTRANCE TO CHAPTER-HOUSE.

THE Abbey Church of which this forms a part is about six miles from Rouen, and is one of the most perfect examples of Norman architecture existing. It will be found more fully illustrated in Mr. Galsworthy Davie's "Architectural Studies in France." A note as to the origin of the church will be found on the drawing.

### OLD CASTLES AND PALACES IN WALES.

WE give views of the remains of Manorbere Castle, the keep at Pembroke, the interior of the bishop's palace at St. David's, and the gateway of the episcopal palace at Llanhadden, which were among the buildings visited by the British Archæological Association last week. Some particulars of the remains will be found in our account of the Association's Congress at Tenby (see p. 350 of this week's *Builder*).

**Lavatory Apparatus.**—Mr. H. R. Batson has made provisional application for a patent for improved lavatory apparatus for industrial schools and similar institutions.



MANORBERE CASTLE.



THE PHOTO. SPRINGETT & CO LONDON

KEEP, PEMBROKE CASTLE.




"THE GRANGE," BROOK GREEN. Mr. F. Pinches, A.R.I.B.A., Architect.

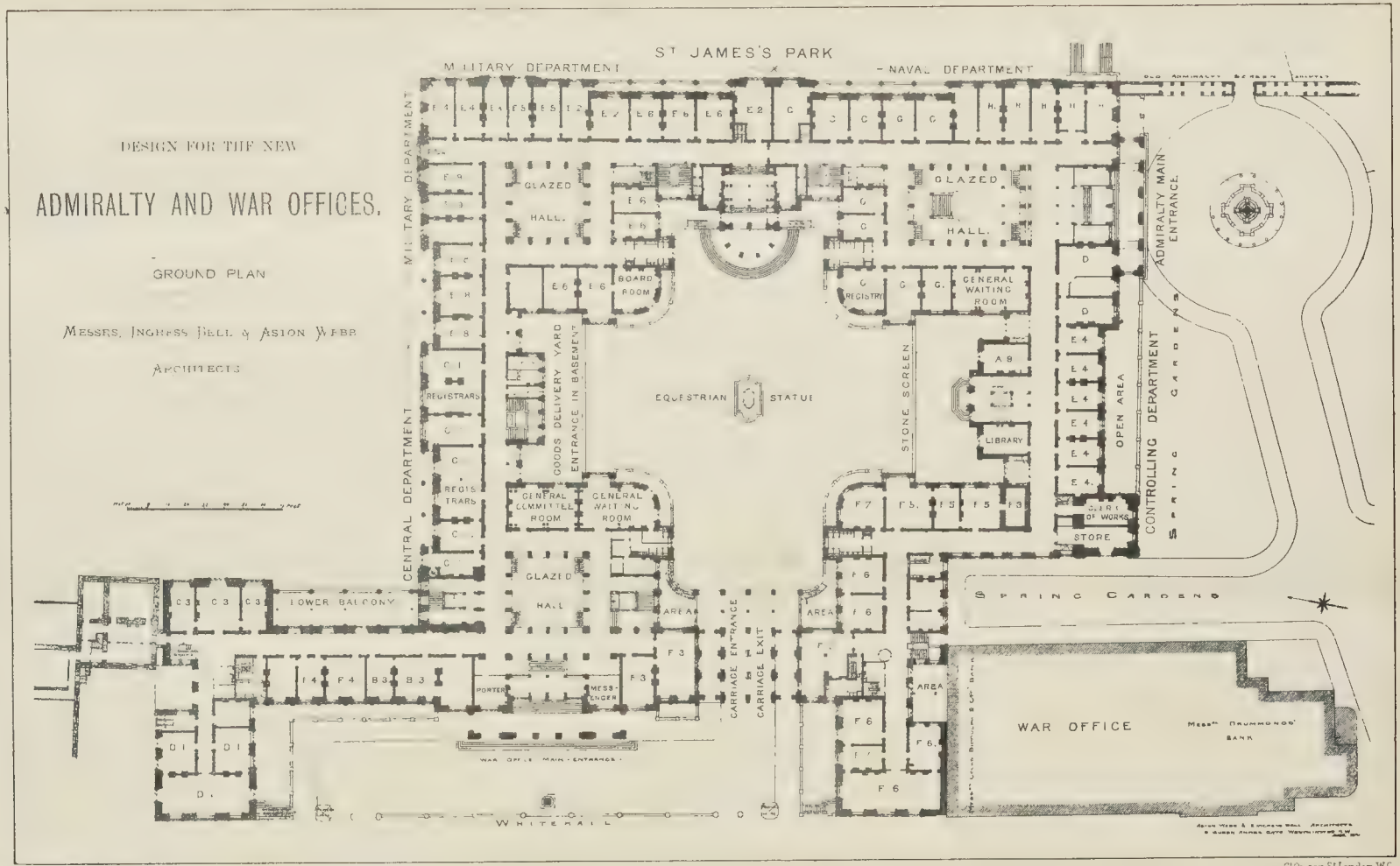
DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

GROUND PLAN

MESSRS. INGRESS BELL & ASTON WEBB

ARCHITECTS




Wyman & Sons Photo Litho

6 Queen St London, WC



DESIGN FOR NEW ADM

By Messrs. E. J



TY AND WAR OFFICES.

L & Aston Webb.

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

PLAN OF FIRST, OR PRINCIPAL FLOOR.

MESSRS. INGRESS BELL & ASTON WEBB, ARCHITECTS




Wyman & Sons Photo Lithe

Queen St London WC

# CHURCH · OF · S · GEORGES · DE · BOSCHERVILLE ·

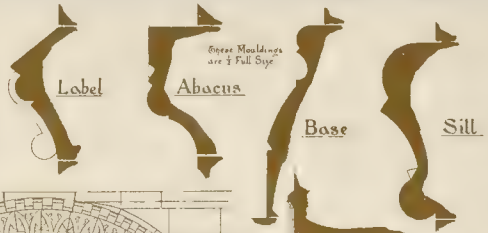
## ENTRANCE · TO · CHAPTER-HOUSE ·

Scale · of · Feet ·

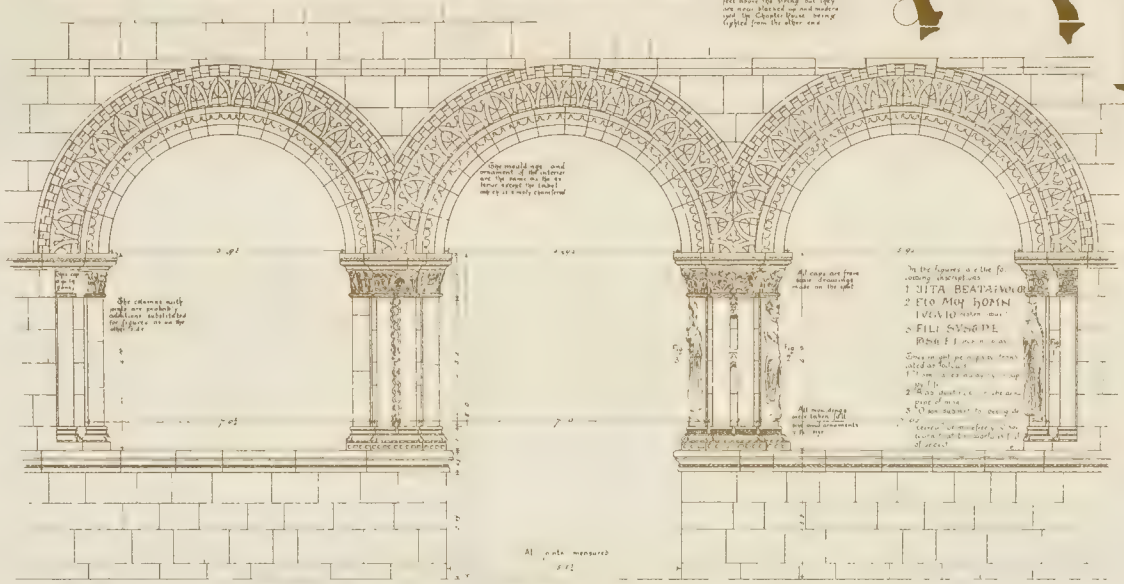


The ornaments and mould ings of this arcade would be very suitable for reproduction in Terra Cotta

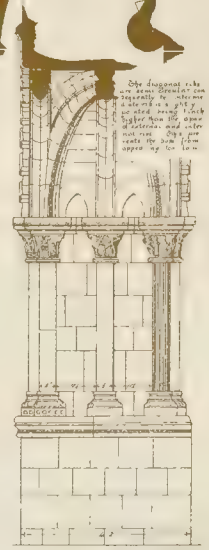
There were originally three archeaded over the three arches for that of each were about 3 feet above the string but they are now placed one and modern used the Chapter House being lighted from the other one




These Mouldings are ½ Full Size



The diagonal ribs are semi circular con tinuously to intersec t and retreat being 1 inch higher than the upper d extrados and inter not rise Ribs are centre the bosses from appear ing to lie



The mouldings and ornament of the internal are the same as the ex terior except for label mould ing as it is only chamfered

The shafts with angle are probably additions substituted for figures as on the other side

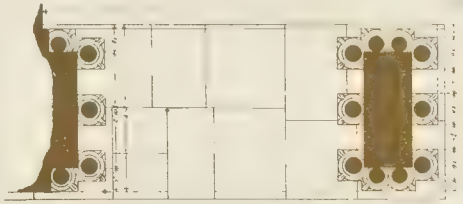
All caps are from rough drawings made on the spot

All new dressings were taken from and wood ornaments

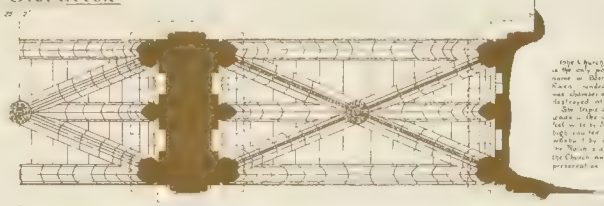
In the figures & the fo scoring inscriptions 1 VITA BEATA IN DO 2 ETO MIH DOMN I VERVO 3 FILI SVSCIPE BSE

Front · Elevation ·

Section ·



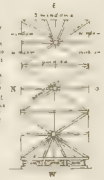
½ Plan · looking · down ·



½ Plan · looking · up ·

The Church of S Georges de Boscherville is the only portion left of the abbey. It took name at Boscherville about six miles from Rouen, founded by Raoul de Gouvet (?) who was chamberlain to the conqueror. It was destroyed at the revolution.

The triple arched entrance shown above leads to the Chapter house a chamber 23 feet six in. by 21 ft. 10 inches and 21 feet high. I have also drawn a sketch plan of which is by Abbot Cotter in 2 Vol. 8vo of the Norman Arch of the No. Entrance of the Church and is in very good state of preservation



Measured July
Delt August 1882.

C. F. Kell Photo Lith & Printer, 8 Castle St. Holborn London. E.



INTERIOR OF BISHOP'S PALACE, ST. DAVIDS.



INK PHOTO SPRAGUE & Co LONDON

GATEWAY OF EPISCOPAL PALACE, LLANHADDEN.

## THE GERMAN ARCHITECTS' AND ENGINEERS' CONGRESS.

THIS annual gathering has just been held, under favourable circumstances, at Stuttgart. The usual preliminary meeting of delegates took place on the 22nd ult., and was attended by forty representatives from eighteen societies in various parts of Germany.

The subject of contracts between employers and professional men was dealt with, and, after much discussion, it was resolved not to act upon the suggestion that the settlement of the question should be postponed until the issue of the Imperial code now in preparation. Consequently, the rules will be finally drawn up within the next few months, after which they will be published. The question of normal regulations for the delivery of iron structures had given rise to preliminary expressions of opinion by fifteen societies, which, in conjunction with the reports of the Association of German Engineers and the Association of German Iron Manufacturers, afforded considerable matter for discussion. The Aix-la-Chapelle Society had, consequently, a short time ago suggested the examination and summarising of these various opinions by a joint commission of the technical bodies interested. The assembly resolved upon reconstructing the portion of the rules of general application, and upon inviting expressions of opinion from the various local societies. The whole subject will then come before next year's congress for final discussion and settlement. Professor Fränkel, Herr Gerber, Herr Köpke, Professor Häseler, Dr. Schäffer, Professor Winkler, and Professor Weyrauch, are entrusted with the revision of the material now available.

During the last year a collection has been organised for the erection at Dresden of a Semper Monument. The total cost is estimated at 1,000*l.*, and about a quarter of that sum has now been obtained. In order to second the efforts of the local societies it was resolved at the present Congress to invite subscriptions from bodies of a more general character, such as art societies, &c., in Germany, Austria, and Switzerland.

The Mid-Rhenish Society having brought to a close its researches on the subject of "Typical Forms of Dwelling-houses," the further treatment of the subject was undertaken by the Hanover Society at its own request, with a view to the publication of the materials now ready and still to be obtained. Arrangements were also made as to the publication of the valuable information now collected as to the use of glazed bricks and statistics of building. The business proceedings concluded with the selection of Dresden for next year's meeting, and of Frankfürt for the general assembly of 1886.

The first general meeting was opened by a congratulatory address, in which Herr Von Schlierholz welcomed the assembled visitors, and referred to the progress made by Stuttgart since 1858, when the Architects' and Engineers' Congress last met in that city. After Dr. Hobrecht, of Berlin, had invited the assembly to express their feelings of respect towards the Royal family of Wurtemburg, Herr Adolf Bötticher, of Berlin, gave an address dealing with the most recent investigations regarding the history of building in ancient times. The speaker was particularly qualified for such a task, having personally co-operated in the excavations at Olympia as the official representative of the German Government. His remarks bore special reference to the work done within the last ten years at Tiryns, Mycenæ, Olympia, Pergamon, Delos, and Pompeii. Mycenæ and Tiryns were discovered by Schliemann in 1876, and maps of both localities served to elucidate the detailed references made. A plan was likewise shown which represented the interesting palace at Tiryns, which was only discovered this year, and which is being treated by Schliemann in a descriptive work now in preparation. With reference to the Lions' Gate at Mycenæ, the speaker proceeded to deal with the most recent opinions as to the origin of Doric columns, which he traced back to Egypt, attributing their source to wood architecture, of which various specimens came to light at Olympia. Thus the Heraion consisted for the greater part of wood in the oldest times, its wooden columns having been subsequently exchanged for stone pillars. From this and other examples, the speaker argued that the oldest forms of Grecian houses and temples were composed of wood, at least in the upper portions. Reference was also made to the work carried on by the French at Delos, which seems, however, to have possessed less architectural value than antiquarian interest. In the same manner, the excavations at Pergamon have been more important in their results as to sculpture than architecture. With regard to Pompeian discoveries, Herr Bötticher divided the architecture of that locality into five distinct periods, each characterised by stylistic and decorative peculiarities, which were illustrated by drawings and photographs.

Professor Hubert Stier, of Hanover, gave an interesting account of the German Renaissance, remarking that for half a century one past style has been utilised after another in new buildings, the result being a more intimate acquaintance with the history of architectural forms, and with their adaptation to practical uses. The speaker remarked that his father had incorporated the German Renaissance style into his classification of the subject as early as 1854, but the first incentive to its general adoption was given by the patriotic feelings which the events of 1870 and 1871 aroused throughout the German nation. The influence of the German Renaissance was not only felt in architecture, but also extended to furniture, tissues, weapons, metal work, and various other branches of artistic industry. The weak point of the style in question would, however, seem to be its deficiency in monumental character, and to this circumstance the speaker attributed the fact that in ecclesiastical architecture the Italian Renaissance has been the leading *motif*.

The testing of iron and various kindred points were dealt with by the engineering section, in which Professor Winkler delivered an interesting address. The new buildings and harbour alterations necessitated by the admission of Hamburg into the Zollverein formed the subject of Herr Meier's remarks, from which the assembly derived a comprehensive idea of the works in progress; the completion of which is expected to take place in 1889. Dr. Dietrich's paper on "Electrical Transmission of Force" was likewise well received.

Special interest attached to the address of Herr Lange on "Building in the United States," the remarks of the speaker being founded upon personal observations made in his capacity of technical attaché to the German Embassy at Washington. Various details were given as to the Government departments for engineering and building matters which are respectively under the control of the Ministers for War and Finance. The country is divided into districts each of which is under the supervision of a chief engineer. The sum annually voted for engineering works is 3,000,000*l.* to 3,500,000*l.*, of which sum about one quarter is being devoted to the regulation of the Mississippi. The building department undertakes the erection of excise offices, post-offices, judicial buildings, naval hospitals, &c., and spends about 1,000,000*l.* annually. These buildings are very solidly constructed, and are fireproof, but their cost is relatively high. In some of the larger cities the post-offices are said to cost from 1,000,000*l.* to 1,250,000*l.* each, and the New York Post-office even as much as 2,000,000*l.* As to dwelling-houses, the speaker alluded to wooden structures as still predominating in the country and in small towns, while in larger cities the external walls at least are obliged to be of brick. Amongst the special features of the internal arrangements is the frequency of passenger-lifts. Americans are fond of painting the outsides of their houses more often than is customary in Europe, the general aspect of the cities being thereby rendered cheerful. Ecclesiastical architecture is not in a satisfactory condition, according to Herr Lange's opinion; it being usual to build small churches, and the habit of placing them on an ordinary street building site was not conducive to their effect, on account of the proximity of other structures. The manner in which many architectural details are carried out is explained by the fact that wood, iron, zinc, and other materials are used in portions of buildings which bear the character of stone as to form and treatment. Some interesting facts were given as to the Tabernacle of the Mormons at Salt Lake city, and their temple, which has been in progress since 1853, and which (contrary to reports which have circulated) has nothing extraordinary in its architecture, measurements, or cost. It has now attained a height of about 90 ft. Special commendation was given to the park-like manner in which cemeteries are laid out. Finally, Herr Lange attributed the simplicity and boldness of American buildings to the indulgent nature of public criticism, on which architects can usually depend. Americans know that by increasing the responsibility of architects, their courage and inventive faculties must be affected, and that when such is the case the public really suffer a loss.

Dr. Wolpert treated a subject of general sanitary interest in his address upon "The Testing and Improvement of the Air in Dwelling-rooms and Assembly-rooms, as to Temperature, Moisture, and Purity." He explained that for living-rooms and school-rooms a normal temperature of 64° to 68° Fahr. was desirable, while a slightly lower temperature was permissible in bedrooms. At the same time he disputed the advantages sometimes attributed to sleeping in cold rooms. The normal temperature alluded to should be uniform throughout a room, there being no important difference allowable between the lower and higher portions. Various methods of arriving at this uniformity were referred to in detail.

With a view to preparing for the intended visit to the cathedral at Ulm, Herr Von Egle gave the assembly some details, both historical and technical, as to this noted work and the projects for the restoration of the tower and other portions. Works of this nature have been progressing to some extent since 1840. The success of the efforts made to raise money for the completion of the restoration has been so encouraging that it is hoped to terminate it within six years. It is contemplated to utilise as far as possible at Ulm the services of those skilled assistants who are now free on account of the completion of work at Cologne. Herr Lange gave an account of the efforts now being made for the preservation of the Rathhaus at Augsburg, and a resolution was agreed to in which the Congress expressed its approval of the scheme.

The excursions made were well attended, and proved enjoyable adjuncts to the programme. The cloisters of Bebenhausen were specially interesting from an architectural point of view, and, under the guidance of Herr Beyer and Herr Schlierholz, their various points were seen by the party under circumstances favourable to their appreciation. An exhibition of architectural drawings was held at which the ten prize designs for the Berlin Museum were shown in conjunction with other works of interest and artistic value.

In connexion with the assembly various other special exhibitions were organised, amongst which that of the Society of Industrial Art calls for particular mention. The objects shown included a vase in *rouge antique* marble, a mirror with table and a sideboard in ebony. A Japanese fire-screen and various other decorative objects are spoken of with commendation by the local press. The social festivities were on the usual scale of completeness, and arrangements were made for the visitors inspecting the various new buildings in Stuttgart under the guidance of local architects and officials. The banquet of August 26th was attended by 300 guests, and was thoroughly successful in every respect. The attendance at the Congress numbered 319.

## DOINGS IN DUBLIN:
## BUILDING AND SANITARY.

THERE are a number of small building operations, but no public buildings of importance, at present proceeding in Dublin proper, but it is anticipated that the new Science and Art Museum will be commenced without any further delay, as Messrs. Deane & Son's plans have been finally decided upon by the Government. The history and circumstances of this project, which has been hanging fire for the last sixteen years, form a very chequered chapter in official correspondence and architectural competition, and if the whole story of ways, means, and motives were told concerning it, some singular and startling revelations would be made. The architectural features of the new building have been already described in these pages. The site is a good one, in proximity to Leinster House; the materials will be chiefly native, and,—a not unimportant consideration,—the work will afford employment to a considerable number of building artisans, who need a long spell of constant employment to make up for bad times.

On the borders of the city, the building of the

new Catholic Asylum has been commenced. The structure, which is intended for the male blind, is situated on an elevation beside a mansion known as the Castle of Drumcondra, lately the residence of Lord James Butler. Very few of the old stones of the original castle of Drumcondra,—a building the scene of some important historical transactions in the reign of Queen Elizabeth,—remain. An inscription exists which tells of the building of the old castle in 1560, and it was here the famous Irish chief, Hugh O'Neil, was married to Mabel Bagnell, the castle being then the residence of Sir William Warren. The new asylum at Drumcondra will be about 218 ft. long, and three stories in height. The style will be Gothic, and the materials of red brick, relieved by bands of dark blue brick, with stone dressings. The ground-floor comprises a refectory, 70 ft. by 26 ft.; school-room, 56 ft. by 26 ft.; class-room, 26 ft. by 26 ft.; along with printing-room, music-rooms, kitchen, stores, &c. Four dormitories will be provided on the two upper floors, each 70 ft. by 26 ft., including lavatories, bath-rooms, &c., with four cells for the Brothers in charge. The heights respectively of the floors from the ground upwards are 16 ft., 15 ft., and 14 ft. Atop there will be an attic, to be utilised for storage and work rooms. The architect is Mr. W. H. Byrne, of Dublin.

A few miles south of the city, at Stillorgan, a new Convalescent Home and Hospital is approaching completion for a religious brotherhood known as the "St. John of God." The new building will cost between 6,000*l.* and 7,000*l.*, the whole of the funds being subscribed by the mother house of the order at Lyons. The new structure is severely plain, and destitute of ornamental details, with a frontage of 135 ft. The ground-floor comprises a large hall, extending the length of the building. On the right-hand side of the hall are lavatories, two refectories, prior's room, and reception-room; and on the left are bath-rooms, apothecary's hall, and kitchen. Hereafter it is intended to prolong the hall, with portico to meet the monastic house. The second and third floors have halls similar to that of the ground floor, with bedrooms on each side. It is contemplated also to provide a chapel when funds are forthcoming.

On the site of a large abbey, which was founded at Tallaght, near Dublin, in the twelfth century, and subsequently converted into the summer residence of the Archbishops of Dublin, a new Dominican church and convent are being built. The new buildings include the church and cloisters, the west wing, with the completion and alteration of the east wing. Some years back the west wing was commenced, from the designs of the late Mr. J. J. McCarthy, R.H.A. As the locality is very thinly populated, the new church will be mostly used for conventual purposes. The facing stone is black local limestone, known as "calp," with white limestone dressings. The walls of the nave will be lined with brick, while those of the chancel and choir will have Bath stone. In accordance with the usage in Dominican churches, the choir will be situated at the back of the high altar, and will comprise fifty stalls. Over the sacristy a night choir is provided, 42 ft. by 22 ft., with arcaded opening into the day choir. The chancel and choir will show groined ceilings in oak, resting on trefoil corbelled shafts. The nave will have a wagon-headed ceiling, with arched principals. The architect is Mr. George C. Ashlin, and the contractors Messrs. Meade & Son, both of the city.

The long-proposed and urgently-needed public baths and washhouses are in course of erection in Tara-street, the site being a portion of the land taken a considerable time ago by the Corporation for the purpose of making a new approach from Great Brunswick-street to the swivel bridge over the Liffey. A loan was obtained from the Treasury, amounting to 4,700*l.* The plan omits a swimming-bath,—a rather serious omission, considering the wants of the city; but we find by a resolution passed within the last few days in the Corporation,—"That it be an instruction to the Public Health Committee to provide one or more swimming-baths as a department of the public baths and washhouses in course of erection." This, it seems, will need another application to the Treasury. Why proceed with a plan omitting an important requirement in a poor neighbourhood, and after the buildings have been commenced, begin preparing plans for the always necessary swimming-baths? The new buildings will comprise a washhouse, 55 ft. long by 40 ft. wide, accommodating about twenty persons; a drying closet, a private washhouse for the use of the establishment; eight reclining baths for men and four for women. There will also be offices, manager's residence, store and other rooms. The walls are of red King's Court brick, the front exhibiting some moulded and ornamental treatment in the same material. The plans are by the City Architect, Mr. J. Freeman.

Somewhat large and imposing business premises are in course of erection in Great Brunswick-street, for Messrs. T. McKenzie & Sons, intended for their new seed and agricultural implement warehouse. The frontage extends about 180 ft., and there will be a conspicuous entrance-porch in centre, with a series of six windows on each side on the ground floor, with dropped arch-heads. The walls will be composed mostly of King's Court bricks with Portland stone dressings and a granite string-course between ground and second story. The height of floors from bottom upwards will range respectively 15 ft., 14 ft., and 12 ft., and they will rest on iron girders supported by columns. On the left-hand side of large ground-floor will be the machinery and workshops, and on the right the seed stores. The architect is Mr. J. O'Callaghan, the builder Mr. Donovan, and the clerk of works Mr. Robert Parker. The iron work is being supplied by Messrs. Courtney & Stephens.

Among the provincial ecclesiastical churches worthy of note is that of the new church of the Trappists Brothers, at Mount St. Joseph, near Roscrea. The building is in the Early English style, with a mixture of Norman in the interior. Ornamentation was avoided as far as possible, in accordance with the instructions given, as the Order is one of those in connexion with which austerity of life and surroundings is strictly enjoined. The entire length of building is 225 ft., transept 90 ft., nave 30 ft., and side aisle 15 ft. wide; the height to apse of roof is 75 ft. Tower and spire are yet unbuilt, but provision is made for them on the south side of the transept. When finished the spire will be 220 ft. For about twelve bays in length the west end of the church is separated by a rood screen from the monastic portion, and it is to be used as a secular church. The high altar is composed of marble and Caen stone. The architect is Mr. W. H. Beardwood, of Dublin, and the works were principally carried out under the supervision of the lay brothers. The contract of the carpentry work was carried out by Mr. Maher, of Roscrea. The altars were executed by Messrs. Early & Powell and Mr. W. P. O'Neil respectively, of Dublin. The church and monastery stand in a park of 375 acres, which was presented to the Brothers by Count Moore, M.P. The new church has cost 8,000*l.*

The sanitary condition of Dublin, both north and south, still calls for increased vigilance. Although the Corporation has done some commendable work within the last two or three years, much, indeed, still remains to be accomplished. The state of the river Liffey, running through the centre of the city, is still abominable, and the stench from it during the last three months has been at times intolerable. Plans have been proposed for mitigating the almost unbearable nuisance, and the Corporation again and again return to a driftless debate upon the subject, but still little or nothing is done. In fact, the only practical remedy is the one we pointed out several years ago,—a parallel system of main drainage on each side of the river, with intercepting sewers. This system was adopted in the scheme of main drainage promoted by the Corporation some years ago, but the project at that time met with fierce opposition on the part of the citizens, on account of the great cost of the scheme, and it being out of proportion with the financial circumstances of the city at that time. The materials of sewer construction, bricks, iron, cement, &c., were, too, very high in price at the period; and these, with other reasons which need not be alluded to here, contributed to give the first main drainage project its quietus. The scheme is being revived again, and, subject to necessary modifications, it no doubt could be successfully carried through. The points of outfall for the sewage of the city, if it be resolved to run it to sea, are questions of some difficulty, on account of marine townships and watering places stretching for some miles north and south of the harbour and bay. Sewage utilisation processes have not, as a rule, proved profitable, and they have been in some instances ruinously expensive. Public health, however, is a paramount consideration, and money expended in maintaining it is money well laid out, and the cost must not be too closely scrutinised from a mere commercial point of view. In every system of main drainage dealing with the sewage matter of cities and towns the solid portion should be intercepted, and nothing but the effluent water passed into the mouth of our harbours. The present condition of the Liffey, with its many foul tributaries pouring hourly their volumes of filth into the main stream is terrible to contemplate. It is no argument to point to residents who have lived on the banks of the river for years, and to say they have not felt one whit the worse through such residence. Who can tell? It is the sheerest folly to think that any human being can live constantly for years over an elongated cesspool and continue in good health. Clergymen of every denomination, doctors, and lawyers, visitors, and disinterested folk, who can have no object in throwing blame, directly or indirectly, on the Corporation of Dublin, all are loud in proclaiming the Liffey nuisance and appealing for its abatement.

Another great evil that at present obtains in Dublin, and which has obtained for long years, is the dreadful state of many of the old tenement dwellings, wherein are housed thousands of the working classes, and the great majority the very poorest of their kind. Many of these houses were once private mansions occupied by single families, but from six to a dozen families now find refuge in them, with sanitary accommodation only adequate for one or two families. The Public Health Committee of the Corporation have of late carried out some judicious and urgently-needed arrangements in respect to a large number of these tenement houses; but the number of these dwellings is almost legion, and the state of hundreds of them still as bad as can be. We have entered the dirty yards of several of them, ascended the filthy and dilapidated staircases, and examined scores of the rooms. We will not draw fancy pictures, or exaggerate, but will simply say that many, very many, of these houses in streets north and south of the Liffey are unfit for human creatures to live in. Some poor tenants are, to be sure, very dirty, and miserably poor into the bargain; but apart from this there are a number of unprincipled landlords who own this class of property, and fatten on the rents it yields, who should receive little mercy at the hands of the sanitary authorities. These landlords ought to be made to keep their tenement property in a habitable condition, and failing them, the Corporation should take action, and, if necessary, demolish these rookeries of disease. One of the great wants of Dublin is the provision of houses at low rents suited to the needs of the very poor. Blocks of artisans' dwellings have been provided by companies, and to some extent they have supplied a want; but several of the rooms of the dwellings are occupied by a class of persons one would expect to find elsewhere. These dwellings do not meet the wants of the very poor, nor are the companies who built them particularly concerned in providing rooms for any but the better class of artisans or others who can afford to pay certain rents. Acting on the commercial principle, perhaps they are not to blame for their resolves, only that no credit should be taken on the score of benevolence and philanthropy where they exist not.

We have something more to say on sanitary questions in relation to sundry other matters in Dublin, which we must defer for another article.

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**Brighton.**—About a year ago the building committee of the Congregational Church in Queen's-square, Brighton, received a report from their architect, Mr. Arthur Loader, that the Caen stone with which it was encased was in such a state of rapid decay that it required immediate attention. It was decided to reface it with Corsham Down stone, and the work is now in rapid progress, the contractor being Mr. J. T. Chappell, of Lupus-street, London, under schedule, and under the immediate superintendence of Mr. Loader, architect, of Brighton; the stone being selected from the quarries of Messrs. Pictor, of Bath.

## ILLUSTRATIONS OF RECENT PATENTS.

5,845, Improvements in Chimney-Pots. Edwin Samuel Romilly, London.

This invention is designed to improve the chimney-pots of earthenware or metal, such as are ordinarily used for the terminal of chimneys. The upward draught of smoke and heated air is promoted, and by a peculiar arrangement down-draughts are entirely prevented. The terminal is fixed in the ordinary way. The upper end of the pipe or pot is made conical, the smallest end uppermost, and round it a second tubular pipe, slightly conical, is fixed, the lower end of which either forms a part of the inner pipe or rests and is fixed on a ledge or flange formed round the inner pot at or below the point where the conical part of the latter commences. An annular space is thus formed round the conical part of the inner part of gradually increasing area as it rises, and into the lower part of this space openings are made through the outer pot, these being preferred of a triangular shape, as shown on the drawings. Fig. 1 shows a vertical section,

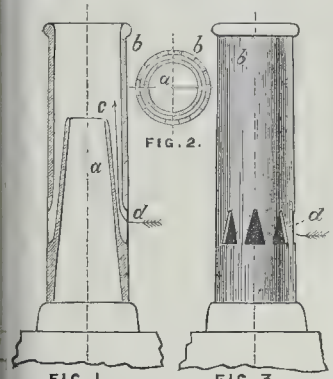
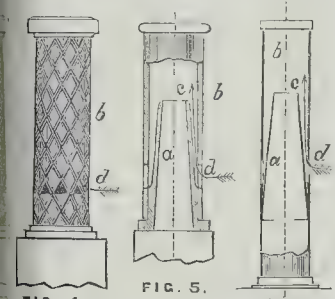



Fig. 2 a horizontal section, and Fig. 3 is an elevation of the improved chimney-pot: *a* is the inner pot conical at its upper part; *b* is the outer pot or tube, the two pots being shown made in one piece; and *c* is the annular space between them increasing in area at its upper end; *d* the openings through the outer pot, *b*, into the lower part of the space *c*.

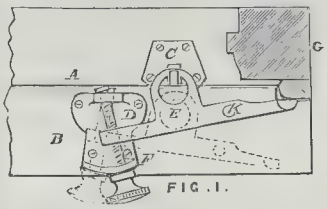
The air or wind blowing from any direction against the chimney-pot enters the apertures upon the same side into the lower part of the annular space, and is there directed upwards, as shown by the arrows round the inner conical pot *a*, inducing an upward current through the latter and up the outer pot *b*, thus accelerating the upward draught in the chimney. Should the escape of the smoke be temporarily obstructed by currents of wind, or a downward draught caused, the smoke will escape through the apertures *d* rather than down the conical pot *a*. Particular attention has been given by the patentee to the points in the ordinary chimney-pot. The improved form may be made in suitable material,—terra-cotta, earthenware, or metal,—and may be ornamented. Fig. 4 shows a form wherein the openings



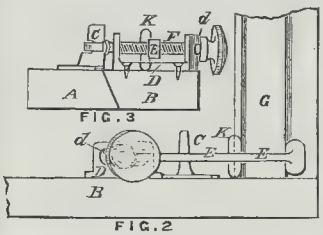

are so arranged as to be unnoticeable at a little distance. Several alternate forms are suggested, and in fig. 6 the pipes are shown of metal, the inner one being riveted or bolted to the outer one, *b*. These chimney terminals are also adapted to the chimneys of marine or other boilers, furnaces, &c.

711. Improvements in Fasteners for Window-sashes. George Bisley, Rotherhithe.

The object of this invention is to secure a close and secure joint, such a one as will close the windows fast, and prevent rattle, and furnish additional security by being difficult to interfere with from the outside. In the drawings, fig. 1 is the plan, fig. 2 front, and fig. 3 a side elevation, and by




a comparison of these drawings, the action of the window lock will be easily understood.




A and B are the two meeting-rails of the sash-frame G. The improvements consist of a pin, stud, or hook (C), fixed on rail A, provided with a recess or shoulder, as shown, into or over which slides or falls the eye or equivalent of a lever E, resting on the other sash-rail, one end of such lever E abutting against the sash-frame, as shown; the other formed with a screwed eye or nut, and operated by a screw bolt, or pin, F, passing through the said eye, and working in a slot, D, of the frame or stand, D, secured on the sash-rail, B. The screwed bolt being operated from one rail, brings the long end of the lever, E, against the sash-frame bead, its eye being over the notch of the hooked pin, C, on the opposite rail, so that the sashes, being previously in place, with their meeting-rails in position, they are firmly secured, and held steadily together. When it is desired to open the sash-frames, the lever, E, is loosened by the screw, F, and its eye removed from the hooked pin, C, when the lever assumes the position shown in the plan by the dotted lines in fig. 1. The lever may be supported on a pin or knob, K, which is provided on both sides, so as to render the fastening suitable for use at either side of the sash.

8,245, Manufacture of Wall Paper. J. A. Turner, West Gorton.

This invention has for its object the manufacture of wall-papers that shall have a waterproof back surface, so as to withstand the action of moisture in the walls, and that shall also be of sufficient strength and substance to enable them to be hung up without being cemented to the wall surface. For this purpose the wall-paper, after it has been printed upon, is coated at the back with a suitable waterproof cementitious substance, such as vegetable pitches. To such prepared surface is applied a sheet or backing of either paper or woven fabric, such as cotton, cloth, or canvas,—the paper or cloth being applied to the surface in any suitable manner, but by preference by passing the same while hot between pressing rollers, both the wall-paper and the backing being drawn in continuous lengths from rolls on which they are wound. In some cases the cementitious matter is applied to the paper or cloth backing, or to the backing only. In employing embossed wall-papers for the purpose of this invention the back surfaces of the embossed parts may be filled in flush with the cementitious substance, whereby the front surfaces of such parts will be protected against injury.

## INDUSTRIAL REMUNERATION CONFERENCE.

THE following is the more detailed statement of the views of the Committee in regard to this proposed Conference, referred to in our "Notes" (p. 348, *ante*):—

"The Committee are desirous of carrying out the objects of the trust by obtaining the fullest information possible as to the actual working of our present industrial system.

They are anxious to procure from all available sources accurate information, so far as possible in a statistical form, as to the money wages, command of the comforts of life, health, savings, and general condition of those engaged in different industrial employments within the country, and they would invite all persons disposed to assist them to communicate any information and any suggestions bearing on these points, to the Rev. W. Cunningham, Trinity College, Hon. Sec., before the end of October, 1884.

They also intend to organise a Conference, in which it is hoped that artisans and co-operators will be largely represented, as well as employers of labour and persons interested in the study of social problems; at this Conference such points as the following will be brought forward for discussion:—

1. The existing system by which the products of industry are distributed.
2. Do any artificial and remediable causes influence prejudicially
   (*a*) The stability of industrial employment?
   (*b*) The steadiness of rates of wages?
   (*c*) The well-being of the working classes?
3. How far, in what manner, and by what means would the more general distribution of capital or the State-direction of capital, contribute, or not contribute, to
   (*a*) An increase in the products of industry?
   (*b*) The well-being of the classes dependent upon the use of capital? (Co-operative production, profit-sharing, &c.)
4. How far, in what manner, and by what means would (1) a more general ownership of land (peasant proprietorship), or of an interest in land (tenant right); or (2) the State-ownership of land conduce, or not conduce, to
   (*a*) The increased production of wealth?
   (*b*) The welfare of the classes affected by the change?
5. Does existing legislation, or the incidence of existing legislation, affect prejudicially
   (*a*) The production of industrial wealth?
   (*b*) The well-being of the classes engaged in the production?
   (*c*) The natural or the most beneficial distribution of the accumulating products of national industry (including Succession Duties, Friendly Societies, Insurance, &c.)?

Can any of these be promoted by changes in existing legislation or taxation?

They intend to arrange for one or more papers on each subject, and addresses from one or more selected speakers, and hope to have also short speeches from those members of the Conference who have special knowledge on any particular point raised in the papers.

Trade societies, or other bodies desiring to be represented by delegates at the proposed Conference in January, 1885, and authors who may desire to contribute papers, or to furnish statistical information bearing on these subjects, are requested to communicate with the Rev. W. Cunningham, Trinity College, Cambridge, before November 1st, 1884."

## IMPROVEMENTS IN STOCKHOLM.

FROM the office of the Grand Governor at Stockholm a report has been issued on recent improvements effected in that city. In the first place, as to the Northern Ethnological Museum, it is pointed out that this valuable and interesting collection has hitherto been located in the principal street of Stockholm, where, for want of a suitable building for its reception, it has been divided amongst several small low houses adjoining each other. A grant of land for the erection of a permanent museum has been made by the Crown in the Royal Park, called Djurgarden, just outside the town, and five prizes have been offered for competition amongst native and foreign architects, who have thus been encouraged to send in plans. The first prize (1,530 kronor) has been taken by a Karlsruhe architect, an extra prize of 1,000 kronor being awarded to one at Dusseldorf. The museum already possesses a building fund of 100,000 kronor, but much more is required for the handsome edifice which it is intended to erect, and public appeals are being made for contributions.

In regard to general improvements in Stockholm, it may be noted that in 1876 the total length of the streets of that city was 38,420 Swedish feet; in 1881 it had increased to 389,878 ft., or over sixty-five English miles, and considerable sums have been expended yearly in repairing old streets. The result has been that unsightly and disagreeable cobble paving stones have nearly disappeared, and have been replaced either by cut stones or by Macadam and asphalte. The cleaning of the streets is, moreover, greatly facilitated by these changes, and a general improvement in their appearance is already discernible. The water supply has also increased considerably since 1876; the pipes have been lengthened from about forty miles to sixty miles, and two new reservoirs have been erected in the north of the town, and hold very large quantities of

water. The drainage of Stockholm has likewise undergone great improvement. Not long ago all the liquid sewerage of the town was carried away by open gutters; the streets became consequently impregnated with impurities, and the air filled with poisonous evaporations during winter months; the gutters, moreover, froze, and great expense had to be incurred in keeping them free of ice. After the improvements introduced in the Stockholm waterworks, plans have been made for adopting the self-cleansing system of underground drainage, through glazed earthenware pipes.

The progress of these works has been very slow, as nearly the whole of Stockholm is built upon solid rock, but most of the principal, and all the new streets of the town are drained on the new system. Formerly the landlords were responsible for the scavenging of those parts of the streets which were opposite their houses, but this old custom has been entirely done away with in the chief quarters of the town since the formation of a scavenging company, and the cleanliness of the streets has yearly improved. The town has also been considerably embellished during recent years by improvements in the public squares and gardens. Those especially worthy of notice are the gardens of Humlegarden, which now form one of the prettiest and most agreeable quarters of the town. They were formerly used as royal pleasure gardens, and were not open to the public until 1820. The grounds then fell into disorder, and became the haunt of low and disreputable people. In 1870 the municipality, after repeated appeals, succeeding in renting the ground from the Crown, and in 1877 they were presented to the city by the King. Since then Humlegarden has undergone extraordinary changes, and is now a great ornament to the town, and is situated in the centre of the new quarter which has sprung up within the last ten or twelve years.

## THE DOME OF ST. PAUL'S.

Sir,—No one, I think, can contemplate the dome of St. Paul's at the present moment without concurring in your opinion that Thornhill's work is, in the main, the proper thing:* it is simple and grand in its arrangement, and hits the *vil media* between the project of an open empyrean flecked with clouds and angels, setting no limits to a dome as an architectural feature, and the other extreme of cutting it up into panels and plaques. There can be no doubt that architectonic decoration,—the application of art to public buildings,—is a *métier* in itself over and above that knowledge and technical skill essential to the success of a painter of easel pictures. Thornhill had had considerable experience in that kind of work, although his art was by no means of transcendent quality. Moreover, as Wren's intimate and colleague, his design for the dome must have had Wren's approval and sanction. This is an important consideration. There is another point, too, that ought not to be overlooked, viz., that both the architect and the painter would, if time had permitted it, have introduced colour into the decoration of the dome. It appears to me, therefore, that the right mode of bringing the decoration of this portion of the cathedral to completion would be to translate Thornhill's figure-subjects into colour, and to introduce gold grounds for the open sky spaces in those designs. This treatment would, in its results, produce a magnificent effect,—an effect that, I would venture to affirm, would be unrivalled by the decorations of any other church in Christendom. In graciously and modestly consenting to be yoked to Stevens's car, in the present experiments, the two eminent painters have manifestly done themselves an injustice. They would have succeeded perfectly, in all probability, if they had been untrammelled and left free scope.

There is another matter with respect to the embellishment of the interior of St. Paul's that requires reconsidering. It is questionable whether that extensive picking-in of mouldings and other ornaments is compatible with the grand style of ecclesiastical decoration, more especially when pictorial art is to be extensively adopted. In this case gold should only be used in large spaces, as grounds. The picking-in method is more appropriate to palatial decoration. Neither should the native stonework of the edifice be too much overlaid with colour and ornamentation, as its calm grey would form an admirable setting to the pictorial decorations. In the best works of Italian mural art the great painters had a keen sense of the value of plain spaces,—of intervals of repose.

W. Cave Thomas.

* We did not quite say that; we said that of the three designs now visible it appeared to us the best in general character for that kind of treatment,—*i.e.*, dividing the dome by vertical divisions. This, of course, only in regard to general design: we neither want Thornhill's detail nor his dingy monochrome tone.—Ed.

## PARTY WALL.

Sir,—May I trouble you with the following question? A row of houses was built some thirty years ago on lease, having at the back a boundary-wall delineated on plan in the lease. A year or two afterwards the vacant land at the back was also built on, the above wall forming the boundary of the second owner's property. Leaseholder No. 1 desires to protect what he considers his wall from trespass, by adding a ridge to the flat top of the wall, but No. 2 objects that he has a right in the wall, and will remove anything that No. 1 may put upon it, although what was intended would prevent decay of the wall as well as the trespass complained of. To whom does the wall belong? Or can No. 2 interfere with the supposed right of No. 1 to do as he pleases?

A Leaseholder.

*** No. 1 can make any alterations in the wall that are in conformity with the Building Act, subject only to obligation to make good any damage done to the adjoining owner's premises during the alterations.

## RESPONSIBILITY FOR ACCIDENTS TO WORKMEN.

Sir,—Can any of your correspondents say who is responsible for accidents to workmen? An employer (not a builder or contractor) providing scaffolding and material, or a contractor for labour to brickwork at per rod?

Surveyor.

## PROVINCIAL NEWS.

*Berkhamstead.* — The new building lately erected from the designs of Messrs. Batterbury & Huxley, architects, of Berkhamsted and John-street, Bedford-row, London, for the London and County Banking Company (Limited), has been opened for business. The work was carried out by Messrs. Taylor & Grist, builders, Aylesbury.

*King's Lynn.*—The King's Lynn Board of Guardians have resolved to take immediate steps to carry out entirely new drainage and sanitary arrangements for their workhouse, as designed by Mr. E. G. Mawbey, the borough engineer, the plans having received the approval of the Local Government Board. The system of drainage is, as far as possible, provided with means of inspection, ventilation, and automatic flushing.

*Nottingham.*—A new reservoir at Mapperley Plains, in connexion with the water supply of Nottingham and surrounding district, has recently been opened. Its interior measurement is 150 ft. by 150 ft., and it will hold about 1,500,000 gallons of water. From the floor to the overflow is 13 ft. There are 212 supporting arches which divide the whole of the interior into fourteen bays and fourteen principal arches. The walls, which are 4 ft. 3 in. thick at the bottom and 2 ft. 3 in. thick at the top, are backed by a battering of clay, varying from 2 ft. 6 in. to 7 ft. 6 in. thick, so as to render the surroundings perfectly water-tight. The first 7 ft. from the foundation upwards is built in Portland cement mortar, and the whole of the remainder of the work, with the exception of the principal arches, is built in ground hydraulic mortar. The floor is composed of concrete, 9 in. thick, and underneath this is 15 in. of clay on the top of the virgin foundation. The surface of the concrete is finished off with a coating of pure cement, which really forms the floor of the reservoir. The arches of the reservoir are covered over with punned clay, 18 in. thick, and above this there is 12 in. of soil. There is a system of ventilation by means of fourteen specially manufactured ventilators, and by this means the air finds continued access to the surface of the water. To give an approximate estimate of the magnitude of the undertaking it may be mentioned that 1¼ million of bricks have been used; from 250 to 300 men have been employed, and about 120 horses and carts have been in requisition. The work has been carried out under the direction of Mr. Tarbotton, chief engineer to the Corporation, and his assistant, Mr. Wharton, Mr. Phillips acting as clerk of the works. The contractor was Mr. T. Smart, of Trent Bridge, who completed his contract a month under the specified time. The bricks used are hand made, and are from the works of the Nottingham Patent Brick Company, and all the "springers" and "stops" are specially made bricks. The clay "puddle" has all been supplied from the best beds of Bulwell clay. The reservoir, which has cost something less than 6,000*l.*, is intended to supply Carlton and Netherfield, and from its elevated position will improve the high level supply of the borough of Nottingham.

## CHURCH BUILDING NEWS.

*Liverpool.*—St. Dunstan's Church, Edge Hill, is about to be commenced, from designs prepared by Mr. H. Roumieu Gough, F.R.I.B.A. The building will be a large and important one, affording accommodation for upwards of 800 worshippers, the estimated cost of the fabric being 8,000*l.*, while the furnishing, including altar and reredos, font, lectern, choir-seats, litany-desk, stained glass, organ, clock and bells, &c., most of which are already promised, will probably bring up the total cost to nearly 12,000*l.*

*London.*—The new church of St. Michael and All Angels, Stoke Newington Common, is being built on a fine site at the fork of the Fountayne and Northwold roads, facing Stoke Newington Common. The church as designed consists of nave, chancel, north and south aisles, morning chapel, organ-chamber, vestries, and tower and spire (the latter to be built at a future time). It is being built with red brick facings outside, and plastered inside, with red brick quoins, jambs, and arches. For the work usually executed in stone the Albion Concrete Company's cast concrete is being used, except for the columns, which are of Sumsion's Bath stone. The church is to seat 750. The contract for the church, exclusive of tower and spire, is 5,242*l.* It is being built from the designs and under the superintendence of Mr. J. E. K. Cutts. The builders are Messrs. Holliday & Greenwood.

*Peel (Isle of Man).*—The new church at Peel, Isle of Man, was opened on the 25th ult. by the Archbishop of York, who spoke of the new building as being "possibly the future cathedral of the diocese." The church, which is cruciform in plan, consists of a nave, 96 ft. by 21 ft.; north and south aisles, 70 ft. by 12 ft.; north and south transepts, 32 ft. by 24 ft.; chancel aisle, 23 ft. by 17 ft.; chancel, 38 ft. by 21 ft.; organ-chamber, 18 ft. by 18 ft.; vestry, lavatory, meter-room, north and south porches, and tower. It is of the Early Decorated style of Gothic architecture, boldly and freely treated. The walls are composed of the Peel red stone, in courses of varied thicknesses, and the whole of the dressings to windows and doors, also the quoins, tracery, spire, and other dressed work are of red sandstone, from the quarries of Mr. Guest, of Runcorn. The interior stonework is also of red Runcorn sandstone. The lower portion of the tower serves as a porch, which forms the principal entrance to the building. Immediately above this, and approachable by a winding staircase, is the ringing-floor; and above, at an elevation of about 50 ft. from the ground, is the belfry, which contains a peal of eight bells from the works of Messrs. Warner, bell-founders, London. The tower rises to a height of 70 ft., and is 18 ft. square. The tower is surmounted by a spire, which, when finished, will rise to a height of 86 ft. above the square of the tower, and a wrought-iron vane will add 8 ft. more to this height, making a total of 164 ft. above the ground level. The roofs externally are surmounted by red ridge tiles. The whole of the interior fittings are of pitch-pine, stained, and polished. The roofs are open-timbered, and also of pitch-pine. The chancel roof is wagon-headed, with the interior panels of pitch-pine. The whole of the glazing was executed by Mr. T. Holt, of Liverpool. The church is warmed by the hot-water system of Mr. George Kneale, of Liverpool. The whole of the carving was executed by Messrs. Norbury & Co., of Liverpool. The encaustic and tile-work has been executed by Messrs. Chantrell & Son, of Liverpool. The font is of Caen stone, supported on marble columns, and stands at the west of nave in the centre. The pulpit is of Caen stone, with bands of red sandstone,

with marble shafts and carved panels and spandrils. The reredos is of Caen stone also, with richly diapered panels, gilded on the main lines. The reading-desk is of oak. The gas-fittings were executed by Mr. A. Bucknall, of Liverpool, and are a very good sample of art-metal work. The fixing of these, as well as the gas and water mains, was entrusted to Mr. Kermode, of Peel. The fittings of the church have already been mentioned in these columns. The contract was taken by Messrs. D. Anderson & T. Radcliffe, of Peel, Mr. Clague being the foreman mason. The architects are Messrs. Thomas D. Barry & Son, of Liverpool.

*Darwen.*—The new Mission Church of St. Barnabas, in the Culvert District of St. John's Parish, Darwen, has been opened. The church is simple in outline and construction, being under one continuous roof; breaks in the outline being obtained by the reduced widths of the eastern and western bays forming the sanctuary and baptistery respectively,—by continuing the roof over the projecting porch and vestry,—and by a large gabled dormer on each side. The total width inside is 31 ft., and the total length from west to east wall 101 ft. The height to the wall-plate of the nave being 14 ft. The roof, which is covered with green slates, is framed with collar-beam principals with moulded curves, the one over the entrance to the chancel and the remainder of the chancel principals being marked by posts carried down to the floor, betwixt which are framed the balustered screens which partition off the chancel from the organ-chamber on the north side and the vestry on the south side. The walls are built of local stone, faced outside with broken-coursed rubble, and on the inside with Bolton pressed red brick, pointed. The passages are laid with flags, and the chancel with simple patterns of plain and stamped tiles. The windows are of wood with wood casements glazed with lead-lights, except the east window, which is of stone. The nave seats are of pitch-pine, varnished, and the chancel stalls are of yellow pine, painted, as also are the pulpit, altar-rail, and lectern. The font is of Halifax sandstone. There is an open-framed bell-turret on the ridge of the roof close to the west wall. The heating is effected by hot-water pipes and coils on the low-pressure system, the engineer being Mr. C. Seward, of Preston. The architectural style is Gothic in character, and the aim has been to adapt the principles of ecclesiastical architecture to the simplest forms of construction, and at a very low cost, the cost per sitting being under 3*l.* The total accommodation is 350. The contractors for the various works, who are all of Darwen, were as follow:—Messrs. J. Orrell & Sons, masons' work; Mr. L. R. Marsden, joiner's work; Mr. Holden Baron, slater's work; Mr. R. Jackson, plasterer's work; Mr. H. C. Jepson, plumber and glazier's work. The architects are Messrs. Paley & Austin, of Lancaster.

*Old Shoreham, Sussex.*—Certain alterations to the ancient Parish Church of Old Shoreham, Sussex, are in contemplation. Plans and estimates have been submitted by Mr. Arthur Loader, architect, of Brighton.

## DISSENTING CHURCH-BUILDING NEWS.

*York.*—The new Wesleyan chapel in Clarence-street was opened on the 13th ult., by the Rev. F. Greeves, D.D., president of the Wesleyan Conference. The chapel is in the Italian style, and is built of pressed bricks, from Messrs. Williamson's, near Hull, with stone dressings from Bradford. The columns of the portico are of polished grey granite. The interior is fitted up throughout in varnished pitch pine. The ceiling is divided into panels, and enriched with ornament. The organ recess has Corinthian pilasters and enriched entablature. A portion of the windows are of stained glass, by Messrs. Winfield (late Camm Bros.), Birmingham. Accommodation is provided for 830 persons, including free seats. There are also four large vestries or classrooms. The total cost of the building, exclusive of boundary-walls, has been about 3,000*l.* The contractors are Mr. Swalwell for stone and brick work; Messrs. Bellerby for painting; Messrs. Walker for heating, all of York. The joiners' work has been executed by Mr. Deacon, of Shipley; the plasterers' work by Mr. Dixon, of Bradford; the plumbers' work by Mr. G. Thompson; and the slaters' work by Messrs. Pycock, both of Leeds. The gas-fittings and railings have been supplied by Messrs. Freeman & Collier, of Manchester; the ventilation by Messrs. Hill & Hey, of Halifax; and the carving by Mr. R. Boys, of Leeds. The architect is Mr. W. J. Morley (now Morley & Woodhouse), of Bradford and Bolton.

*Freckleton (near Preston).*—Memorial-stones of a new Wesleyan chapel were laid on the 30th ult. The chapel will accommodate 275 worshippers, and the style adopted is English Renaissance, the materials employed being patent bricks and Longridge stone. A new Sunday school, in connexion with the above chapel, was opened on the 31st ult. The entire cost will be about 1,500*l.* The architect is Mr. David Grant, of Preston.

*Douglas (Isle of Man).* — The foundation-stones of a new Wesleyan chapel here were laid on the 27th ult. The building will occupy a position at the angle formed by Rosemount and Buck's-road. The tower is placed at the corner of the site. Galleries are carried round three sides of the chapel, and the total accommodation is for about 900 worshippers. The building has been designed in the style of English Gothic which prevailed about the end of the thirteenth century, by Messrs. William Waddington & Son, architects, of Manchester and Burnley, under whose supervision the various works will be carried out by Messrs. Kelly & Preston, contractors, of Douglas. The cost of the chapel, omitting the higher stages of the tower and the spire, will amount to 6,000*l.*

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—XI.

### THE RENAISSANCE.

EXCEPTING in Oriental nations, it would appear that human nature cannot exist without change of fashion, or, rather, it cannot resist the temptation of following such a change when it has been set in headquarters. Now, Italy was, at the time that we reached in the last article, the spiritual as it had once been the imperial capital of Europe, and in Italy there was, about the middle of the fifteenth century, a revival of classical literature.

Fergusson has written, as a companion to his Handbook, a "History of Modern Architecture," 1862, 1 vol. 8vo., in the introduction to which he remarks that, although the great bulk of the clergy throughout the whole of the Middle Ages could read Latin with facility, it was not till the age immediately preceding the fall of Constantinople that the existence of the great literature of Greece became known in Western Europe; but when Petrarch and Boccaccio first became acquainted with its beauties, they naturally lauded their discovery to the skies, and incited those who could not read Homer and Demosthenes in the original Greek to study their echoes in Virgil and Cicero.

Then this revival of letters opened the eyes of the Italians, and especially the Romans, to the beauties of the equally ancient architecture in their midst. And it was but natural that they should crave for a return to this their natural style; and so the fashion was set.

As opposed to stagnation, change is healthy; and up to this time the continuous changes that we have been watching were the results of gradual progress,—attained by *general* as opposed to *individual* efforts,—in working out the problems of building, as they successively arose. Fergusson calls these results the true styles of architecture; all those subsequent to the Renaissance, or new birth, of Classic art he calls the copying or imitative styles.

Even in these, however, a distinction is to be noticed. Up to the beginning of the present century Classic art was *adapted*, or diluted; since then both Classic and Gothic have been *adopted*, or swallowed whole. Fergusson distinguishes these two systems as the Renaissance and the Revival respectively of former styles, and it must be admitted that he takes a pessimist view of both, so that there is not much consolation to be derived from his pages. More hopefulness may, however, be permitted to practising architects than to even such an eminent critic as he is.

To begin, then, with the Renaissance in Italy, it will be easily understood that the seed fell on very receptive soil, as the Italians had not shown very much sympathy with Gothic art; but, even during the eleventh century, produced such churches as St. Miniato at Florence, which, says Fergusson, are more Classical in plan, and,—as their ornaments are generally borrowed from ancient buildings,—far more so in detail than many of the buildings of the Renaissance period. That, however, which distinguishes Renaissance buildings is their being *wilful* adaptations of past styles and being the production of *one* individual mind, and of that mind only. The consequence is that we shall now come across a multitude of names of men as well as of buildings, or portions of buildings, So-and-So having designed one part and So-and-So another part.

The first of these architects that we read of is Brunelleschi, born at Florence is 1377, died 1444. He found a job ready to hand in the completion of the great octagon of the cathedral. No drawings had been prepared for this, though probably it would have been completed by a series of retreating stages like that at Chiaravalle (Fergusson's Handbook, page 775), a form which, in fact, survived in many Renaissance churches (see Strack's and Laspeyre's works on Italian churches), but our architect was fired with the desire to do something quite different; so off he went to Rome to study "the antique," and on his return in 1420 erected the huge dome that is illustrated on page 121 of Smith's "Gothic and Renaissance." Another famous example of his work in Florence is the Church of St. Spirito, illustrated in plan and section by Fergusson ("Modern Architecture," pp. 41, 42), in which we find a fragment of the entablature placed on each column under the springing of the pier arches, a custom which became common, and which Fergusson deplores, as it was a return to a meaningless feature which had been carefully avoided in the buildings of the fifth and sixth centuries.

Besides churches, Brunelleschi appears to have designed,—or to have been consulted about the Riccardi Palace (1430) and the Pitti Palace, both at Florence. These are illustrated by Fergusson (page 84) and Rosengarten (page 379). The somewhat similar Strozzi Palace, designed by Cronaca, 1489, is illustrated by Smith on page 169, as well as by Rosengarten, and all these palaces have a strong family likeness. There is a good deal of "rusticated" walling about them, their windows are "two-light," comprised under a partly pointed arch, and are, so far, Gothic; but these palaces finish up with a huge classical cornice, that is well-proportioned to the height of the wall. The next palace illustrated by Fergusson, namely, the Rucellai, designed by Alberti in 1460,—therefore rather earlier than the Strozzi,—exhibits the introduction of the Classic orders, which became the bugbear of so many Renaissance architects. They could not tear themselves away from their tormenting rules, and their chief ingenuity is displayed in making the best of them. For instance, Sansovino may be said to have "scored" when he surmounted two stories of orders with an entablature proportioned to the two together, in the Library of St. Mark at Venice, from which our Carlton Club is copied; and Palladio, who is looked upon as such an authority as to have "Palladian architecture" named after him, obtained another brilliant victory over two orders which had to be respectively adapted to the lofty nave and lower aisles of St. Giorgio Maggiore at Venice. This *coup de grâce* consisted in raising the latter order on pedestals (see Fergusson's "Modern Architecture," page 75). This same master, however, is responsible for what Fergusson selects on page 28, as an example of all that is abominable, namely, the Valmarina Palace, Vicenza, where a five-storied building is intended to look like one great hall, by means of one huge order, which is "treated" in various artful ways, but without success.

The same use of a gigantic order is found at St. Peter's at Rome, a building which passed through the hands of several designing architects. First of all, Pope Nicholas V. began, from the designs of Rosselini, an enormous building, which, however, was only raised a few feet out of the ground when the Pope died in 1454; and the matter rested till Pope Julius II. instructed Bramante to proceed with the building, and a foundation stone was laid in 1506. On the death of this pope in 1513, and of his architect the next year, Raffaelle, better known as a painter, was called in; it was then found that Bramante's piers were not strong enough for their work; Raffaelle died in 1520, apparently without having forwarded the building,

and was succeeded by Baldassare Peruzzi, who altered the design for the building from a Latin to a Greek cross, but died in 1536, before much was done, and was succeeded by the celebrated Antonio San Gallo (not to be confused with Giulio di Sangallo), who made an excellent design, illustrated by Fergusson on page 56, but who had to devote all his time to remedying the defects in construction introduced by his predecessors; and, on his death in 1546, the control of the works fell into the hands of the great Michelangelo, to whom we certainly owe the form of the dome, and probably the ordinance of the whole interior. However, he left the building unfinished, and on his death in 1564, Fontana proposed certain alterations, and it was suggested that the Latin cross plan should be reverted to. This was finally carried into effect by Maderno, and thus the main building was complete. About the year 1661 Bernini added the piazza, with its circular porticos and fountains.

This history of St. Peter's well exemplifies the recognition of the several designers of Renaissance buildings or portions of buildings, and the importation of a *personal* element into the work, and must serve as a sample of the numerous architects employed in and about Rome. The best special work to study on this subject is Letarouilly's "Édifices de Rome Moderne," 1840, 3 vols. fol.

For the buildings in Florence, some of which have been mentioned, the student should consult a work by Gauthier, and mark the distinction between the styles in the two cities.

This same author, Gauthier, has produced a fine book on the very distinct work to be found in the hill-side city of Genoa, "Les plus beaux Édifices de la Ville de Gènes et de ses Environs," 1818, 1 vol. folio. In this book the skilful adaptation of Classic work to the peculiarities of the site will excite admiration. The staircases rising from the street-front level of some of the palaces, and thence to internal landings, and thence again to the back, where they are seen emerging on to hanging terraces and gardens, and all contrived apparently without effort or hitch in their dignified architecture, have been called by Professor Roger Smith the "very poetry of planning."

Venice, again, has its special author, Cicognara, who published a fine work on the buildings of that city in 1838, 2 vols., folio. Here, again, the peculiarities of the site have wrought their influence on the building. There have been many beautiful predecessors in the Mediæval palaces, with their traceried fronts, so enthusiastically dwelt upon in Ruskin's "Stones of Venice." This lightness of treatment survives in the Vendramini Palace, illustrated on p. 93 of Fergusson's "Modern Architecture," and there is a playfulness of outline in most of the Renaissance buildings here, contrasting pleasantly with the more formal buildings of Rome.

For the building of Lombardy, Paravicini's folio work should be studied. In Milan, Bramante's so-called dome of Sta. Maria delle Grazie is a very refined piece of architecture, untroubled by colossal orders; and there is the Great Hospital, begun in 1456 by Filarete, and continued by Bramante, whose design was finally completed by Richini in 1621. The chief beauty is in the internal courtyards, consisting of two stories of arcades, supported entirely by columns, without any alternating piers.

Mantua has its Palazzo del Té, of which not only the architecture but the painted decorations were carried out by Giulio Romano and his pupils. The subjects selected for these fresco paintings mark the complete change that had come over popular taste since the days when Giotto painted the chapel of the Arena at Padua. If a knowledge of classical mythology be urged as an excuse for them, they are hardly worth the excuse. However, these articles are on architecture, and not on morality.

At Turin, one of the earliest architects we read of is Guarini (born 1624, died 1683), by whose time architecture had become theatrical in its style.

At Naples, the Caserta Palace, by Vanvitelli, is the largest and most nobly decorated palace executed in Italy since the Renaissance, but it will be seen from Fergusson's illustration, p. 128, to be extremely monotonous.

In the next article, the more interesting combinations produced out of Italy by the new style will be considered.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*Aug.* 29.—11,764, H. E. Clark, London, Manufacture of Fire-guards, Window-blinds, &c.

*Aug.* 30.—11,782, J. Hall, Sheffield, Automatic Whitewasher for Ceilings.—11,814. H. R. Butson, London, Lavatory Apparatus for Schools, Barracks, Prisons, &c.—11,822, G. D. Peters, London, Window-sashes.

*Sept.* 1.—11,849, S. Lloyd, London, Folding Firelighters.

*Sept.* 2.—11,867, R. H. Holme and U. F. Arveschoug, Newcastle-on-Tyne, Tipping Ash-pan.—11,889, A. Mackie & J. Mackie, London, Ventilation of Buildings.—11,890, W. H. Page, London, Construction of Buildings.

*Sept.* 3.—11,919, W. H. Blackwell, Manchester, Sashes for Windows.—11,926, G. Cresswell, Brighton, Water-closets and Urinals. 11,931, W. Morrison, New Swindon, Chimney-top.—11,957, S. D. Pochin, London, Iron and Concrete Structures.—11,960, H. T. Crewe, London, Glazing Roofs, &c.

*Sept.* 4.—11,983, C. J. Henderson, Edinburgh, Warming and Ventilating Buildings.—11,990, R. C. Jones and J. W. Cunningham, London, Sash-fasteners.—11,996, J. Hitch, London, Water Supply to Closets, &c.—12,007, W. Saunders, London, Fastener for Stair Carpets.—12,008, E. Edwards, London. Artificial Stone. Com. by T. Grundmann, Hirschberg.

### SPECIFICATIONS ACCEPTED.†

*Sept.* 5.—2,045, J. Lowley and J. Harold, London, Opening and Closing all the Bolts of a Door simultaneously.—7,305, D. H. Brandon, London, Fire- and Water-proof Material for Roofing, &c. Com. by D. A. Brown, Boston, and C. F. Brigham, Worcester, U.S.A.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

## Miscellanea.

**The New Dock and Railway Works at Preston.**—The contract for the new dock works at Preston, and the improvement and deepening of the channel of the river Ribble, from Preston to the point where it falls into the Irish sea, which has just been entered into with the Corporation by Mr. T. A. Walker, of Great George-street, Westminster, will in a few weeks give employment to a large number of labourers and artisans, as it is intended at once to enter upon the varied works included in the contract both at the Preston end, and also along the channel to the mouth of the river, a distance of fourteen miles. Mr. Walker's contract amounts to 439,359*l.*, which includes the diversion of the river at Preston for about a mile in length; the construction of a river-entrance from the docks, with entrance-gates; a tidal basin four acres and three quarters in extent; locks and lock gates; a main dock of forty acres area; together with the construction of training walls along each side of the channel of the river from Preston to the river mouth. The contract is to be completed within a period of five years, or by the 1st of July, 1889. This contract, large as it is, does not include the whole of the intended works under the Act of Parliament which the Corporation have obtained. The dredging of the river will be carried out by the workmen of the Corporation, whilst in addition to Mr. Walker's contract a timber-pond of 25 acres is to be constructed, also graving-docks, coal tips, four large warehouses, hydraulic machinery, and railways round the docks and quays, the aggregate cost of the undertaking when finally completed being estimated at little short of 1,000,000*l.* The width of the proposed new channel at its narrowest point when entering the dock basin and dock at Preston is intended to be 60 yards at the bottom of the slope, with 30 ft. of water at high water spring tides, and 36 ft. of water over the bar at the mouth of the river. Simultaneously with the carrying out of the works, the construction of a new railway from Wigan and Longton to Preston, to be connected with the docks, and also the authorised railway from Preston to Lytham and Blackpool, with a station at the docks, are also to be proceeded with, and it is estimated that the united cost of carrying out these several works during the next three or four years will be upwards of 1,500,000*l.*

**The Edinburgh Improvement Trust.**—At a meeting of the Edinburgh Improvement Trustees on Tuesday last, the Works Committee recommended that Mr. James Lessels be appointed architect to the Trust, in room of his late father, at the salary of 75*l.*

**Protecting Timber from the Ravages of Marine Animals.**—At the International Forestry Exhibition, Edinburgh, on Tuesday last, Professor M'Intosh, of St. Andrews, delivered a lecture on "The Boring of Marine Animals in Timber, &c." Alluding to the methods of protecting submarine timber from the ravages of such animals, the professor said different kinds of wood were mentioned as being impenetrable by such boring action, but so far none had been successful. There were many preparations for the treatment of the wood before immersion. Soluble bitumen, silicated lime, and various compositions, had each in turn been tried externally; while silicate of lime, creosote, and other fluids had been forced, under great pressure, into the tissues of the woods. The experiments of the Dutch Commissioners, who investigated the matter, had led them to the conclusion that no external protection other than metallic sheathing or the studding of the wood with broad-headed nails would be successful in resisting the attacks of these borers, while the only impregnation they found reliable was creosoting. In conclusion, Professor M'Intosh pointed out that while the Dutch, French, and other Commissions had done material service in regard to the best means of protecting timber from the attacks of borers, the subject was by no means exhausted. On the contrary, it would form a fitting object for research at the marine laboratories, which at last, he was glad to say, were being established on our coasts.

**Liverpool Labourers' Dwellings Company, Limited.**—Mr. Charles T. Bowring presided on Wednesday at the thirteenth annual meeting of the Liverpool Labourers' Dwellings Company, Limited, held in the company's offices, Union Bank-buildings, 5, Fenwick-street. The report of the Directors, which was unanimously adopted, stated that the demand for cottages had fallen off, and many cottages having remained empty, the rents were considerably reduced; but, although this was done, the directors were glad to state that the gross rents received only showed a diminution of about 10*l.* as compared with last year, and the cottages had been better tenanted. The expenditure showed a decrease of about 30*l.* as compared with last year. The net profit on the year's working was 515*l.* 4s. 6d., and adding to this sum the amount carried forward from last year, 11*l.* 4s. 4d., there was a sum of 526*l.* 8s. 10d. available for dividend. The directors recommended that a sum of 496*l.* 4s. be applied to the payment of a dividend at the rate of three per cent. per annum, and that the balance of 30*l.* 4s. 4d. be carried forward to next year.

**New Bank Buildings and Shops at Camberwell.**—The London and South-Western Banking Company are erecting a new bank, together with a block of shops, on a portion of the vacant land resulting from the widening of Church-street, Camberwell. The bank buildings are situated in a prominent position immediately opposite Camberwell-green, having a main circular frontage to the green, with an extensive return frontage in Wren-road, 80 ft. in length. The building is faced with Portland stone, rusticated, with an arched entrance in Shap polished granite, at the corner of Church-street and Wren-road. Each floor contains ranges of lofty arched windows with moulded and carved keystones. The four shops, in continuation of the bank buildings eastward, are carried up to the first floor with rusticated Portland stone piers, uniform with the bank, the upper portions of the frontage being in red brick with Portland stone dressings. Messrs. J. & J. S. Edmeston are the architects, and Mr. G. Kynock, of High-street, Clapham, is the contractor, his contract amounting to 11,748*l.*

**Geneva.**—A Munich window has lately been erected at the east end of the Church of the Holy Trinity, by Messrs. Mayer & Co. It represents in the centre the Crucifixion, on the left the Holy Women at the Sepulchre, and on the right Christ consoling the Women on the way to Calvary. This work is placed in memory of Mr. Henry Christopher Schaëf, of Moinex, Haute Savoie.

**An Electric Brake.**—A trial of the Walcker electric brake, which is in use in America, was recently made on the tramway between Turin and Piossasio. It is stated that by its means two cars running at a speed of 35km. per hour were stopped in six seconds, and within a distance of 18m. The brake is being shown at the Turin Exhibition.—*The Electrician.*

**Franciscan College and Monastery at Peckham.**—Adjoining the large Franciscan Church in Peckham Park-road, which was erected a few years ago from designs by Pugin, a new college and monastery, now in course of erection, is fast approaching completion. The building is situated at the north-east side of the clergy-house, connected with the church, and has three main frontages. The principal frontage in Peckham Park-road is 70 ft. in length and 80 ft. in height, containing four floors above the ground line. The materials of the elevation are malm brick, with Corsham stone for cornices, strings, window-dressings, weatherings, and chimney-caps. The whole of the basement is arranged for the *cuisine* department of the college. The ground-floor contains, on one side of the corridor, the refectory, an apartment 20 ft. square, whilst, on the opposite side of the corridor, is the library; and, in continuation, on each side of the corridor, are the students' rooms. The first floor also contains students' rooms on each side of a corridor as in the ground-floor below. The upper floors contain the dormitories. Mr. Burns, of Liverpool, is the architect, and Mr. F. Doherty, of Leyton-square, Peckham, is the contractor. The cost of the college will be about 4,000*l.*

**The London Tramway Company's New Depot at Peckham.**—On the south side of High-street, Peckham, bounded on the east by Rye-lane, the London Tramways Company are constructing an extensive new depôt, which, with the exception of their terminal establishment at Greenwich, will be the largest of the kind belonging to the company. The site upon which the new buildings are being erected forms a portion of the ancient Basing Manor estate. The property purchased by the Tramway Company for the depôt includes the old Manor House, adjacent to the High-street, which, subsequently to the estate being sold by the Gardyner family, as lords of the manor, was occupied as a public school. Amongst other property acquired by the company are a number of rickety hovels on the east side of Basing-road, the demolition of which, on sanitary grounds, is very desirable. The depôt will cover an area of between two and three acres, with an approach from High-street about 150 ft. in length. The erection of the stables, which are intended to have stalls for about 200 horses, is now in progress, as well as sheds for the cars.

**Open Spaces.**—We hear that the National Footpath Preservation Society will advocate the purchase of land near towns and villages for public recreation-grounds; and we understand that the Town Council of Lancaster have just paid 5,650*l.* for the purchase of the Giant Axe Field for the benefit of the town. We should like to know the acreage.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Schools | Egham School Board | 25*l.*, 15*l.* | October 11th | i. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Two Schools at Newhaven | Newhaven School Brd | Geo. Fuller | Sept. 16th | xviii. |
| Brick and Pipe-Sewers, &c. | Willesden Local Board | *Official* | do. | ii. |
| General Paving Works | Westminster B. of Wks. | do. | Sept. 17th | ii. |
| Gasfitter's Work | Com. of H.M. Works... | do. | do. | ii. |
| Bellhanger's Work | do. | do. | do. | ii. |
| Girders, &c. for Bridge | Midland Railway Co. ... | A. A. Langley, C.E. ... | Sept. 18th | ii. |
| Coffee Hut, Derby | do. | do. | do. | ii. |
| Mess-room, &c. Normanton | do. | do. | do. | ii. |
| Waiting-room, Cudsworth | do. | do. | do. | ii. |
| Wagon Shop, Grimesthorpe | do. | do. | do. | ii. |
| Painting, &c., Kettering Station | do. | do. | do. | ii. |
| Timber | Dartford Union | ..... | Sept. 19th | xviii. |
| Granite | do. | ..... | do. | xviii. |
| Public Hall and Coffee-Tavern, Greenwich | ..... | W. Rickwood | Sept. 20th | xiii. |
| Public Library, &c. | Swansea Corporation... | H. Holtom | Sept. 22nd | xiii. |
| Repairing Parapet Walls | St. Marylebone Grdns. | H. Saxon Snell & Son | do. | xviii. |
| Making-up Roads | Hornsey Local Board | T. de Courcy Meade, C.E | do. | xiii. |
| Re-erection of Stables, &c. | Liverpool Corporation | *Official* ..... | do. | xiii. |
| Crane for Gateshead Quay | Borough of Gateshead | ..... | Sept. 23rd | i. |
| Retort House (Brickwork) | Sheffield Gas Company | J. T. Key | do. | xviii. |
| Retort House (Ironwork) | do. | do. | do. | xviii. |
| Police-court and Offices at Stratford | West Ham Local Brd. | *Official* | do. | ii. |
| Bridge, Marshgate-lane | do. | do. | do. | ii. |
| House for Medical Officer | South Met. School Bd. | Not stated | do. | ii. |
| Main Drainage Works | West Bromwich Cor.... | *Official* | do. | ii. |
| Buckhurst Hill Drainage | Epping Union R. S. A. | Lewis Angell, C.E. | Sept. 25th | xiii. |
| Pipe-sewer | Barking Local Board ... | Brundell & Dawson | do. | xviii. |
| Enlargement of Station, Perth | Perth Gen. Statn. Com. | Blyth & Cunningham... | Sept. 26th | ii. |
| Medical Superintendent's House, &c., Fulham | Met. Asylums Board ... | A. & C. Harston | do. | ii. |
| Public Offices, and other Buildings | Widnes Local Board ... | F. & G. Holme | Sept. 29th | xviii. |
| New Offices, Berwick-street, Newcastle | Tyne Improvment Com. | R. J. Johnson | Sept. 30th | xiii. |
| Drill Shed, &c., Maryport | Admiralty | *Official* | October 3rd | i. |
| Stores | Great Western Ry. Co. | ..... | October 6th | ii. |
| Premises, Hackney | Mr. Choppings | ..... | Not stated | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Inspector of Nuisances and Surveyor | Mkt. Har. Un. R. S. A. | Sept. 18th | 130*l.* per annum | xvi. |
| Surveyor | Northampton Cor. | Sept. 22nd | 200*l.* do. | xvi. |
| Surveyor | Oldbury Local Board | Sept. 25th | 100*l.* do. | xvi. |

### TENDERS.

For the erection of two houses at Hitchin, for Mr. Wm. Ransom. Mr. J. Shilcock, architect. Quantities by Mr. Henry Lovegrove, 26, Budge-row, E.C.:—

| | |
|---|---|
| R. Runson | £3,987 0 0 |
| E. Twelvetrees | 2,859 0 0 |
| W. & A. Cox | 2,764 0 0 |
| W. Butterfield | 2,730 0 0 |
| S. Bedhouse | 2,692 0 0 |
| G. Warren | 2,690 0 0 |
| W. Seymour | 2,646 0 0 |
| Warren & Bates | 2,635 0 0 |
| G. Jeeves & Sons | 2,622 0 0 |
| J. W. Willmott | 2,620 0 0 |
| G. Stapleton | 2,590 0 0 |
| S. Brockett | 2,500 0 0 |

For villa-residence, Coddington-road, Brockley, for Mr. W. Hall. Mr. G. S. Harrison, architect. Quantities by the architect:—

| | |
|---|---|
| Edgley | £1,270 0 6 ! |
| A. White & Co. | 959 0 0 |
| Eldridge | 900 0 0 |
| Leng | 887 0 0 |
| Priestly | 880 0 0 |
| Best | 881 10 0 |
| Amor | 846 0 0 |
| Aviss & Son | 804 15 0 |
| Mower | 829 0 0 |
| Croaker | 780 0 0 |
| Holloway | 780 0 0 |
| D. D. & A. Brown | 771 0 0 |
| Turner Bros. | 765 0 0 ! |
| Robinson & Miller | 695 0 0 ! |

For erecting the London Almshouses, Shepherd's-lane, Brixton, for the Corporation of London. Messrs. Davis & Emanuel, architects, 3, Finsbury-circus, E.C. Quantities supplied by Mr. H. P. Foster, 5, John-street, Adelphi, W.C.:—

| | |
|---|---|
| Colls & Sons, Moorgate-street | £13,300 0 0 |
| J. Mowlem & Co., Westminster | 13,000 0 0 |
| Harris & Wardrop, Limehouse | 12,274 0 0 |
| T. Rider & Son, Union-street, Boro' | 12,248 0 0 |
| Maxwell Bros., Brixton-road | 12,058 0 0 |
| G. S. S. Williams & Sons, Thornhill-square | 11,970 0 0 |
| W. Bangs & Co., Bow-road | 11,964 0 0 |
| J. Grover, Wilton-square, New North-road | 11,962 0 0 |
| T. Little, Size-yard, Whitechapel-road | 11,893 0 0 |
| E. Conder, Baltic Wharf, Kingsland | 11,619 0 0 |
| S. J. Jerrard, Lewisham | 11,589 0 0 |
| J. Outhwaite & Son, Upper East Smithfield | 11,510 0 0 |
| E. Lawrance & Son, Wharf-road, City-road | 11,256 0 0 |
| Holliday & Greenwood, Loughborough Junction | 11,151 0 0 |
| Greenwood & Sons, Arthur-street West | 11,048 0 0 |
| Mark Gentry, Langthorne Works, Stratford | 10,500 0 0 |

For a house at Guildford, for Mr. W. Wells. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

| | |
|---|---|
| Colls & Son, Dorking | £2,799 0 0 |
| Pink, Milford | 2,782 0 0 |
| Mitchell Bros., Shalford | 2,721 2 5 |
| Martin, Wells, & Co. | 2,472 0 0 |
| Peters, Horsham | 2,469 0 0 |
| Bottrill, Reading | 2,458 0 0 |
| Kingerlee, Oxford | 2,440 0 0 |

[Architect's estimate ..... £2,850 0 0]

For works at Erles Court Farm, Wiltshire. Messrs. Arundel & Tarte, architects, Great James-street, Bedford-row:—

| | New Buildings. | Cottages. |
|---|---|---|
| Sindall, Cambridge | £679 11 10 | £496 1 10 |
| Barrett, Swindon | 607 2 2 | 458 1 10 |
| Wheeler, Swindon | 605 13 10 | 417 5 3 |
| Colborne, Stratton | 569 5 0 | 409 10 0 |
| Beaven, Bristol | 560 0 0 | 395 0 0 |
| Looker, Stratton | 541 0 0 | 385 0 0 |
| Johnson & Manners, London | 468 0 0 | 365 0 0 |

For parsonage farm, Lyddington. Messrs. Arundell & Tarte, architects:—

| | A.* | B.* |
|---|---|---|
| Phillips, Swindon† | £1,365 0 0 | £1,225 10 0 |
| Beaven, Bristol | 1,340 0 0 | 1,220 0 0 |
| Williams, Swindon† | 1,290 0 0 | 1,150 0 0 |
| Wheeler, Wantage | 1,286 18 5 | 1,141 14 5 |
| Barrett, Swindon | 1,240 3 6 | 1,111 4 11 |
| Colborne, Stratton† | 1,189 10 0 | 1,116 0 9 |
| Locker, Stratton§ | 1,165 10 0 | 1,037 15 0 |

* Alternative estimates. † Informal. ‡ Late. § Accepted.

For alterations and additions to Nos. 14 and 16, Clapham-road, for Mr. G. F. Cotton. Mr. J. W. Stevens, architect, Dyer's-buildings:—

| | |
|---|---|
| Hatfield, Clapham | £279 0 0 |
| A. White & Co., Rotherhithe | 217 0 0 |
| Lavender & Sons, Clapham | 196 0 0 |
| Creed, Loughborough Junction * | 194 0 0 |

* Accepted.

For parochial room for All Saints' Parish, Nottingham. Mr. Frederick Jackson, architect, Nottingham:—

| | |
|---|---|
| Enoch Hiad, Nottingham | £997 0 0 |
| Huskinson & Jefferys, Nottingham | 989 0 0 |
| Lynam & Kidd, Nottingham | 853 0 0 |
| Bell & Son, Nottingham | 807 15 0 |
| Henry Vickers, Nottingham | 765 0 0 |
| Thomas Beck, Matlock Bridge | 718 19 0 |
| S. & J. Cargill, Nottingham (accepted) | 698 0 0 |

Accepted for residence and stabling at Codsall, for Mr. R. Fryer Morson. Mr. J. E. Veall, architect, Wolverhampton:—

| | |
|---|---|
| P. Horsman & Co., Wolverhampton | £1,605 0 0 |

[No competition.]

Accepted for engine stack and boiler at the Royal Seed Establishment, Wordsley, for Messrs. Edward Webb & Sons. Mr. J. E. Veall, architect, Wolverhampton:—

| | |
|---|---|
| J. Guest, Brettel-lane | £180 0 0 |

[No competition.]

For six houses in Clayton and Carlton streets, Westgate End, Wakefield, for the Wakefield Equitable Provident Land and Building Society. Mr. Abraham Hart, architect, Thompson's-yard, Westgate, Wakefield. Quantities by the architect:—

| | |
|---|---|
| Holmes Bros., Lake Lock, Stanley | £890 0 0 |
| J. & J. Mountain, Wakefield | 840 0 0 |
| G. Mountain, Wakefield | 810 0 0 |
| Richardson & Son, Newton | 790 0 0 |
| B. Lockwood, Westgate | 785 0 0 |
| T. W. Cawood, Westgate | 780 8 0 |
| James Tattersal, Wakefield | 772 18 0 |
| W. Clark, Westgate | 758 0 6 |
| C. Clark, Westgate | 730 9 0 |
| J. W. Woulds, Sandal (accepted) | 720 0 0 |

For the erection of a villa-residence, Green-lanes, on the Bowes Park Estate, for Mr. John J. Hough. Mr. D. Taylor, architect and surveyor, New Southgate. Quantities not supplied:—

| | |
|---|---|
| J. Harper, Hackney | £1,775 0 0 |
| Yardley & Sons, Wood Green | 1,739 0 0 |
| Steven Bros., Seven Sisters-road | 1,297 0 0 |
| Kirby & Chase, Hornsey-road | 1,290 0 0 |
| T. Scarborough, Wood Green | 1,284 0 0 |
| F. Vollor, Wood Green (accepted) | 1,278 0 0 |
| T. Brooks, Wood Green | 1,240 0 0 |

[Surveyor's estimate ..... £1,378 17 0]

For completion of church at Lismore, co. Waterford, chancel, chapels, &c. Mr. Walter G. Doolin, M.A., architect, Dublin. Quantities by Mr. H. M'Connell :—

| | | | |
|---|---|---|---|
| Hammond, Drogheda | £6,200 | 0 | 0 † |
| Creedon, Fermoy (accepted) | 1,757 | 0 | 0 |
| [Architect's pricing | £1,469 | 0 | 0] |
| [Surveyor's pricing | £1,486 | 0 | 0] |

For interior and exterior and decorations to the Metropolitan Benevolent Societies' Asylum, Balls Pond-road, Islington, N. :—

| | Repairs. | | | Lamps & Letters. | | |
|---|---|---|---|---|---|---|
| Roberts | £350 | 0 | 0 | with lamps. | | |
| Hobson | £239 | 0 | 0 | £50 | 0 | 0 |
| Combes | 212 | 0 | 0 | 45 | 0 | 0 |
| Hobbs | 197 | 0 | 0 | 38 | 0 | 0 |
| Dearing & Son* | 119 | 0 | 0 | 41 | 0 | 0 |
| Goodley | 120 | 0 | 0 | 35 | 0 | 0 |
| Moody | 128 | 0 | 0 | 10 | 0 | 0 |

* Accepted.

For billiard-room for Mr. J. H. Davis, Cressingham House, Carshalton. Mr. Thos. Lockwood Heward, architect, John-street, Bedford-row, W.C. :—

| | | | |
|---|---|---|---|
| Howe & White, Wallington | £370 | 0 | 0 |
| Potter, Sutton | 363 | 0 | 0 |
| Hazell, Beddington | 350 | 0 | 0 |
| Smith & Bence, London | 347 | 0 | 0 |
| Evans, Carshalton | 309 | 0 | 0 |
| Clarke, Wallington | 298 | 0 | 0 |
| Aldous, Carshalton (accepted) | 250 | 19 | 0 |

For sundry alterations at the Middlesex Music Hall, Drury-lane, for Mr. J. L. Graydon. Mr. Alfred Wright, architect, 193A, Brompton-road, S.W. :—

| | | | |
|---|---|---|---|
| H. R. Baggs | £573 | 0 | 0 |
| Beale | 547 | 0 | 0 |
| Cook | 509 | 0 | 0 |
| W. Johnson | 490 | 0 | 0 |

For new business premises, East-street, Fleetwood, for Mr. H. J. Rowton. Mr. C. Pearson Shaw, architect. Quantities by the architect :—

| | | | |
|---|---|---|---|
| J. Jackson, Fleetwood (Excavator, Drainer, and Bricksetter) | £613 | 3 | 5 |
| R. Ronson, Blackpool (Carpenter and Ironwork) | 910 | 0 | 0 |
| J. Johnson, Fleetwood (Mason, &c.) | 65 | 2 | 9 |
| G. L. Seed, Poulton (Slater) | 68 | 0 | 0 |
| Whiteside & Walmsley, Blackpool (Plasterers) | 103 | 0 | 0 |
| J. Coulston, Blackpool (Plumber, Glazier, Gasfitter, &c.) | 425 | 0 | 0 |

Accepted for pulling down and re-erecting three dwelling-houses in Chapel-lane, Kendal (exclusive of grates and ranges), for Mr. Henry Pickthall, Manchester. Mr. John Stalker, architect. Quantities by the architect :—

| | | | |
|---|---|---|---|
| C. Gibson (Excavating, Walling, &c.) | £178 | 0 | 0 |
| T. Stables (Carpenter and Joiner) | 117 | 0 | 0 |
| W. Jackson (Plumber and Painter) | 34 | 9 | 6 |
| J. Hoskinson (Plasterer) | 34 | 5 | 0 |

For alterations, &c., at Abbotsford, Burgess Hill, Sussex. Mr. Arthur Loader, architect, Brighton :—

| | | | |
|---|---|---|---|
| R. G. Lockyer, Brighton | £313 | 0 | 0 |
| S. Norman, Burgess Hill | 276 | 0 | 0 |
| F. A. Wilson, Brighton (accepted) | 259 | 0 | 0 |
| S. Norman (accepted for water-supply) | 149 | 0 | 0 |

For new front to 46, Preston-street, Brighton. Mr. Arthur Loader, architect :—

| | | | |
|---|---|---|---|
| E. C. Kemp | £320 | 0 | 0 |
| W. Hackman | 254 | 10 | 0 |
| W. Taylor | 240 | 0 | 0 |
| R. G. Lockyer, Brighton (accepted) | 238 | 0 | 0 |

For new wing to house, and new coach houses, at Frittenden, Kent. Mr. Arthur Loader, architect :—

| | | | |
|---|---|---|---|
| Baker & Hadley (accepted) | £4,720 | 0 | 0 |

For repairs and alterations at No. 33, Montague-place, Russell-square, for Mr. T. S. Sutton :

| | | | |
|---|---|---|---|
| C. Bush | £250 | 0 | 0 |
| J. T. Nichols (accepted) | 134 | 14 | 0 |

For the erection of the first portion of proposed new buildings at St. Mary's College, Woolhampton, near Reading, Berks. Mr. Frederick A. Walters, architect, 4, Great Queen-street, Westminster, S.W. Quantities supplied by Mr. W. H. Brayshaw :—

| | | | |
|---|---|---|---|
| Norris | £5,884 | 0 | 0 |
| Parmenter | 5,560 | 0 | 0 |
| Kemp | 5,399 | 0 | 0 |
| Kimberley | 5,110 | 0 | 0 |
| Claridge | 5,071 | 0 | 0 |
| Buckle & Wheeler (accepted) | 4,350 | 0 | 0 |

For warehouse, Cousin-lane, E.C., for Messrs. J. & J. Colman. Mr. R. W. Price, architect, 12, Buckingham-street, Adelphi. Quantities by Messrs. Barber, Boxall, & Barber :—

| | | | |
|---|---|---|---|
| Boyce | £3,480 | 0 | 0 |
| Clark & Bracey | 3,333 | 0 | 0 |
| Nightingale | 3,133 | 0 | 0 |
| Smith | 3,127 | 0 | 0 |
| Brass | 3,125 | 0 | 0 |
| Ashby & Horner (accepted) | 3,100 | 0 | 0 |

For reconstructing premises at Hereford, recently destroyed by fire, for Mr. James Morgan. Messrs. Willett & Wakeling, architects :—

| | | | |
|---|---|---|---|
| H. Welsh | £600 | 0 | 0 |
| J. Dair | 592 | 0 | 0 |
| W. Pritchard | 577 | 0 | 0 |
| J. Lloyd | 552 | 0 | 0 |
| J. Rowberry | 548 | 0 | 0 |
| R. Taylor | 542 | 0 | 0 |
| E. Powell | 506 | 0 | 0 |
| W. Bower & Co. | 476 | 0 | 0 |
| H. Gardner & Co. | 423 | 0 | 0 |
| H. W. Daniels* | 374 | 0 | 0 |

* Accepted, subject to variations and omissions.

For offices and soup-kitchens in Bath-street, Hereford. Messrs. Willett & Wakeling, architects :—

| | | | |
|---|---|---|---|
| H. Welsh | £942 | 0 | 0 |
| Colley | 915 | 0 | 0 |
| Daniels | 843 | 0 | 0 |
| Powell | 816 | 0 | 0 |
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# The Builder.

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## *The Common Sense of Restoration.*

DURING the last few days we have heard much talk and seen many letters about "Restoration," one of the subjects which all people think themselves competent to discuss, and about which there is at present a degree of acerbity between restorers and non-restorers which renders it a capital opening for the interchange of newspaper compliments in the off-season. In the consulship of Plancus, as many of us can remember, restoration was a venerable word, representing ideas which were supposed to sum up the whole duty of ecclesiological man; and what was man in those days if not ecclesiological? It is touching to read in the *Times* the letter of the secretary to "The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels," and his half admission that in the early days of the Society the money was not rightly expended; or, rather, as he puts it, not "expended as it would be now,"—a naïve admission of the doctrine that whatever *is* (at the present moment) is right. But, he adds, "I do not think that the Society was to blame. It was in advance of the age. Its object was to provide additional church accommodation, and it was its misfortune, not its fault, if ecclesiastical architectural taste was at such a low level that many and many magnificent and interesting architectural features could be ruthlessly swept away to make room for the erection of a large painted deal gallery; or a very beautiful, though small, parish church could be destroyed to be supplanted by a church of the 'Gothic sort,' with cast-iron pillars painted white." That the Society accepted this sort of thing would seem to prove that it was *not* in advance of the age; but the passage recals our attention to the main object of church restoration, as practised a generation ago. That object was to supplement the revival of the Mediæval church spirit by providing buildings for increased church accommodation, and providing them in a style which was supposed to represent the proper surrounding for a revived church and ritual. Restoration of existing churches began in the same spirit. The churches had been suffered to go into decay during the period when the church was practically dead in the country, and to repair and re-beautify them was, in the first instance, simply a common-sense proceeding of a semi-practical nature. As the Mediævalising spirit gathered strength, of course the thing became more and more a matter of sentiment, and everything that savoured of the hated period before the revival, all that was antagonistic to Mediævalism, was to go. The Mediævalising of churches became a shibboleth, and there was no salvation for any one who remained lukewarm on such a matter.

The anti-restorationists are now having their innings; and bigotry and prejudice on the one side are being answered by stronger prejudice and blinder bigotry on the other side. The ecclesiological revivers and restorers used to indulge in painful and probably overdrawn descriptions of the state of things in unrestored churches; but the anti-restorers for the most part seem possessed by such a spirit of opposition that people who in regard to other matters would probably be strictly truthful, in regard to the doings or even the intentions of supposed restorers will make sweeping statements upon no authority at all; will distort and exaggerate facts till their statements reach absolute misrepresentation, to use no stronger expression; and will invent wonderful and unheard-of canons of architectural criticism, evolved from their inner consciousness, in order to hold up to ridicule the doings of the hated restorer. Just as a generation ago "restoration" was the orthodox catchword for would-be æsthetic people, by the use of which, without any knowledge of the subject, they could pass as "superior people," so now the abuse of restoration and of restorers is a kind of passport to the ranks of the æsthetes, and mere declamation on the subject, without the accurate knowledge of a single fact, is enough. We regret to say that ladies are very prominent in this exhibition of zeal without knowledge. They are amongst the most bigoted members of the "Anti-Scrape" Society. As an example, we heard a lady member of that Society with the long name which has been thus indecorously abbreviated, inveighing against any one who pulled down an old building on any pretext whatsoever. We ventured to hint that all the Mediæval builders pulled down the works of their fathers ruthlessly, and built up new ones on their very foundations; that almost every cathedral in England consisted largely of work built on the foundations of older work which had been pulled down because the later builders thought they could do something better. "Oh, indeed," was the reply in a tone of severe superiority, "I should like a proof of that!" The speaker might, of course, as well have asked for a proof that Mediæval churches had pointed windows and buttresses; but the abuse of architectural restorers may be indulged in nowadays without the slightest knowledge of even the outlines of the subject. Another example of the kind of architectural criticism which satisfies your anti-restorer is exhibited in a letter by Mr. W. J. Loftie in the *Times* of Wednesday, concerning what he calls the "frightful idea" of restoring St. Stephen's, Walbrook, of which he has heard rumours. To prevent misunderstanding, we may say at once that we have ascertained from inquiry that what has been suggested is merely letting down the pew-woodwork by one panel (removing a small bottom panel), so as to reduce the excessive height of the pews without altering the upper portion or finish of the woodwork at all. We should be very averse to making any alteration whatever in St. Stephen's unless on very strong practical grounds. The alteration proposed can hardly be called necessary, though it must be admitted that the high "sheep-pen" pew, however good the woodwork may be, is a construction very much at variance with modern feelings and habits among worshippers; and certainly the alteration talked of is not such as to materially affect the architectural aspect of the interior. But the very rumour fills Mr. Loftie's mind with indignation and contempt against all architects, who only propose these things out of spite against Wren, and because they cannot produce anything as good as he did. Mr. Loftie, it must be observed, speaks entirely from a standpoint above architects, as one instructing them in matters in which he is better informed. Mr. Loftie's claims to this position appear to rest on some rambling attempts at architectural criticism in his otherwise interesting "History of London,' in the course of which it appeared that he had never heard the name of Elmes, and attributed the greatest English building of the Classic revival to Wilkins; and on the authorship of the first volume of the "Art at Home" books, a plea for "Art in the House," written in a style worthy of Laura Matilda herself, and forming probably the very silliest of all that most silly series of booklets. Mr. Loftie's claims to rank as architectural instructor are characteristically exemplified in the letter on St. Stephen's, Walbrook. He says:—

"There is probably nothing, except, perhaps, to remove the dome, calculated so terribly to injure Wren's design as cutting down the pews. They are the chief element in the extraordinary effect produced upon the spectator as he enters the church.

It will be understood at once when I say that the columns which support the dome and divide the aisles rest on bases so high that each column seems to rise from a floor level exactly with the top of the pewing. While, therefore, the visitor sees the whole design as if in a picture, the apparent size of the little building is immensely enhanced. Strange to say, I hear the proposed vandalism has the approval of several architects."

If Mr. Loftie can explain to us how the apparent spaciousness of a building is enhanced by making the floor of it appear 5 ft. 6 in. nearer the roof than it really is, we should be very much obliged to him. Most people in their ordinary senses would think that was the way to diminish the effect of size and spaciousness in a church or any other building. The common-sense of the matter is this:—The cutting down (or rather letting down) of the pews in the way described, by about eighteen inches, would be far more in accordance with the present (and the best) taste as to the furnishing of a place of worship; it would take away nothing very material from the woodwork itself, and it would unquestionably give greater appearance of height and spaciousness to the church than at present. The one real architectural drawback to the alteration is that Wren arranged the bases of the columns to range with the height of the pews, and, if the alteration were made, there would then be eighteen inches of plinth left standing above the pew level. The effect would not be so complete, though it would be possible to treat the bases so as to connect them with the new line of woodwork. Of course this would involve introducing a new detail into a very complete work of Wren's, and we should oppose it on that ground, unless there were a very large congregation (which we believe there is not) who were seriously incommoded and annoyed by the present make of the pews. In that case practical considerations come first, an argument to which Wren himself would probably have readily agreed.

This question of practical expediency is one of the main points to be taken into consideration in regard to altering, restoring, or rebuilding old buildings; and one which is apparently put totally on one side by the anti-restoration champions. There are three lights in which a building may be regarded; we name them in the order of their importance. First, the practical fitness of the structure for the uses for which it is intended; the first and most important in the case of all buildings, except purely monumental or memorial designs, and the one upon which, save in those cases, everything else ought to turn. Secondly, the building regarded as an artistic design. Thirdly, the building, with all the alterations through which it has gone, regarded as a part of history. By the anti-restorationists this latter consideration is put forward not only before the two others, but to the absolute exclusion of the two others. The completeness of the building as an architectural design, and its convenience for the uses for which it is intended, are to them, if one may judge by their own words, matters of no account whatever. History embodied in architectural changes and alterations is undoubtedly of very high value and interest, and to people engaged in special antiquarian studies it is naturally the chief interest. But that is not what buildings were erected for. They are erected firstly for use: secondly, when something higher than mere utilitarian value is aimed at, for architectural beauty, as harmonious and consistent designs. When there is any question of restoring an ancient building, of renewing it where dilapidated, of removing any incongruous additions that have been made to it, perhaps in a period of debased taste, and which are out of keeping with its architecture,—the rational course, instead of uttering hysterical denunciations against touching anything that a former generation has done, is to consider and weigh the balance of advantages and disadvantages of alteration, and decide accordingly. Take a church, as being the most common battlefield of restoration at present. If it is actually a ruin, and a ruin of noble architectural style, to touch it in any way, except for the purpose of mere maintenance against further decay, is rank sacrilege, and any patching up or reworking would at once destroy all its value and dignity as an architectural memorial. Few people, however, would ever propose such a course as this. But in the case of a church in use for worship, the first claim is that it should be kept in a seemly and decorous condition, that its fittings and interior arrangements generally should be in accordance with the convenience and the habits of the people of the present day who use it, and that it should be in thorough repair and in a state of structural safety. The latter condition we should presume no one would be silly enough to contest, though some of the protests of the "Anti-Scrape" Society would lead one to think that they ignore even this necessity, and that they would rather have the chance of a roof coming down on their heads than see it repaired or a new one substituted. In regard to fittings, if a former generation has filled a church with a style of fittings which are quite at variance with modern ideas of what is either convenient or suitable in a church, are modern congregations for ever to go on using them because they were once put there? As well say that a man who lives in an ancient mansion or castle is not to alter and refurnish it with regard to modern ways of living. Then there comes the question, not so easily to be settled, of purely architectural fitness and propriety. Now it is really necessary to remind people at present that there is such a thing as architectural design, and that one object of architectural design is fitness and coherence of all the parts one with another, without which quality the architecture ceases to be a harmonious whole, and becomes only a collection of scraps with no logical relation to one another. At a certain period of our history, our finest Mediæval churches were filled with objects,—monuments, reredoses, pews, and galleries, &c., in some cases absolute monstrosities, in the best cases entirely at variance with the architectural *régime* of the building. In some cases these are of such good quality of design and execution that it becomes a question whether the gain to completeness of effect by removing them to some other situation is at all equal to the loss of the total architectural interest of the building which would be involved in removing them.* In the case, however, of things which are not good in themselves, which are in bad and debased taste, and poor in execution, to scruple to remove them (unless they are monuments of those whose memory is worth preserving) is a mere superstition. A bad thing is none the better because it has been where it ought not to be for a hundred years, nor is it worth while to leave it in its place merely to show that some of our forefathers were fools. We have ample evidence of that historic fact, as our descendants will have some similar evidence about *their* forefathers, but it may be questionable whether it is a kind of fact which it is worth while making much architectural sacrifice to keep on record. But this worship of everything that has ever been done in architecture, because it has been done, is unworthy of thinking people. It is a standard such as has never been set up or acted upon in any previous age. It is carried to the extent of absolute falsifying of architectural criticism. As a prominent example, we may refer to the admiration which one now constantly hears expressed for the west towers of Westminster Abbey. Whoever designed these (for it is by no means certain that Wren was really guilty of them), there can be no question, with any unprejudiced critic who is competent to form a judgment, that they are just about as bad as they can be; poor and weak in outline, and in detail a wretched travesty of Mediæval detail by an architect who did not understand it, and had not the slightest feeling for it. Had the Society before referred to been in existence when those towers were built the very same men (had they lived then, who now profess to admire them, would have fought tooth and nail to prevent their erection,—*must* have done so, on their own principles. But because the towers have stood there a couple of centuries they are to be regarded with admiration. Could critical inconsistency and imbecility go further!

The question of removing monuments, however bad, is, of course, one of some complication. The notion at present seems to be that any monument, however execrable in taste, is, by the fact of being a monument, sacred. The general feeling is no doubt a right one, but we would venture to suggest whether there is not a limit to forbearance even in this case. The desire to have our names commemorated on a monument is, after all, rather a weak side of human nature; and when we consider how insignificant were some of the people who got hideous monuments erected to them, and how little worth is the fact of having your name preserved on a slab of marble when nothing worth knowing about the bearer of it has survived, we are inclined to apostrophise these dead names as Frederic did his soldiers who feared to go under fire,—"Dogs! would ye live for ever?" Monuments of nobodies, which are tasteless and poor, we cannot think have necessarily a claim to disfigure a building for ever; especially as they might usually be preserved elsewhere. A case has been prominently mentioned in the course of the recent correspondence on the subject, of the removal of the "Pedlar window" at St. Mary's, Lambeth; a portrait of a pedlar and his dog, who (the pedlar, not the dog) is reported to have left a piece of land to the parish on condition of being thus memorialised in the church. The window should be preserved, and it is reported that it is to be put in the vestry: the proper place for it: but a fuss has been got up about it as if an act of sacrilege had been committed. We should be disposed to say that the pedlar was guilty of a vulgar and unseemly ambition in wishing to be portrayed in the church, of all places, on such grounds, and that the then authorities of the church did an unseemly thing in entering into the bargain. The complainants make a point of the fact that it is displaced to make room for a memorial window to recent inhabitants of the parish, but we may take it for granted that this is not intended to consist of portraits of them (or of their dogs), but of some subject more suitable to a church. There is much more reason in the complaint of a Worcestershire Rector, that he found the old Norman font banished to the outside of the church by the restoring architect, "in favour of a new one of a kind that one may buy any day in London or Birmingham." If the old font was really in a condition in which it could be used, to banish it was contrary to all church tradition and association, for in most church rebuildings in the Middle Ages the font was preserved, even when the architecture of the church was entirely altered; which is the reason so many Norman fonts are to be found in churches of later date.

To sum up,—the question of restoring and altering an old building is one to be considered dispassionately and in due reference to all the circumstances bearing on the practical utility and the architectural design of the building, and the true value of the objects it is proposed to displace. Each case, so considered, would be found to have its own special features and require its own special treatment, to be decided on grounds of reason and common sense, not on those of exaggerated and over-acted sentiment.

* N.B., not *destroying* them. nothing good in itself should be destroyed in any case But it may be in its wrong place.

## AN ANCIENT FOUNDATION RECORD.

THE new volume of cuneiform inscriptions which the Trustees of the British Museum have just issued under the editorship of Sir Henry Rawlinson will be welcome alike to the archæologist and the philologist. The very extensive and surprisingly productive series of explorations carried out by Mr. Rassam in Babylonia have resulted in very large and valuable additions to our national collection, and it is from these that the selection of inscriptions now published has been made. In the early

days of Assyrian decipherment it became apparent to students that Assyria was, in art, science, and literature, the child of Babylonia, and if they would study that literature in its early editions they must do so in the libraries of Babylonia. The ancient cities of Chaldea were most jealous guardians of the treasures hidden beneath their ruins, and for years the brick hunters and explorers had dug unrewarded. The discovery, some ten years ago, of the Egibi tablets opened up a new era in Babylonian explorations, and from that time there has been a continual flow of inscriptions and monuments into the national collection. The result of the opening up of these buried libraries of Chaldea has been a very extensive enlargement of the area of cuneiform literature, and proofs of a most indisputable kind have been furnished of the great antiquity of Chaldean civilisation. The inscriptions now extant show that long prior to B.C. 3750 the work of civilisation and development in Chaldea must have been going on, and changes in national life had taken place which could not have been accomplished in a few centuries, but must have occupied some thousands of years.

The fortunate accident that led Mr. Rassam to excavate at Aboo Hubba has restored to us the site of one of the oldest cities in Chaldea, in whose temples were preserved antiquities reaching back to a very remote period. The publication of the two cylinders of King Nabonidus, which were found in the coffer or foundation chest of the temple, as we have already described in the *Builder*, furnishes us with an insight into the history of this remarkable building and the changes it underwent during many centuries. Judging by the text of the inscription, which consists of about 170 lines, the cylinder was written in about the tenth year of Nabonidus, B.C. 545, a few years after the capture of Ecbatana by Cyrus and the overthrow of the Median empire. The cylinder records the restoration and adornment of three temples. 1. The Temple of the Moon-God, in the city of Harran, in North Mesopotamia. 2. The Exploration and Restoration of E-Parra, the Temple of the Sun-God. 3. The Exploration and Restoration of the Temple of the Goddess Anunituv. Both of the latter were in the city of Sippara, the site of which is marked by the mounds of Aboo Hubba. The archæological value of this inscription consists in the insight it affords into the way in which the kings carried out their pious works of restoration. The first duty of a king when engaged in the work of restoring some ancient temple was to search for the memorial records of the founder or previous restorers of the temple. All the memorial tablets and cylinders which have been found in the temples and palaces of Assyria and Babylonia conclude with a solemn request to future descendants of the writer to respect his records, to clean and replace them, as for example, in the tablets of Assurnazirpal (B.C. 885) found at Ballawat, which are published in this volume (pl. 69-70), where we read :—"O future prince among the kings my sons whom Assur shall proclaim him! When the temple shall decay and this tablet thou seest, and thou removest, its ruins restore thou. The characters of my inscribed name to its place restore thou. Bel, the great god; Assur, the lordly prince; and the god Makhir, dwelling in this temple, in the raising of their eyes, firmly may they establish. His writing, his name, his seed in their land, may they establish. Whosoever this tablet shall see, and sins [curses] many shall repeat. O goddess Istar, lady of war and battle! His weapons then thou breakest, his throne then thou takest from him. Whosoever this tablet shall see and raise it up, the altars shall cleanse, a victim shall sacrifice, and to its place restore. Assur the great lord his praise shall hear, and in the battle of the kings, in the place of the onset, the courage of his heart shall find for him."

In the works of restoration which he undertook, the Babylonian king most religiously fulfilled the prayers of his ancestors, and it is from the record which he gives of the various foundation-stones he found, that we gain much valuable chronological information. The Temple of Harran, which he restored, was a very ancient edifice, and, though strictly speaking, not a Babylonian temple, was affiliated with the great centre of Chaldean moon-worship, the temple at Ur. In an ancient astronomical tablet, mention is made of the planet Mercury "as the star and prince of the men of Harran"; and there is a seal in the British Museum on which is represented a priest standing before an altar, surmounted by a cone, and above the cone a star, with the inscription, "The God of Harran." This temple was probably in existence when Abraham migrated from Chaldea, and as a colony from Ur would be the city he would most naturally remove to. During the disturbed state of West Asia, from B.C. 625 to the establishment of order by Nebuchadnezzar and his successors, the temple had been sacked by the Sabmanda,—or barbarian hordes of Scyths and Medes,—and Nabonidus was commanded in a dream to restore it. In his search for the records of his ancestors he found the cylinders of Shalmanesar II. (B.C. 859), the son of Assurnazirpal, who had visited the city when marching against the Syrians. He also found there the cylinder of Assurbanipal, which had no doubt been placed there soon after the king's coronation in this temple, which took place in B.C. 668. The work of restoration seems to have been very important and to have extended to the city as well as the temple, as the king speaks of his restoration of "the city and the temple"; and again he says, "the city of Harran in all its extent" was restored by him. The work of restoration is described as consisting of a thorough rebuilding of the temple, "the walls were rebuilt, and in parts "plated with gold and silver, and decorated with white marble." The doors were of cedar-wood, with bands of gold and silver inlayed with precious stones. At the gate of the rising sun (east gate) the king placed right and left two colossal figures of the god Lakhma, the god of Light. The work completed, the king says that amid great rejoicing and shouting he made "the city of Harran and this temple as, bright as the rising moon." The city of Harran was a town of considerable importance in North Mesopotamia, and derived its name from the word *kharranu*, a road, it being then as now the centre where all the chief roadways met. The city has recently been visited by Professor Edward Sachau, of Berlin, and is described by him in his work, "Reise in Syrien und Mesopotamien." The town was crescent-shaped, and the Arab chronicles say that Harran was shaped like the moon, no doubt an echo of its ancient celebrity as a moon city. In the centre of the south portion is the castle mound, rising to a considerable height, and beneath which in all probability are the ruins of the temple. There are six gateways; and here centre the oldest commercial roads in the East. The Harran-Serudj-Berejik road, the ancient North Hittite road which passed through North Syria, Asia Minor, to the shores of the Ægean; the Harran Jerabis route, the ancient road to Carchemish and Aleppo, traversed no doubt many times by the armies of the kings of Assyria. The roadway passing south through Kalat Nedjim, the ancient Tul Barsip, to Damascus *viâ* Tadmor (Palmyra). Eastward were two roads, the one leading to Diarbeker, the ancient Armenian route to Van, and the Mosul road, the ancient route to Nineveh. Here, then, is one of the most important centres of civilisation in Western Asia, a city *old* in the days of Abraham, awaiting the touch of the explorer's spade to yield up a rich store of buried records. The cylinders of Shalmanesar and Assurbanipal were cleaned by the pious restorer and placed along with his own, and are no doubt lying *perdu* until unearthed by the explorer. The work of restoration of the two great temples at Sippara was more elaborate than that at Harran, and the search for the records of previous benefactors to the shrine even more careful. During the wars and rebellions subsequently to the establishment of the Sargonide dynasty in B.C. 721, this chief city of North Babylonia had suffered very considerably at the hand of the spoiler, and in B.C. 663 the Elamites had spoiled the temple and carried off the images of the gods. In the fine terra-cotta cylinder of Assurbanipal (Cylinder B) the king records his works of restoration; also in a barrel cylinder, printed in this volume,—but they appear to have been only partial, and it remained for Nebuchadnezzar, "the Great Builder King," to undertake the thorough work of restoration. The work must have been a very heavy one, for the King (Nabonidus) records in this inscription that his predecessor was engaged for more than forty years on the work, and then had not completed it. Nebuchadnezzar appears to have searched vainly for the records of the foundation of the temple, and the search being continued by Nabonidus he found at last, at the depth of 18 cubits, that is 30 ft., a memorial record of Naram-Sin, son of Sargon I., king of Agadhe or Akkad, one of the quarters of Sippara, which had been placed there 3,200 years previously to his reign, that is in B.C. 3750. This very astonishing date does not rest upon the authority of one inscription, but is repeated in a duplicate copy recently discovered,—and the subsequent discovery by Mr. Pinches of a chronological canon of Babylonian kings, indicates that the scribe who wrote this text no doubt consulted the lists of kings in his temple library.

The depth to which the excavations had to be carried to find this record seems strongly in favour of the authenticity of the date, and the fact that the temple had at various times during that period been demolished and repaired by nearly one hundred kings may account for the accumulation of matter over the record.

Having cleaned and repaired this record, and sacrificed the victims, and poured out libations, the king restored it to its place. During the search for this record, the statue of the Sun-god had been removed from the shrine to another, and it rested there until the works were completed. As in the case of the temple at Harran, gold, silver, and precious stones were lavishly used. One fact recorded is the use of *five thousand* beams of cedar wood for the ceiling of the shrine.* The work of this temple completed, the king commenced the restoration of the sister temple dedicated to the goddess Anunituv. This goddess,—the Babylonian form of Istar or Venus,—was the goddess of the morning and evening star, "who," as the inscription says, "at the rising and setting of the sun made glad the heart of Nabonidus." A curious detail of symbolic decorations is recorded in her temple, some chambers of which were explored by Mr. Rassam, was decorated with black and white, as emblematic of the morning and evening. In the exploration of this temple, and the search of records for previous restorers of the shrine, the king found the memorial-stone of King Sagaraktiyas, son of Kurdur-Bel, which, he states, has remained unseen for 500 years, thus fixing the date of this king as B.C. 1050. The work of restoration of this temple was much the same as that of the other temples,—gold, silver, precious stones, marble, and crystal being lavishly used. From this valuable archæological text we gain many new technical terms, such as the words for foundation, *ussu*, literally "base," the foundation stone being called *timien*, literally "*line is made*"; roof, *takhupi*, that is "covering"; and the bands of brass on the gates, such as the scrolls from Ballawat, were called *sukuruti*, or "ties." This text is one of the fullest and, fortunately, best-preserved records yet recovered from the ruins of Babylonian temples, and its publication reflects great credit upon the Trustees of the British Museum.

In like manner to his ancestors, this royal archæologist concludes his inscription by commending his foundation record to those who come after,—to read it, clean its inscription, and to restore it to its place uninjured. Could he but see the place of honour it now occupies in the New Room of the Assyrian Department, surrounded by the like records of many who before and after him ruled the land of Chaldea, we doubt not that he would be satisfied.

* The word *tulli* literally means "overshadowing," and is from *tullu*, "shade," and must therefore be the ceiling.

## WATER PURITY AND SEWAGE PURIFICATION.

THE recently-published volume of Transactions of the Sanitary Institute of Great Britain contains the address of the late eminent analyst, Dr. Angus Smith, at the Congress held last year at Glasgow. It deals so largely with the much-discussed subject of water purity and purification of sewage, that it seems singular no one in the recent Conferences should have thought of quoting the views held and propounded by such a distinguished authority. It may be useful, therefore, at the present time to draw attention to some of the remarks contained in that address. Commencing with an allusion to the labours generally of M. Pasteur in France as "of a kind which cannot be too highly admired," he refers more especially to his latest discovery, viz., "the attenuation of the virus of chicken cholera by the action of the air and oxygen." Quoting Pasteur's own words regarding the cultivation of virus in contact with air, and the experimental test by which he was enabled to pronounce as a principle that "it is the oxygen of the air which attenuates and extinguishes virulence," and which led him to the supposition that "it was oxygen, as an ever-present agent, that set the limits to great epidemics," Dr. Angus Smith explained how he himself, while pondering over the effect of oxygen on organic matter, was led to the conclusion that "it destroyed those minute forms which have been shown to be concomitant with putrefaction and decay." A similar mode of thought had previously led him to consider that it was the want of an excess of oxygen that caused confined sewer gas to be dangerous, whilst the enormous amount of gas coming from decomposing matter, such as on the Clyde, seemed to pass away, leaving comparatively little effect. This purification of the polluted waters of the Clyde, Professor Smith explains thus,—"The air may act in two ways. It may act by rapid oxidation of the substances in the water, or by dilution of the gases when formed, and the destruction of putrid matter in water is really very rapid when plenty of air is allowed. Air is brought to the Clyde by the water, and also by the waves, both artificial and natural, exposing a great deal of surface. The air may act also merely by rapid dispersion of the gases"; but as in the case of the Clyde no marked type of disease, such as is produced by confined sewer gas, has been generated, the conclusion is drawn that "it is not to mere dispersion, but to a more thorough putrefaction and oxidation, and to a more complete destruction of the organic substances by the abundance of air than can take place in sewer water," that the Clyde owes its immunity.

The observations which follow, while unfolding a provision of hygienic action in nature known but to comparatively a small section of the community, explain the process so clearly as not to require any special scientific knowledge for its comprehension; but they have such an important bearing on what may be almost termed the absorbing topic of the day for the dwellers in London and its suburbs, that little apology is needed for transcribing them at length. "If nature," Professor Smith observes, "had contrived no method of destroying such seeds of death, populations such as that of Glasgow would never have grown up. And what is the method? That method is first, putrefaction; at least, I know of none other, except the concluding portion of that work, viz., thorough oxidation. When, therefore, you see the Clyde seething with gases of putrefaction, and when you smell it to such an extent that a feeling of loathing is produced, you may remember this, that the work of destruction is going on with a wonderful rapidity, and that the enemies of life are being slaughtered there millions upon millions, never to appear again in a similar form, though other generations of them may rise up. As putrefaction seems not to take place without the action of organisms, I had the idea that it might be arrested by an abundant use of air, and I had some belief that the oxidation took place very rapidly after putrefaction. It was when examining this subject that I found it necessary to touch also upon the question of vitiation in water. When nitrogenous bodies decompose with an abundance of oxygen, the nitrogen becomes oxidised, and nitric acid is formed. I had long suspected that the reverse also took place, and that when there was an excess of putrefactive matter, oxygen was absorbed and even removed from the nitrate, whilst free nitrogen was given off. This process I was able to verify by carrying it on in the laboratory. It was clear, then, and beyond all cavil, that rivers could purify themselves in time, and organic matter be thoroughly removed. It was my belief that organic substances, that germs of disease, that microbes, or the smallest organisms themselves, were all subjected to this universal and unsparing attack of putrefaction and oxidation." In his Report on the Rivers Pollution Prevention Act, Professor Smith, referring to the above-mentioned results, pertinently asks, "How far, then, can oxidation, or a great supply of air, be employed to destroy putrefaction, or to purify? The bearing that it has on the analysis of water will be clearly seen by chemists." We took occasion to remark, in a recent notice on the late General Scott's pamphlet, that too little importance had been ascribed to the aëration of water, and the above quotations from Professor Smith's address greatly emphasise our observations on the desirability of the water companies devising some means to give the requisite aëration to water pumped from the Thames and other rivers with a view to still further depriving it of such organic impurities as it may still contain. With such an authority as that of Professor Angus Smith on the self-purifying power of rivers, supported by the opinions and scientific investigations of Professors Sorby and Odling, it seems little short of folly to advocate the disuse of river-water for our domestic supplies (at least in cases where the river is adequate to the demand), and to incur great and needless expenditure in leading water from distant sources, or in raising it from enormous depths, when by a comparatively small outlay on the process of aëration, the obvious sources of surface supply so bountifully provided by nature can be rendered innocuous from the pollutions resulting either from an excessive growth of our population or from the ever-increasing demands of our civilisation.

But not only is oxidation a chief agent in the purification of water, but its effects are equally remarkable when applied to sewage. "Substances and living things, the Professor observes, "may be carried by the rapid sewage system into the range of a new activity before undergoing that putrefaction which breaks them up in proximity to us or in the sewers themselves. It seems to point to a plan of causing the destruction of organisms by putrefaction and subsequent oxidation or by chemical action. At least it seems to me that we require to learn if it be true that any of the germs of disease will live in an abundance of good air. We know that abundant dilution will render them all ineffective. It is probable there will be a difference amongst them in this respect, whilst all will yield to the double action of,—first, putrefaction, and then oxidation."

After explaining the character of the changes involved in the word "decomposition," the doctrine sought to be emphasised is that putrefaction in a certain stage is one of the greatest of purifiers, and the most complete that nature has devised. By the germ theory, it is supposed by many who use it without knowing its meaning, that some little germ of disease passing from a sewer into a river may carry with it power to infect other organisms, and thus endanger the lives of all within its reach. But it is abundantly evident from actual results that no such power of infection exists in any of the germs yet known when putrefaction and oxidation are abundantly given. Probably the River Clyde is subjected to as great, if not greater, pollution than any river in the United Kingdom, and yet, as Professor Smith observes, the number of persons who go down from Glasgow to the Firth of Clyde, and who receive health and strength there, are living testimonies to the absurdity of current ideas as to the power of germs in such situations.

The treatment of sewage is certainly the burning question for the day to Londoners, and, therefore, a contribution towards its solution by so eminent a chemist is deserving of the most attentive consideration. Experiments for ascertaining the complete disruption of organic matter in water first led Professor Smith to the thought of driving air through sewage in order to produce oxidation, in the belief that excess of air would be offensive to the microzymes, although a small amount seemed necessary for their activity. But the late Dr. James Young was of opinion that that process would be found too expensive, and he conceived a plan of passing steam through sewage at a very low tension, and, consequently, with an enormous bulk. Dr. Young died before he could perfect his design, but it is believed that he had thoroughly mastered the subject, and that it may yet be possible, from the information contained in the papers which he has left, to bring his process to a practical issue. Unhappily the great mind which would, doubtless, have best contributed to this end has likewise passed away. It is to the marvellous powers of oxygen, however, that Professor Smith was desirous of directing special attention.

"It would seem," he observes, "as if this wonderful agent had the remarkable power of blowing hot and cold, of producing strength and weakness, being our greatest friend and an enemy from which we cannot escape. No wonder, then, if we give it many contradictory duties to perform. It was always known that pure air had a cleansing power, and it has long been known that oxygen was the main agent there; but it has somehow happened that its rapidity of purification has never been brought so clearly to my mind as by these experiments on the purification of sewage. The act of purification is to be seen here rapidly. It is not the work of days or weeks, but the work of minutes; and the belief is taken out of the region of reasoning into that of the simplest observation." If this statement be correct,—and who can call it in question?—the solution of the problem of the disposal of sewage cannot be very far off. In comparison with the Clyde, the Thames, even in its worst portions, is a wholesome river, and there can be little doubt that the dwellers on its banks have, like those on the Clyde, to be thankful for the self-purifying process that Nature has provided for the immunity which they have consequently experienced from the worst form of epidemics, which, according to many authorities, ought to have decimated the metropolis long ago. Nature is long-suffering, and left to itself works miracles more wonderful and sure than human science can do; but at the same time there is undoubtedly a limit even to the powers of Nature, and to that limit it would seem we are rapidly approaching.

It behoves, then, those with whom the authority and the purse-strings rest to bestir themselves ere it be too late, and to relieve the river from, at all events, any further addition to its sewage burden. Prevention is better than cure; and, therefore, the sooner a diversion of the sewage of the metropolis to the sea can be made, the safer will it be for the health of our great city; but at the same time it is to be hoped that the lessons which the late distinguished Professor sought to teach may bear practical fruit in the purification of both our water supplies and sewage.

## NOTES.

THE President's address at the opening of the Social Science Congress dealt mainly with the subject of the increase of State intervention in the form of legislation, of which subject a very comprehensive summary was given, mainly tending to the acceptance of State intervention as a fact of the age, and as in the main beneficent in its results and even a necessity for the proper working of society in the present day. In one class of interests, however, he admitted that Parliament had resisted every attempt to make Government responsible,

viz., in regard to the working and management of railways. We do not know whether Mr. Shaw Lefevre means to hint that Government intervention might be extended in this direction also. We can imagine nothing that could well be more disastrous to the interests of the travelling public. Some of the companies require some pressure to induce them to adopt improvements which they ought to have adopted long since; but in the main, competition, scientific enterprise, and a certain pride which first-class companies take in the working of their lines, are better securities for good service than any that Government could offer.

IT not unfrequently happens that a myth little known or unknown to literature is specially emphasised by Greek vase-painting. A good instance appears this month in the Monumenti of the German Institute at Rome. On an amphora recently discovered at Orvieto the following design appears:—Herakles, unmistakable from his lion's skin, is at work digging the earth with a pick, near him an uprooted vine. To his right a bald, old man threatens him with a hammer; the bald, old man is of the type peculiar to Silenus. To the left of Herakles stands his patron goddess Athene. Evidently the story embodied here is the myth of some labour of Herakles, in which he was compelled to work at agriculture, in the service of the old wine-god Silenus. A similar design appears on two other vases, one in the Louvre, the other at Capua. Their style forbids the supposition that they take the inspiration from the Satyric drama of Euripides. The execution of the vase now published in the Monumenti clearly belongs to the middle of the fifth century. It has all the marks of the manner of the Attic Cylix, masters whose best known representation is Hieron. It has therefore to look for its inspiration to some early form of the legend of which we have no literary record.

NOW that the juncture of the Metropolitan and Metropolitan District Railway is approaching completion, it is a proper time to call attention to the want of a connexion between the Great Western and Metropolitan Railways at Paddington,—a connexion, we mean, by which passengers may be able to pass from one station to another without climbing steps, and having to cross a crowded thoroughfare. Such a connexion has now for some years been in existence between the Great Eastern and the Metropolitan Railways, and it is perfectly scandalous that the same kind of passage has not been made at Praed-street. It is a cause of much inconvenience and very often of considerable delay when passengers from one station to the other are obliged to enter the street. One would have thought that the Metropolitan Railway, from motives of self-interest, would have endeavoured to secure as many passengers as possible from the Great Western system, instead of leaving them to be caught by cabs and omnibuses. It is to be hoped that if these companies do not make the necessary connexion Parliamentary attention will be drawn to the subject whenever a Great Western or a Metropolitan Railway Bill comes before the House. For if the companies will not of their own motion consult public convenience on this point, pressure should be put on them to compel them to do so.

WE hear with great regret of the death of Mr. Walter R. Browne, the engineer, who crossed the Atlantic to attend the meeting of the British Association, and died of typhoid fever at Montreal on the 4th of this month. Mr. Browne, who was only forty-two years of age, combined with great ability and knowledge of professional matters the talent also,—not always found in combination with engineering proficiency,—of clear and forcible literary expression and exposition of his knowledge on special subjects. A brilliant paper read by him at the Annual Meeting of the Iron and Steel Institute in May last led us to invite his co-operation in this journal, an invitation to which he responded with the energy and readiness which seemed part of his nature; he had already contributed several papers and Notes on engineering subjects to our columns, and voluntarily undertook to act as our special correspondent in the Mechanical Section of the British Association meeting, and it was to his expected communications that we referred in a "Note" in reference to the British Association proceedings (page 284, *ante*); communications which were destined never to be written. He had projected an important series of papers on a special subject for this journal, to be commenced immediately on his return. If we may judge from what we came to know of him in the course of business, those who were his most intimate connexions will have had still more occasion to regret his loss as a personal friend.

UNDER the title of "Links in the History of the Locomotive," the *Engineer* is publishing a very interesting series of illustrated articles. Last week appeared No. 17 of the series, which endeavours to clear up some doubtful points as to the celebrated locomotive built by George Stephenson, and known as the "Rocket." There were, it now appears certain, two "Rockets" built by Stephenson. The first one was built in 1829, and of this the *Engineer* publishes an illustration copied from a drawing made by Mr. Phipps, M.I.C.E., who was employed by Messrs. Stephenson to compile a drawing of the "Rocket" from such drawings and documents as could be found. This gentleman had made the original drawings of the "Rocket" in 1829. But "Mr. Phipps is quite silent about the history of the engine during the eleven months between the Rainhill trials and the opening of the [Liverpool and Manchester] railway." Concurrently with the illustration we have mentioned, there is also published an exceedingly interesting *fac simile* of a sketch made by James Nasmyth (subsequently the inventor of the steam hammer, and of whose facility as a draughtsman we had occasion to speak some time ago) of the "Rocket" of 1830. On this drawing is the following memorandum, in Nasmyth's handwriting:—"This sketch of the 'Rocket' I made at Liverpool on the 12th of September, 1830, the day before the opening of the Liverpool and Manchester Railway, while it remained stationary after some experimental trips in which George Stephenson acted as engine-driver and his son Robert as stoker. James Nasmyth." That the engine now shown at the Patent Office Museum, South Kensington, is not the one which was sketched by Nasmyth, is very evident. Our contemporary does not so much question that the "Rocket" at South Kensington is in part, perhaps, the original "Rocket" of Rainhill celebrity, as that it ever ran in regular service on the Liverpool and Manchester Railway. But then, what became of the "Rocket" of 1830? The suggestion is that the first "Rocket" was cast on one side until it was bought by Lord Dundonald. But the "Rocket" of the Manchester and Liverpool Railway is hardly less worthy of attention than its immediate predecessor, and concerning it information is needed. There are probably men still alive who could clear up the question, and it is to be hoped that they will do so.

THE question of keeping Highgate Woods as an open space is one of immense importance to the metropolis. It is obvious, however, that the Ecclesiastical Commissioners cannot do otherwise than make the most they can out of this property. They are bound to administer their property to the best advantage, without regard to the question of whether or not it is pleasant or advantageous for a neighbourhood. At the same time it seems equally clear that in dealing with a property like these Highgate Woods the Commissioners may, without failing in their duty, make the offer of the ground to the public, or to any body representing the public, if such body can pay the same sum as would be received from selling or letting the ground for business purposes. Of course, Parliament is supreme, and can pass any special measure in regard to the Ecclesiastical Commissioners and Highgate Woods which they please. But one thing there can be no doubt about, and that is, that since public attention is directed to this matter, the Commissioners should hold their hands before dealing with the property, in order to let the public feeling come to some practical determination.

WE have received from Frankfort-on-the-Maine a pamphlet by Herr Herrmann Ritter, architect, giving an account and illustrations of an ingenious but very complicated drawing instrument invented and patented by himself for mechanically translating the lines of geometrical plan and elevation into perspective. It would be impossible to make a description intelligible without drawings; but we mention the fact that those who feel any curiosity about it may apply, if they like, to the inventor, or to Maubach & Co., of Frankfort. Our impression is that it is just one of those things which look beautifully clever and complete in a drawing, but which in practice would be more trouble than the result is worth. A good draughtsman wants no machine.

THE autumn congress of the Sanitary Institute of Great Britain commences at Dublin on the 30th, under the Presidency of Sir R. Rawlinson, C.B. The department of "Sanitary Science and Preventive Medicine" is presided over by Dr. T. W. Grimshaw; that of "Engineering and Architecture," by Mr. C. D. Cotton, C.E., and that of Chemistry, Meteorology, and Geology, by Dr. C. A. Cameron, the gentleman who cannot perceive any sewage nuisance in the Thames at Barking. As Dr. Cameron is Superintendent Medical Officer of Health for Dublin, it is to be hoped he is more sensitive as to the Liffey.

ON Wednesday last were interred at Highgate Cemetery the remains of Mr. John Netten Radcliffe, formerly one of the Medical Inspectors, and more recently Assistant Medical Officer of the Local Government Board. Mr. Radcliffe has done so much good work for the advancement of public health and the promotion of hygiene generally, that his memory deserves a grateful record in this journal, which has ever aimed at the advancement of those important objects. Mr. Netten Radcliffe, who began his career as a volunteer in the medical service of the Turkish Army during the Russo-Turkish War 1854-5, was the inventor of the hospital tent which bears his name, and which has often done good service in epidemic outbreaks of disease. In 1874 was published his celebrated report to the Local Government Board on certain means of preventing excrement nuisances in towns and villages,—a report which is regarded as a standard work on the subject of that branch of nuisance-prevention. Mr. Radcliffe also wrote some valuable reports on hospital hygiene, and among these were three of special importance relating to the structure and arrangements of the Radcliffe Infirmary at Oxford, the Norfolk and Norwich Hospitals, and the Royal Infirmary at Manchester. These were published in the Medical Officers' Supplement to the Sixth Annual Report of the Local Government Board, 1878, and are well worth the careful study of any architect engaged in hospital work. Mr. Netten Radcliffe retired from official life in 1883, in consequence of failing health, and died on the 12th instant at the age of fifty-seven.

THE *Courier de l'Art* is very severe on the work that is being done in the way of the decoration of the Panthéon:—"Ce sévère colosse qu'on est en train d'affubler d'un habit d'arlequin." The latest additions to the decoration are two frescoes by M. Maillot, in one of the lateral chapels, and a mosaic by M. Hebert. The subject of the latter is "Christ teaching the Guardian Angel of France the Destinies of her Country." The guardian angel is Joan of Arc, who, habited "*en cuirasse*," is "presented" by the Virgin. M. Hebert is credited by our contemporary with skill in the arrangement of the composition, but with far too mediævalising a tendency in his efforts to consider decorative effect. He has placed in the classic Panthéon mosaics of the early Ravenna type. The artist is accused of having given himself to this style of late, and

exhibiting in the *Salon* every year one of these dying creations, figures with green flesh, hollow eyes, which make the spectator feel ill to look at them. In the mosaic, "Le Christ, la Vierge, les anges, tous sont longs, longs, comme des jours sans pain." Nevertheless, the critic somewhat inconsistently admits that this "longueur" gives a character of idealism to the figures which does not displease him. Some painters and critics with us seem to be of the same mind.

## SUBTERRANEAN RAILWAYS IN PARIS AND IN LONDON.

THE pressure of population on the channels of communication, of which we have so much experience in London, is becoming intolerable in Paris. In 1881 a population of 2,243,000 persons was contained in 77,000 houses, over an area of thirty square miles, in that city. In the same year the "Greater London" of the Registrar-General contained 4,764,312 inhabitants, occupying 645,818 houses, built over an area of 697 square miles. The total passenger traffic of Paris is returned at 340,000,000 persons in the year, or about 932,000 per day; of whom about 34 per cent. were carried by tramways, 31 per cent. by omnibuses, 30 per cent. by cabs and other vehicles, and 5 per cent. by steamboats. In London the total amount of traffic is not accessible; but 384,000 pedestrians and 75,000 vehicles pass daily over the metropolitan bridges; and the traffic on three of the metropolitan railways,—viz., the Metropolitan, the Metropolitan District, and the North London,—amounted in 1881 to 373,000 passengers per diem. This total takes no account of the daily influx of passengers by railway at Victoria, Paddington, Euston, St. Pancras, King's-cross, Ludgate-hill, and the Eastern Counties Termini, or of those who, arriving at the London Bridge or the Waterloo Stations, do not cross the river; or, again, of the dense traffic on the high-level line from Charing-cross to Cannon-street. The rate of travelling in Paris, according to the previous statement, is rather more than 150 journeys per inhabitant per annum. Going and returning, then, without counting pedestrians, each Parisian will only take an enumerated trip by vehicle three times in a fortnight. At the same rate the London journeys by railway or other vehicle would amount to upwards of 711,000,000 passenger trips per annum, or nearly 2,000,000 per diem, without counting pedestrians.

Whether we regard London, Paris, or any other great centre of population, it becomes apparent that an enormous amount of inconvenience and loss of time is due to the abandonment of the ancient Roman method, borrowed from the camp, of building cities on the plan of straight thoroughfares, crossing each other at right angles; a return to which excellent method has been accomplished by the builders of the rapidly-growing cities of the United States. The actual loss of that time which has a direct money value that is incurred by the want of a direct thoroughfare, either for locomotives or for common road vehicles, from the northern to the southern railway stations in London, must be something very serious indeed. In Paris there exists a similar inconvenience, although, of course, on a smaller scale, which it is now proposed to remedy. Three lines of subterranean railway are projected for this purpose. One will connect the Chemin de Fer de l'Ouest with the Lyons Station, with a branch to the Arc de Triomphe, and another, by the Trocadéro, the Mont Parnasse, and the Orleans Stations to the Sceaux Station. Lastly a line is to run north and south, inside the existing Ceinture Railway, passing the Nord and Est Stations, the Bourse, and the Halles Centrales, to the Sceaux Station.

The total length of the lines which it is thus proposed to construct is 23·25 miles, for which the estimate is 5,720,000*l.*, or about 246,450*l.* per mile. The average gross revenue of the tramways along the *boulevards* and from the Place de l'Étoile to La Villette, together with that of the three-horse omnibus service along the Boulevards La Madeleine and Le Bastide, is 26,833*l.* per mile per annum. If the new line provide for the traffic *a grande vitesse* only, as will probably be the case, and if the traffic secured by the new line yields an equal revenue per mile to that above cited, there can be little doubt that the undertaking would pay 6¼ per cent. on the capital; while, if the amount of the omnibus traffic cited be taken as a measure of revenue, the return would be between 9 and 10 per cent. on the capital, assuming the estimate not to be exceeded.

It may be instructive to compare this outcome with that of the railways through London. Unfortunately, the accounts of the Charing-cross and Cannon-street line, like those of the Ceinture Railway in Paris, as involving operations on the part of more than one company, are not distinguished in the annual returns. But we can take the average of the statistical features of the North London, the Metropolitan, and the Metropolitan District railways, which form an aggregate length of fifty-two miles. Of these, the cost per mile, at the end of 1883, averaged 416,538*l.* The gross revenue was 30,047*l.* per mile per annum, and the working expenses came to 14,400*l.* per mile per annum. The resulting earning on capital is only at the rate of 3·52 per cent. per annum; but this net return on traffic is reduced by the omnibus character of the North London traffic, which, following the usual law in such cases, costs 51 per cent. income to work, while the two passenger lines are worked at 42 per cent. of gross income. On the North London Line each servant of the company only earns 227*l.* per annum, while on the Metropolitan District the mean earning per servant is 348*l.*, and on the Metropolitan, 395*l.* On the Ceinture Line (*Rive-droite*), the earning of each servant of the companies engaged averages 358*l.* per annum; while the average earning per servant on the Metropolitan and Metropolitan District Lines, taken together, is 375*l.* It thus appears that it is safe to estimate the working costs of the new Parisian lines as not likely to exceed 40 per cent. of the gross income, while the capital cost is only about five-eighths of that of the three London lines.

It may be hoped that a consideration of these figures may tend to stimulate the attention of the metropolitan authorities to the construction of a better line of communication from north to south in London. The enormous cost of a line through London itself is very formidable, and can hardly be encountered by the promoters of any new line, taken *per se*. In 1878 the cost of the Metropolitan Railway stood at 630,00 *l.* per mile, and that of the Metropolitan District Railway at 680,000*l.* per mile. The distances then open were 14 miles and 9 miles respectively; and the extension of the lines to cover distances of 22 miles and 18 miles has reduced the enormous mileage cost, while at the same time it has fed the traffic. At present, however, while regarding the possible development of electric traction, it perhaps is hardly the moment for asking the public to find two-thirds of a million per mile in order to link Euston and Charing-cross by railway. As to a well-laid out and practical street, however, a hint may be taken from the returns of the traffic of the Paris omnibuses. Let us give one pair of facts alone. The earning of each passenger carriage on the Metropolitan District Railway in 1879 was 2,028*l.* The earnings of each three-horse omnibus running along the Boulevards La Madeleine and Le Bastide since 1883 amount to 2,272*l.* per annum. It is true that it costs nearly three-and-a-half times as much to move an equal weight for a mile over the road as it does over the railway. But, on the other hand, the interest of money required is eight times as much in the latter case as in the former. Without expressing an opinion as to what is best, there can be no doubt that a wide, straight, well-paved street, served by a thoroughly well-ordered horse service, would, at the same time, be a great benefit to London, and a highly remunerative enterprise to the purveyors of this mode of communication. In fact the figures above cited, which are the result of a long series of observations, explain how it is that the dividend of the London General Omnibus Company is something more than twice the net earning on capital of the Metropolitan Railways.

**Penally.**—The ancient church of Penally, well known to holiday visitors at Tenby, has been reopened, after restoration of the interior. The floor has been relaid with encaustic tiles, and the whole series of six windows filled with stained glass. The east window, which was in very bad condition, has also been restored, and the church lighted with the Hesperus lamp, the whole of the work having been carried out by Messrs. Jones & Willis, of London and Birmingham.

## THE CHURCH OF ST. NICHOLAS, DEPTFORD.

"Sey forth thi tale, and tarye nat the tyme;
Lo heer is Depford, and it is passed prime;
Lo Grenewich, ther many a schrewe is inne;
It were al tyme thi tale to beginne."
CHAUCER, *The Reeve's Prologue.*

WE recently directed attention to some extensive repairs which have been begun at St. James's Church, Piccadilly. Subscriptions are invited to the amount of 2,445*l.* towards a thorough restoration of another important parish church at the opposite end of the town,—that of St. Nicholas, Deptford. Its ancient grey tower with turret, said to date from the twelfth century, must have formed in generations past, like to the windmills on the opposite Isle of Dogs shore, a prominent landmark to shipping in the Thames. Bearing northwards are Cuckold's Point and Limehouse Church, whilst due east stand the cupolas of Greenwich Hospital with the wooded slopes of the Park beyond. Dedicated to the patron saint of sailors, the church stands on a plot of ground lying between Deptford-green and the Stowage, having Rose Cottages and the almshouses to the east. The nave, aisles, and chancel, of red brick, were built in 1697, and have been repaired upon two subsequent occasions. The register contains entries relating to the Pett family, the eminent ship-builders, one of whom, Peter, was master shipwright to Queens Mary and Elizabeth, the royal dockyard having been established here in their father's reign. In the burial-column we read, under date 1st of June, 1593, "Christopher Marlowe, slaine by Francis Archer." There are monuments to two of Evelyn's children, to dockyard officials, to Captain Fenton, a companion of Frobisher in two voyages, and to many naval commanders distinguished for their prowess during the last two centuries against our Dutch, Spanish, and French enemies at sea. The parishes of St. Nicholas and St. Paul, covering nearly 1,700 acres, constitute the lower and upper towns respectively; the latter, made separate in 1730, contains more than seven-eighths of the total population, and is served by a fine stone structure,—one of Queen Anne's "Fifty" churches. It stands in the midst of an extensive and well-kept graveyard. St. Nicholas's burial-ground is detached from the church, and has an entrance in Wellington-street. Having been laid out, at a cost of 309*l.*, by the Kyrle Society, this ground was opened on the 9th of July last by the Countess of Selborne for public recreation.

William the Conqueror, according to Dugdale, gave the manor of West Greenwich or Depeford, so called from the deep or passage through the Ravensbourne, to one Gilbert de Magminot.* On his great-grandson's death in 1191, without issue, the property passed to the sister and co-heir, Alice, wife to Geoffrey de Say, who gave it to the Knights Templars. That body subsequently exchanged it with his son for Saddlescombe, county Sussex. After a short sequestration Henry III. restored the property (1223) to the Sayes, who again enjoyed possession until the close of the fourteenth century. Passing through various hands the estate, on John Earl of Lincoln's death at Stoke (1487), became forfeit to the Crown. Thereupon Henry VII. gave it, in the year following, to Oliver St. John. But having reverted to the Crown, the property was seized by Parliament on King Charles I.'s death, and was sold, as valued at 1,650*l.*, in behalf of certain state creditors. Since the Restoration the manor has vested in the Crown, the stewardship being held in conjunction with that of Greenwich. The Browne family had long occupied the manor-house or Sayes Court. At the Parliamentary sale they received the Sayes Court site, together with about sixty acres, in lieu of their interest in the whole.† This grant included the Red House (latterly the Victualling Office), a wet and dry dock,—since Deadman's,—and a water-mill. But Sayes Court's chiefest fame rests upon its associations with the Russian Czar and the author of "Sylva." In 1647, at the Ambassador's Chapel, St. Germains, Evelyn married Mary, only daughter and co-heir to Sir Richard Browne, our minister in France. Sir Richard died, in 1683, in what Evelyn calls "my house at Sayes Court." Evelyn, it appears, first made Sayes Court his permanent residence in March, 1652, on his return from a tour in France; and laid out the celebrated gardens

* Compare the Sunderland suburb of this name,—on the river Wear,—where also are shipbuilding yards.
† Two hundred acres in all.

after the succeeding winter. In the Wotton MSS. is a detailed account of his operations, both building and horticultural, from which we gather that he planted the holly hedge, "even with the mount hedge below," in 1670. In the spring of 1683, he says, he planted all the garden out-limits and long walks with holly.* Peter the Great lodged here, at the sovereign's charges, in 1698. His domestic habits were the reverse of fastidious, yet for his reputed pastime of being dragged through quickset hedges in a barrow, the Czar does not seem to have chosen Evelyn's favourite rampart of holly. For in the "Sylva," lib. ii., cap. vi., occurs this passage,—"Is there under heaven a more glorious and refreshing object of the kind than an impregnable hedge of about 400 ft. in length, 9 ft. high, and 5 ft. in diameter, which I can show in my now ruined garden at Sayes Court (thanks to the Czar of Muscovy) at any time of the year glittering with its armed and varnished leaves, the tall standards at orderly distances blushing with their natural coral? It mocks the endless assaults of the weather, beasts, or hedge-breakers. *Et illum nemo impune lacessit.*" It is diverting to contrast Evelyn's solicitude for his garden with Pepys's references thereto. The latter, under date May 1st, 1665, mentions his visit "to Mr. Evelyn's, which is a most beautiful place, but it being dark and late I stayed not; but Dean Wilkins and Mr. Hooke and I walked to Redriffe [Rotherhithe]; and noble discourse all day long did please me."† On the 5th idem he writes:—"After dinner to Mr. Evelyn's; he being abroad [Evelyn was then busy with the care of some sick and wounded sailors, Dutch and English], we walked in his garden. A lovely noble ground he hath indeed, and, among other rarities, a hive of bees, so as, being hived in glass, you may see the bees making their honey and combs mighty pleasantly." Sayes Court was pulled down in 1728 and a workhouse erected in its stead. The garden site has been lately laid out by the owner as a parish recreation-ground. Other changes followed. The dockyard, established for ship-building in the year 1513, ceased to be used for that purpose in 1865 upon the introduction of armour-plated vessels, and was converted into a victualling-yard for the Royal Navy. One relic, however, had long been jealously kept,—the good ship *Golden Hind*, whereon Queen Elizabeth visited and knighted her great captain, Francis Drake. The state cabin was fitted up as a banqueting-house. A chair was ultimately made out of the woodwork and deposited in the Bodleian at Oxford. In March, 1869, Mr. J. P. Austin bought part of the old dockyard for 70,000*l.*, and sold it, with considerable profit, to the London Corporation for their foreign cattle market. This, however, was soon relinquished for the existing depôt of cattle landed from abroad. The hall of the Trinity House came down in 1787. That Company was founded by Sir Thomas Spert, Comptroller of the Navy to King Henry VIII., and Commander of the *Harry Grace de Dieu*, of which ship one or two faithful models may be seen in Greenwich Hospital.

Lovers of the picturesque in what we must now reckon as part and parcel with Greater London would do well to devote an hour or so to the by-ways and leading thoroughfare of Rotherhithe and Deptford. Few better views can be obtained than those presented by Wellington-street (formerly Flagon-row), conspicuous for its irregular wooden houses and quaint little bulk shops whose floors lie below the road level. Similar points of interest are to be found in Church-street,—notably the Three Compasses,—in Creek-road (*antiquè* New-road), together with Grove and New King streets, Deptford. Moreover, the streets which run southwards and eastwards have for distant background varied views of the Surrey and Kentish hills. Church-street, Rotherhithe, can boast of another curious bulk shop opposite to the Pavement, whilst of the many garden houses those in the neighbouring Paradise-row should not be overlooked.‡ Mr. Besant and his coadjutor, the late Mr. James Rice, laid most of the scene of their "Captain's Room" at the Seven Houses by Trinity Church, Rotherhithe. But it is to be observed that this name also belonged to a set of tenements which stood where the East London Railway passes underneath the Deptford Lower-road, near to the site of the old China Hall. Southwark Park absorbs the Mill Ponds and Halfpenny Hatch; Jacob's Island scarcely survives even in name.* Southwark Park-road represents the old Blue Anchor-road. The wide sluice at the northern end of Jamaica-level may possibly be the remains of the canal which was made to relieve the river's current on the rebuilding of London Bridge by Peter of St. Mary Colechurch, at the end of the twelfth century. That cutting is further supposed to have been laid in the course of the water-trench that Cnut opened for his abortive attack upon the citizens. Extending from the lower St. Saviour's Dock, Rotherhithe, to Lambeth, it passed through the multitudinous islets and the morass over which these low-lying parts of London have since arisen. The Jamaica Tavern, so renowned for its orchard, lay westwards of the new park, at the end of the now Cherry Garden-street. Hither Pepys would repair with his companions enlivening their passage by singing on the water. Cowley and the Earl of Nottingham, Queen Elizabeth's Lord High Admiral, lived in Deptford. Similar honours were conferred on Rotherhithe by Admiral Benbow and Swift, in the person of his Lemuel Gulliver; whilst such names as Hyde, Boscawen, and Hood streets perpetuate the memory of other naval heroes.

* The lease to him from the Crown was passed on the 30th of May, 1663. It was renewed for ninety-nine years, on the 12th of January, 1672, though a fee-farm had been promised under the king's engagement. See Wotton MSS.

† The party had spent the day with Colonel Blunt at his seat, Wricklemarsh, near to Charlton. Sir Gregory Page Turner rebuilt the house; this was sold in 1784; a set of chairs there'from is preserved in the Soane Museum.

‡ Most of Paradise-row, where Prince Lee Boo lodged, at Captain Wilson's, is merged in Union-road.

* This wretched locality, familiar to readers of "Oliver Twist," lay, surrounded by ditches, in the area bounded by the present Mill-street (west), George's-row (east), Hickman's Folly (south), and the Thames (north).

## RESISTANCE OF VESSELS.

ONE of the subjects referred to by Lord Rayleigh in his inaugural address at the meeting of the British Association at Montreal last month was the resistance to be overcome in the propulsion of vessels. Till within a recent period in modelling vessels attention was confined to the resistance offered by the midship section, and experiments were carried out with a view to discovering the best form which could be given to the entrance and run of ships, so as to reduce that resistance to a minimum. Before the application of steam to the propulsion of vessels there were elements affecting the modulus of stability which need not enter into the calculations of the present day, such as the height of the masts, the spread and weight of canvas, the angle at which the sails might be set, and the amount of freeboard necessary for ships liable to be heeled over at a considerable angle by the pressure of the wind in a hurricane on the heavy top-hamper which sailing-vessels are unavoidably obliged to carry. The relative dimensions of length and beam were then much less, and the lines of entrance and run, together with the best form of bilge suitable for cargo stowage or the disposal of a man-of-war's complement and stores, presented a very complicated problem for calculation. The proportion of mid-ship section to the wetted perimeter of a fully-laden ship was much greater than it is in the models of ships in the present day; and, consequently, the resistance offered by the vessel's surface appears not to have been considered, while even that of the angle to be given to the entrance and run-lines, both horizontal and vertical, appear to have been but imperfectly understood. The late Mr. John Scott Russell's interesting series of experiments which demonstrated the wave-line theory, and reversed the old lines by giving a double curve to the entrance and a single curve to the run led to great modifications in designing vessels, and to the increase of speed in that class of ships known as "clippers" which were used, prior to the introduction of steam, in the China trade, and which always commanded the highest freights,—carrying as they did the most valuable products so as to secure the earliest sales in the London market. With steam-propelled vessels, however, it became necessary to alter the models. The proportion of length to breadth became much greater, and that of the wetted perimeter became largely increased over the midship section. The substitution of iron for wood introduced also another element into the calculation,—for while the sectional resistance was much reduced by the adoption of finer lines, the total resistance was on the other hand greatly increased by the rougher surface exposed to the water. This new element, however, was not understood, though, as Lord Rayleigh pointed out, Professor Rankine, at a meeting of the British Association in Bath in 1864, surprised his listeners by asserting that he regarded skin-friction as the only legitimate resistance to the progress of a well-designed ship. The great importance of providing the smoothest surface possible for a vessel of the modern type of ocean-going steamers will be at once apparent from the fact that the resistance of painted iron has been found to be 1-15th lb. per square foot, while that of copper is only half as much, or 1-30th lb., at a speed of two miles and a half per hour. Taking one of the simplest models of steamers traversing the Suez Canal, say 400 ft. long and 40 ft. beam with a draught of 24 ft., the midship section would probably be about 850 square feet, but the wetted surface would be fully 30,000 square feet. If modelled on fairly fine lines the sectional resistance would probably not exceed 450 lb., while the surface friction (painted iron) would amount to 2,000 lb. at a speed of two miles and a half, as long as the surface remained smooth, but liable to be greatly increased when that surface became coated either with barnacles or any other substance. Lord Rayleigh observed that the nature of skin-friction is itself not well understood. This is quite true. Mr. Froude's experiments in this respect were by no means exhaustive, and there is much yet in connexion with surface-friction which has to be investigated. For instance, Lord Rayleigh is reported as saying that the resistance varies as the velocity. This point, however, has been by no means established; for at the higher speeds the ratio does not appear to continue constant. Moreover, it has been ascertained from other experiments that the surface-friction varies at different parts of the vessel, being greater at the bow than at the sides, and less still in the run; but the reason for these differences has not been yet explained. No doubt, in the words of the president, "it is connected with fluid viscosity, but the *modus operandi* is still obscure; but in spite of the difficulties which beset both the theoretical and experimental treatment, we may hope to attain before long to a better understanding of a subject which is certainly second to none in scientific as well as practical interest." There are symptoms of an increasing interest arising in the restoration of internal navigation. The projected ship canals, the improvements on some of the more important lines in England, the enlargement of the Ribble navigation, the improvements to the Aire and Calder, the discussion of an enlarged connexion between the Thames and Severn, and Bristol and London, are indications of a reviving appreciation of water-carriage, emphasised by the necessities engendered by foreign competition and home railway combination. An important factor in such navigations is, of course, the boats which have to ply thereon, and the more that their resistance can be reduced, the cheaper will be the cost at which they can be worked, and the greater the diminution in the charges for conveyance.

## BICESTER.

WHATEVER may be the functions of a Rural Dean, we cannot be far wrong in supposing that their due exercise implies familiarity with the parishes of which the deanery is composed, and does not exclude a fair amount of literary leisure. It is pleasant to meet with a man who turns these opportunities to such good account as Mr. Blomfield has done in the book before us,* and we hope he may find many imitators in the ranks of the country clergy in Oxfordshire.

Bicester is best known in these days as the centre of a good hunting country, and there is not much in its outward appearance to distinguish it from any other Midland market town. There is the usual long street, through which in former days the mail-coaches between London and Birmingham were wont to rattle; the Market-place, from which the town-hall was carried away piecemeal by the mob in 1826, and the parish church, around which the history of the place for some 700 or 800 years centres. Bernecester (*unde* Burcester, Bissiter, and

* The History of Bicester: its Town and Priory. Compiled by Rev. J. C. Blomfield, M.A., Rector of Launton and Rural Dean. Bicester: Smith & Pankhurst. 1884.

Bicester) is mentioned in the Domesday Survey among the possessions of Robert de Oily, and had then an adult male population of 17, and two mills,—a fact which shows that then, as now, it was in the midst of a corn-growing district. The manor passed by marriage into the family of Bassett, and descended, through several female heirs, to William Stanley, 16th Earl of Derby. In 1596 he sold it to his own tenants,—thirty-one in number,—and thus the individual lordship of the manor has become virtually extinct.

The parish church,—replacing a Saxon structure which occupied the same site,—was built by Gilbert Bassett about the middle of the twelfth century; but the original cruciform plan was not carried out in its entirety. Chancel, transepts, and nave were finished, but the central tower was left incomplete. Its walls were raised high enough to carry the adjoining roofs, but the western arch was only indicated, and the work in the three existing arches was left very plain and void of ornament. The nave was extended to its present length, as three pieces of tooth-moulding, still *in situ*, forming the outer string-course of the north wall, show; and flat wooden roofs were employed throughout the fabric. Gilbert Bassett, the founder of the church, died in 1162, having spent most of his long life in the moated manor-house which he had built for himself at Berncestre. His grandson of the same name was yet more religiously inclined. Coming into possession of the manor in 1179, he immediately took in hand the establishment of a Priory of Augustinian Canons, and assigned the church to their care. The result of this was that the parochial fabric was neglected, and a century and a half elapsed before any addition was made to it. Then the southern wall of the nave was broken into, and an aisle of good Early English work added. Later on a north aisle was built in the Decorated style. The arches are recessed and chamfered and the pillars octagonal, with cap mouldings, and windows in the same style, were substituted for the small Norman lights at the east end and south side of the chancel. A century later the tower was erected, and the western door and window of Perpendicular work inserted. The tower, 75 ft. high, resembles so closely that of the neighbouring church of Islip that both must have been designed by the same architect, whose name has unfortunately perished. About the same period the roofs of the nave and transepts were raised, and the clearstory formed, and a little later the north porch, with a parvise above it, was added. Such is the architectural history of the fabric for three centuries and a half,—a history of growth both in beauty and use. Then follows the usual record of debasement and disfigurement. Pews and pulpit reigned supreme, and no less than six galleries were intruded between the arches of the nave and chancel. "Nothing," says Mr. Blomfield, "could have been seen in any church more unsightly and unbecoming than this chaos of uplifted boxes." It may be worth while to chronicle an eighteenth-century Archdeacon's notion of what was required for the due preservation of a noble parish church like that of Bicester. The entry is as follows:—

"28 Sept., 1757.—A little under Pinning to be mended at the S.E. corner of the Chancel. The Church Porch to be whitewashed and the steps into the Church at N.W. door to be repaired. The pavement of the whole North Isle and at the S.E. corner of Miss Bosce's burying-place to be new laid, Plain and even: Bottoms of some of the seats to be repaired. A new cover to Font, new Chest, 3 locks and key; Church and Chancel to be whitewashed, 10 Comman' and chosen new Texts wrote." A little more than 100 years afterwards, viz., in 1862, the thorough restoration of the church after the plans of Mr. C. Beazley was effected, and St. Edburg's now presents a comely appearance, though the modern stained glass must be a poor substitute for that which filled the windows as late as 1660. No distinguished name occurs in the list of vicars of Bicester, but it must be borne in mind that after the prior and canons had taken their share of the ecclesiastical revenues the parochial minister had only a poor pittance left him, and that no augmentation was made when the priory was suppressed. That event took place in 1536, for Bicester was one of the lesser monasteries which were first despoiled. The king held the property only two years, and in 1542 it was sold by the Duke of Suffolk to Roger Moore, one of the serjeants of the royal household, who seems to have resided in the Hospice or Guests' House,—the only portion of the priory which now remains.

Mr. Blomfield gives the annals of the priory at considerable length, and has reprinted many of the deeds and account-rolls. From these one is able to gather not only a tolerably clear idea of conventual life, but also much valuable information about the cost of living in the fourteenth and following centuries. In the bursars' accounts, which begin with the year 1297, there are, of course, a good many items which seem to substantiate the charge brought against the monks of fondness for good fare. But the expenses were chiefly incurred for the entertainment of wealthy and powerful guests. If 9d. was spent upon "pork and larks," it must be remembered that they were "bought for the coming of the Lord Richard Daimari (Damory) and John Hubert," and against the item must be set "two sextaries of parchment of velym for the Prior's missal, 2s. 4d.; and ink and vermillion pounz and 'staungegreye' and other small things, 4d." Mr. Blomfield does not suggest any meaning for the last of these articles, and in many instances he is at fault in finding an equivalent for a monkish term. But the book, which, we understand, is only an instalment of a work which will include the parochial history of the entire deanery, is very creditable to the author, and deserves to meet with more than local support. The illustrations are scarcely up to the mark. The best, that of Burcester Hall (formerly Nun's Place), is taken from Dr. White Kennett's "Parochial Antiquities." Unfortunately the quaint house which it represents was pulled down at the end of the last century, sharing the fate of most of the older buildings in Bicester.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

SEVENTH NOTICE.

ALONG the central avenue there are several stands devoted to the exhibition of wood pulps, and there are models of wood-grinding mills showing different modes of converting the wood into pulp. From early times the leaves and inner bark of trees have been used as writing materials, but it is only within the present century that the idea has been entertained of converting wood itself into a manufactured paper. In 1801 a patent was taken out in this country for such a purpose, but, like many inventions of this kind, it was some time before paper manufactured from wood became an article of commerce. The great and increasing demand for paper of all kinds, especially for the printing of newspapers, combined with the insufficient supply and consequently high price of rags and other fibrous stuffs from which the paper had hitherto been made, called greater attention to wood as a substitute. From experiments made it was found that the pine woods were the most suitable for the purpose; and about ten or fifteen years ago a fair start was made in this direction by German manufacturers, and the industry has since spread into Norway and Sweden, and Denmark, and now hundreds of thousands of tons are produced annually. There are three modes of converting wood into pulp, one of them by a mechanical process, the other two by means of soda and by the use of acids. By the mechanical process the wood is ground in water into small fibres, and is then partially dried. Mr. Carl Christensen exhibits an excellent model of a wood pulp well driven by water. The logs are brought up to the saws by a lade, where they are cut into sections of from 1 ft. to 2 ft. in length; they are then barked and split by machinery, and by another process the knots are got rid of and the pith removed. By means of a hydraulic piston the material is held against upright grinding-stones revolving in water, which can be adjusted to produce either long or short fibre. The fibre is then carried by water to sieves, which check the passage of unground chips, while the strained material is passed on to a machine with an endless web, whence it issues in the form of large sheets. These sheets contain about 50 per cent. of water, which is squeezed out of them by hydraulic pressure, and the pulp is then ready for sale. In this state the price in London is about 3*l.* 10*s.* per ton. The wood used must not exceed twenty years of age, as thereafter it becomes hard and the fibre too brittle. The Germans prefer the Scotch fir, but in Scandinavia and Denmark the native pines are used. The preliminary process in the other two modes is similar to that adopted in the mechanical process. The wood, after being cut into small pieces, is boiled in water under high pressure, and is then treated under great heat with caustic soda or sulphuric acid, which extracts from it the resins and gums till it forms a pure cellulose mass, which is then washed and passed through breakers and rolled out upon a cylinder. To withstand the corrosive influence of the acid the iron boilers are lined with lead,—a section of such a boiler is exhibited. In the soda process a large percentage of the soda is recovered for after use by means of evaporation. Difference of opinion exists as to the superiority of these two processes, but the result appears to be equally satisfactory, the respective pulps being regarded as of the same value in the market. Large quantities of wood pulp are wrought up with other materials into papers of different qualities, but that produced by the mechanical mode having less tenacity than that made by the soda-and-acid process is only used for the commonest kinds. The different kinds of wood pulp are sometimes used in combination, and they are largely employed in the manufacture of cardboards, papier mâché, &c. This material may, in course of time, be in great demand for building purposes; it possesses great tenacity, may be moulded into various forms, and give a fine uniform surface. It is already used for ceiling and other decorations, but light and serviceable doors, well suited for the cabins of vessels, &c., may be made of it, and we have heard it recommended for roofing, either in large or small portions.

Another product of the forest which has now become an important article of commerce is indiarubber. This material was only known to the mass of the last generation as an article used for rubbing out pencil-marks and surface-stains from paper, &c.; it is now extensively used for various purposes, and new uses for it are continually cropping up. The raw material varies in quality, there being no less than fourteen different varieties of indiarubber tree. Of these the most common is *Ficus elastica*, and one of the rarest is *Hevia Braziliensis*, from which latter the finest Para rubber is obtained, the tree itself being remarkable for the beauty of its foliage. The material is used both in its elastic and vulcanised form, and is, in a great measure, superseding leather for various purposes. Every bicyclist knows its value in mitigating the vibration of the wheels of his machine, and the engineer finds it invaluable for a similar purpose. The principal exhibitors of rubber products are Messrs. Thornton & Co., of Edinburgh, who have a stand at the extreme east end of the central avenue of the exhibition buildings, and a large glass pavilion in the adjoining grounds. Specimens of rubber in its crude state, as it issues from the tree, and in various stages of preparation for ultimate use, are shown. The adaptations of the material for waterproofing are illustrated, from the light material used for ladies' mantles, to the strongest as applied to shooting, fishing, and campaigning requisites. There are also examples of portable garden hose for conducting water to plants, foot-mats of various patterns, belts, and other surgical appliances, dolls, toys of various kinds, &c. The North British Rubber Company (Limited), who were the first to introduce the manufacture of vulcanised rubber into Scotland, exhibit an assortment of articles in this material as applied to machinery. As illustrating the adaptation of rubber to the production of heavy material, the company exhibit a traction-engine wheel tyre, measuring fully 4 in. thick, and 15 ft. 6 in. in diameter, which is stated to be one of the largest masses of the material yet produced.

A varied and miscellaneous collection of articles more or less associated with forestry has been contributed by a number of gentlemen interested in the subject. The first of these,—and not the least interesting,—which meets the eye is a case containing upwards of two hundred specimens of woodpeckers, contributed by Mr. R. G. Wardlaw Ramsay, of Whitehill. This useful bird is widely distributed, and ranges in size from that of a humming bird to a crow, and its plumage is as varied as its dimensions. There are only four species of woodpecker found in Britain, the most common of which, *Picus viridis*, is distinguished by its dark-green body and scarlet head and tuft. The plumage of the whole family is generally

brilliant and strongly contrasted. Mr. C. V. Riley, of the Department of Agriculture, Washington, contributes a case containing a collection of butterflies, moths, and beetles, with their larvæ which attack trees, and whose greatest enemy is the woodpecker. From examples taken from trees attacked by these grubs, it appears that the wood is riddled through and through, and it is stated that very few of the more common forest trees entirely escape their ravages. From Australia we have a singular natural curiosity in the shape of an example of *Spharia Robertsii*, which is produced thus:—One of the great Australian moths, while passing through its last stage of development, buries itself in the earth, where it is often attacked by a vegetable fungus which roots itself in the creature, sending up a long stringy shoot of about 9 in. in height. The roots fill up the skin of the larval moth, which remains intact, none of the fibres passing outside, so that when dug up the plant presents a very curious appearance. Other cases contain specimens of various birds, including specimens of white-tailed and golden eagles, sent by Mr. James Sargeant, of New Cumnock; and Mr. D. Johnston exhibits three specimens of the ant-eating armadillo.

Amongst the practical exhibits is a railway wagon frame, fitted up by Messrs. James Kennedy & Co., of Glasgow, to show white oak scantling in the kind of work for which it is employed. And with the object of demonstrating the suitability of the oak for such purposes, where strength is so necessary, there is also on view a number of pieces which were subjected to a series of bending and crushing strains by the well-known testing authority, Mr. Kirkaldy, of London. The oak scantling is sawn in the American forests to sizes required, which, besides giving better quality, effects a saving by having the wood sawn at the point where it is grown,—a saving which is immense as compared with the old system of importing logs, and having them sawn in this country. As showing the durability of oak, the same firm exhibit a table formed from the foundations of the old Stockwell Bridge, Glasgow, built in 1345, and taken down in 1850; and specimens are shown of *Liquidambar* wood, which till lately has not been used to any extent in this country, and which is beautiful in its colour and marking.

Another practical exhibit is contributed by Mr. James Dairsie Morrison, of Swanston, near Edinburgh,—a gentleman who has devoted much attention to the study of ventilation,—consisting of an ingeniously-constructed model of a forester's hut, which aims at providing within the space which can be afforded in such dwellings the most perfect conditions of healthy life. It may be recalled that at a meeting of the Highland and Agricultural Society, Mr. Morrison's system of ventilation came up for discussion, when his model of a "perfect stable" gained for him the Society's medal. The members of the British Association had also their attention twice called to the same subject by Mr. Morrison, whose papers were considered of sufficient importance to merit a place in the Transactions. Since then the matter has been further prosecuted; and the hygienic hut is part of the outcome of experiments which have been made. The principle embodied is that of maintaining in an apartment without creating an objectionable draught a continuous current or circuit of pure air. This air is made to enter at one end of the room treated, and to leave it at the other in a sort of drain underneath the flooring, which terminates in the flame chamber of a newly-invented oil-lamp stove used for heating purposes, where all impurities are consumed. The due admission of light is also made a feature of the scheme; and in the construction of the hut powerful and ingenious bracings have been introduced so as to prevent it from being injured by falling trees. A drying-shed, shown by the same exhibitor, claims to be an entirely new departure, inasmuch as it seeks to scientifically secure in one process the perfect drying of wood at a low temperature, with the no less perfect poisoning of all the conditions of low plant and animal life. Having regard to the fact that water evaporates at all temperatures, it is proposed to make heat do two distinct things simultaneously,—viz., to evaporate from the cells of the wood every trace of water, and, while doing so, to act as the carrier into the vacuum thus produced any amount of gaseous poison, such as carbonic acid, carbonic oxide, carbolic acid fumes, or other evaporable poison, which, though entirely harmless to the woody fibre, nevertheless fills every cell with a lining of poison against all low forms of life, and makes dry-rot a chemical impossibility.

The Queen has shown her interest in the exhibition by contributing a neatly-designed rustic châlet constructed entirely of the wood of the grand indigenous trees of the Balmoral forests, with beautiful specimens of the ancient Scots pine, both in a rough and polished state. The *Pinus sylvestris* at one time covered a large portion of the Highlands, and there are still some noble remains, notably on Speyside, Deeside, and the head waters of the Perthshire rivers. But nowhere may this picturesque tree, with its richly-coloured bark and deep green masses of foliage, be seen to more advantage than in her Majesty's forests, which cover about 20,000 acres of the romantic wilds of Upper Deeside. Some years ago the Ballochbuie Forest, where are some of the finest Scots pines in the country, passed into the hands of a firm of Aberdeen wood-merchants, who were proceeding to denude it of the choicest and most stately trees it contained. These proceedings were viewed by her Majesty with dismay, and by stepping in and purchasing the old forest, she put an end to the work of destruction. The old trees in Ballochbuie are now strictly preserved, and part of the ground is fenced in against the incursions of the deer so as to allow seedlings to come up and supply the blanks. By the gale which blew down the Tay Bridge, on the 6th of March, 1883, great havoc was committed in the forest, and the châlet now exhibited is formed from the wood of some of the trees then blown down. The interior is panelled with the polished heart-wood, which is beautifully grained, and the exterior of branches, bark, and moss collected in the forest. The châlet, with most of its furnishing, was made by the joiners at Balmoral, and the specimens show the adaptability of the wood for interior ornamentation and cabinet-making purposes, a table-top by Messrs. Allan, of Aberdeen, showing some very beautiful swirled graining. Over the entrance is the head of a royal stag, showing antlers with twelve points, and two other antlered heads are disposed at the ends of the ridge of the roof. On each side are placed specimens of the wood in a rough state. One of these, from Ballochbuie, is 270 years old, and another shows a girth of 212. This last specimen exhibits a peculiar and most interesting aspect. It had lain on the ground for upwards of forty years, until the sapwood had decayed and formed a thin stratum of soil where heather, cranberry and blackberry plants, and mosses have taken root; but the heart-wood, measuring 3 ft. 6 in. in diameter, remains perfectly sound.

An excellent exhibit of forestry subjects well worthy of notice, both from a botanical and practical point of view, is that of Messrs. Vilmorin, Andrieux, & Co., Paris, in the north-western transept. They have brought together quite a museum of dried specimens of plants, cones, and seeds, comprising upwards of 150 varieties of pinus, fifty different kinds of abies, and numerous specimens of araucaria, cupressus, juniper, and cedar. The collection of seeds includes samples of trees and shrubs from every region,—among others being the teak, mahogany, the eucalyptus, the indiarubber, and the cinchona, with seventy varieties of palms and over fifty varieties of oaks. Specimens of the most useful kind of eucalyptus, leaves, flowers, and seeds, are being shown; and as illustrating their rapid growth, there are displayed some stems of the *Eucalyptus globulus* (blue gum), and of the *Acacia dealbata*, grown on Mr. H. Vilmorin's estate in the south of France, which, although only two years old, measures 15 in. in circumference. There are also on the tables a few specimens of various acacia barks, which are now being largely used in place of oak bark for tanning purposes. The same firm also show some beautifully illustrated works on forestry, in English, French, and German. Mr. James Barrie, forester to the Honourable Mark Rollo, Stevenstone estate, Devonshire, also sends a well-arranged and representative collection of tree and shrub seeds, and cones, and sections of timber grown on this extensive property.

**Cost of Maintaining Three London Bridges.**—The cost of lighting, cleansing, and repairing London Bridge, for the past year, was 1,267*l.*; Blackfriars Bridge, 1,292*l.*; Southwark Bridge, 2,467*l.*, including 624*l.* for relaying new channelling to approaches.—*City Press.*

## THE LATE WILLIAM PETTIT GRIFFITH.

WE much regret to announce the death of this gentleman, which took place on Sunday afternoon last, the 14th instant. William Pettit Griffith was the son of Mr. John William Griffith, architect, who was a resident in St. John's-square, Clerkenwell, for half a century. The subject of our notice was born July 7th, 1815, and was brought up in the profession of an architect. Although upwards of seventy years of age, Mr. Griffith had only just retired from the profession, after incessantly labouring in it for fifty-three years. He retired from his professional residence in Guilford-street, Russell-square, in June last, and died at his new home, at 3, Isledon-road, Hornsey-road, Highbury, on Sunday last, as above stated. Mr. Griffith was elected a Fellow of the Society of Antiquaries in 1841, a Fellow of the Royal Institute of British Architects in 1847, honorary member of the Bedfordshire Architectural Society in 1847, honorary member of the Liverpool Architectural Society in 1849, and honorary member of the Surrey Archæological Society in 1856. In 1854 he obtained, in a competition, the silver medal of the Institute of Architects. Mr. Griffith was the author of the following works:—"Grecian Architecture: Suggestions for Developing," "Natural System of Architecture," "Mediæval Architecture: Ancient Gothic Churches," and "Architectural Botany."

The following were among the papers communicated by Mr. Griffith to various Societies:—In 1852, to the Royal Academy of Belgium, "On the Proportions of the Temple of Vesta at Tivoli"; 1852, the Bedfordshire Architectural Society, "Suggestions for a more Perfect and Beautiful Period of Gothic Architecture"; 1855, Royal Institute of British Architects, "On the Principles to be observed in Designing Mediæval Decorations and Ornaments with reference to the Sources of Ornament offered by the Natural Kingdom"; 1857, the Liverpool Architectural Society, "Proportion, its Practical Application to Architecture and the Fine Arts"; 1863, the same Society, "Of the Influence of Fashion in Architecture"; 1854, the Surrey Archæological Society, "On the Ancient Baptismal Fonts of England"; 1858, the same Society, "An Architectural Notice of the Nave of St. Saviour's Church, Southwark."

Among the works which he has designed and superintended are Ogle-mews Ragged School, for Sir R. W. Carden, 1862; Lamb and Flag Ragged School, 1861; the Goldsmiths' and Jewellers' Annuity Institution Asylum, South Hackney, 1853; new schools, Highgate, for Clerkenwell Guardians, 1858; restoration of St. John's Gate, Clerkenwell, 1845-6; rebuilding spire of St. James's Church, Clerkenwell; Vestry-hall, Clerkenwell, 1857; Royal Hospital for Incurables, West Hill, Putney Heath (the foundation-stone of which was laid May 11th, 1864); an illustration and description of this building appeared in the *Builder*, vol. xxiii., p. 118, Feb. 18th, 1865. Restoration of tower and porch of St. Sepulchre's Church, Holborn, and various other works.

**The Theatre Royal, Edinburgh.**—Plans and specifications have now been prepared, and estimates received, for the reconstruction of the Theatre Royal, which was destroyed by fire on 30th June last. Mr. C. J. Phipps, of London, who designed the ill-fated building, is the architect for the new building, and his plans show that the new theatre will be built very much on the same lines as its predecessor. Several new features are to be introduced, however, which are calculated to add to the safety and comfort of playgoers. First of all, increased facility is to be afforded on the higher levels of the building for entrance and egress by providing an additional staircase. The wall dividing the stage from the auditorium is to be of solid brickwork, and is to be carried up through the roof of the theatre; while all apartments of the nature of workshops and other necessary rooms are to be erected outside the main building. Last, but not least, the ventilating arrangements are to receive careful attention. As already indicated, tenders have been given in for the reconstruction of the theatre, which Mr. Phipps has undertaken to have completed by the beginning of the panto mime season. As to cost, it is expected that this will be covered by the insurances on the old building, which amounted to 12,500*l.*

## Illustrations.

### DESIGN FOR WAR OFFICES.

BY MESSRS. GLOVER AND SALTER.

WE give this week the design by Messrs. Glover and Salter as submitted in the second competition. The illustrations show the proposed front to Whitehall (from a much more distant point of view, however, than would have been possible in reality), and, as in the other cases, the plans of the two principal floors. The open areas, it may be noted, are in this plan increased in size at the upper levels, and are ventilated by an open subway below the basement; and the corridors are lighted not only from these open areas, but receive direct light at the staircases and the messengers' rooms. The design is a powerful one in some respects, and takes a very good place, architecturally, among the nine; but, bearing in mind the fact that architecture is now a succession of fashions, there can be little doubt that at the present moment it is what in fashions would be called "out of date." No blame to the authors for employing the style they prefer; but there could have been little chance of a purely Gothic design finding acceptance, so quickly in these days does the whirligig of time bring in his revenges.

The following extracts from the Report of the architects will assist in explaining their views in the design:—

"The buildings show two distinct façades in Whitehall for the Admiralty and War Office, connected in front by open covered corridors and arcading, so that, although they are thus united and form one continuous building in the rear, the two offices can be separately identified on the main front. The proposed new street between the Admiralty and Biddulph's Bank is for convenience, and to isolate the buildings.

There are three courtyards behind the Whitehall front, and one grand quadrangle behind the Park fronts. Three great carriage entrances are provided towards Whitehall, and one, generally kept closed, in the west (Park) front; and there are carriage porches in the quadrangle. It will be noted that the centre quadrangle gateway is opposite the middle of the Admiralty Whitehall façade, and the two side gateways are,—the one opposite the centre of the War Office courtyard, and the corresponding one opposite the new street. Carriages can enter at the centre gate in Whitehall, and go out by the side gates, either to Whitehall or to St. James's Park, or *vice versâ*. It is thought that the gateway in the park front would serve as a central feature of that long elevation, and also that it would be of value in giving a glimpse of the trees in the park to passers-by in Whitehall and in the quadrangle.

It has not been thought necessary to adhere to the style of the Horse Guards, which building is probably inadequate to its future requirements, and which is so much lower than the new offices that an attempt to match the two would be a failure. For that and the following reasons a Mediæval style of the best period has been adopted:—(1) For contrast with the Foreign Offices; (2) for picturesqueness of outline; (3) for the greater number of window-openings available; (4) because it combines the characteristics of a castellated style with the conveniences and enrichments of palatial and domestic architecture, and so appears suitable for the War Offices of a nation. Thus in the accompanying design the turrets and machicolated cornices, and the great central tower or 'keep' present an appearance and character consonant with the purpose of the building, while each serves its own purpose of use or ornament, the 'keep' being utilised in floors of repositories, and the other towers similarly applied for the departments near them.

In further justification of the choice of a Mediæval style, it may be pointed out that in this design the rooms are well lighted and without slanting sides or awkward corners; the corridors are wide, straight, level, and well lighted, and the staircases are easy and absolutely without winding steps; although Gothic architecture is erroneously supposed to be incompatible with convenience of plan.

Again, if it be asked what modern English public building has given most content and satisfaction to the nation, it can scarcely be doubted that the Houses of Parliament would be named. It is true that the Law Courts are considered to fail in internal arrangements and in external unity; but this is not the fault of Gothic architecture: as stated above, this style is no bar to convenience of plan; and the elevations and perspectives of the accompanying design show that by proper use of horizontal as well as vertical lines, unity, grandeur, and stability can be well expressed in this most pure and beautiful style.

The walls should be faced with Portland, Ancaster, or similar stone, externally, and with white glazed bricks in the areas, and the roofs slated. The floors would be iron joists and Portland cement concrete, covered with tiles in the corridors and with wood in the rooms for comfort.

All the important rooms on the first floor open on to the balconies. It will be noticed that the waiting and 'Interview, or Clerks',' rooms are very numerous, one to every head of department or high official. Besides the public corridors, 10 ft. 6 in. wide, private corridors, 4 ft. 6 in. wide, are provided to all the most important rooms on the first floor, so that communication between the chiefs and their heads of departments can be made in absolute privacy. Both sets of corridors will be well lighted and ventilated by the numerous open areas between them.

The retiring-rooms are arranged in accordance with modern ideas of comfort and convenience too often neglected. Each contains one water-closet or more, with a window to the open air; also a lavatory and lobby, which have other opening windows besides those in the water-closets above the water-closet framing. The retiring-rooms are entered, not from either corridor, but from the short lobbies or staircase landings connecting the two corridors on the first floor, or leading to room son the other floors.

No special or particular system is advocated either for heating or ventilation; any approved scheme could be adopted, as the 2 ft. thick floors and the great amount of spare room in the towers and basement supply more than adequate space for any required apparatus."

As before, we print the key list of references to departments, which will apply also to the other design mentioned below.

*Key to References on Plans.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. " Supplies.
  B 3. " Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. " " "
  C 2. " " "
  C 3. " " "
  C 4. " " "
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

### DESIGN FOR WAR OFFICES (FIRST COMPETITION).

BY MR. T. G. JACKSON.

THIS very elegant and tasteful design, the merits of which would no doubt have come out far better in detail, had the architect been commissioned to present it on the larger scale and with the more complete drawings admitted by the second competition, partakes a good deal of the feeling of the modern manner of London building which has been supposed to have more or less relation to "Queen Anne," or to have arisen from a preference for Late English Renaissance. The author's note in regard to style in his Report is as follows:—

"A Gothic style would not be suitable either to the site or the purposes of the building, and pure Palladian Classic would be still less fitted for a structure consisting necessarily of several low stories and an infinity of small windows. I have adopted the freer style of the English and German *Renaissance*, and thus avoided the necessity of running the Classic order through two stories of the building, an absurdity seldom committed by the best masters of the *Renaissance* in any country, though common enough in our own."

Though we regret the adoption, by several able architects of the day, of some of the less admirable features of the old London brick style, such as the curved pendent ornaments (?) beneath the window-sills, which are ugly in themselves and architecturally unmeaning, we have no doubt that, if carried out, this would have been a building presenting much very pleasing detail, and a general aspect of architectural refinement. But we should very much doubt if it would generally have been taken by visitors for the War Office. It is a great deal too quiet and domestic-looking to convey any such idea. The plan is very symmetrically arranged for intercommunication, but some of the corridors could hardly, we should imagine, have been sufficiently lighted. We append the following remarks from the author's Report:—

"In order to secure ready circulation throughout both offices, I have avoided very large quadrangles, and the plan has fallen naturally into a form very like that suggested by her Majesty's First Commissioner in the article published by him in the *Nineteenth Century* for November, 1882. The public entrances to both offices would be from Whitehall by large archways leading into the smaller quadrangles of the War Office and Admiralty respectively. Each office has a large waiting-hall opening from this quadrangle, and I have placed these, not on the side next the street, but in the interior of the building, tolerably central with reference to all the departments. The public will consequently have no occasion to traverse an unnecessary number of corridors, but can be taken straight from a common centre to the department they are in search of. They need never use more than two of the staircases provided for each office, and the other staircases can be reserved exclusively for the use of officials and persons on special business. The rooms of the chief officials are farthest from the general entrance, and need never be approached at all by the public. The corridors into which the rooms of the Admiralty Board and those of the chief officials of the War Office open are continuous, and those rooms form one suite facing St. James's Park.

There is a similar communication on each floor between the two offices at each of the three points where they touch, except on the upper floor of the Whitehall front, where it did not seem to me necessary.

*Height of Stories.*—In a building consisting of so many rooms of moderate size, seldom larger than those of a private dwelling-house, it has seemed to me that to exceed the height usually given to rooms of that size would make them ill-proportioned and uncomfortable. The average size of the single rooms is about 20 ft. by 17 ft., and the best proportionate height for such a room would be from 13 ft. to 14 ft. on the principal floors to 12 ft. on the top floors, to which dimensions I have accordingly confined myself, except in the case of the Board-rooms and those of the First Lord, the Secretary of State, and the Commander-in-Chief, which are higher, and the entrance-halls, which occupy two stories in height. I may add that I do not think a very lofty building would have a good effect in this situation. Inigo Jones's Banqueting House measures only 67 ft. to the eaves, and the Horse

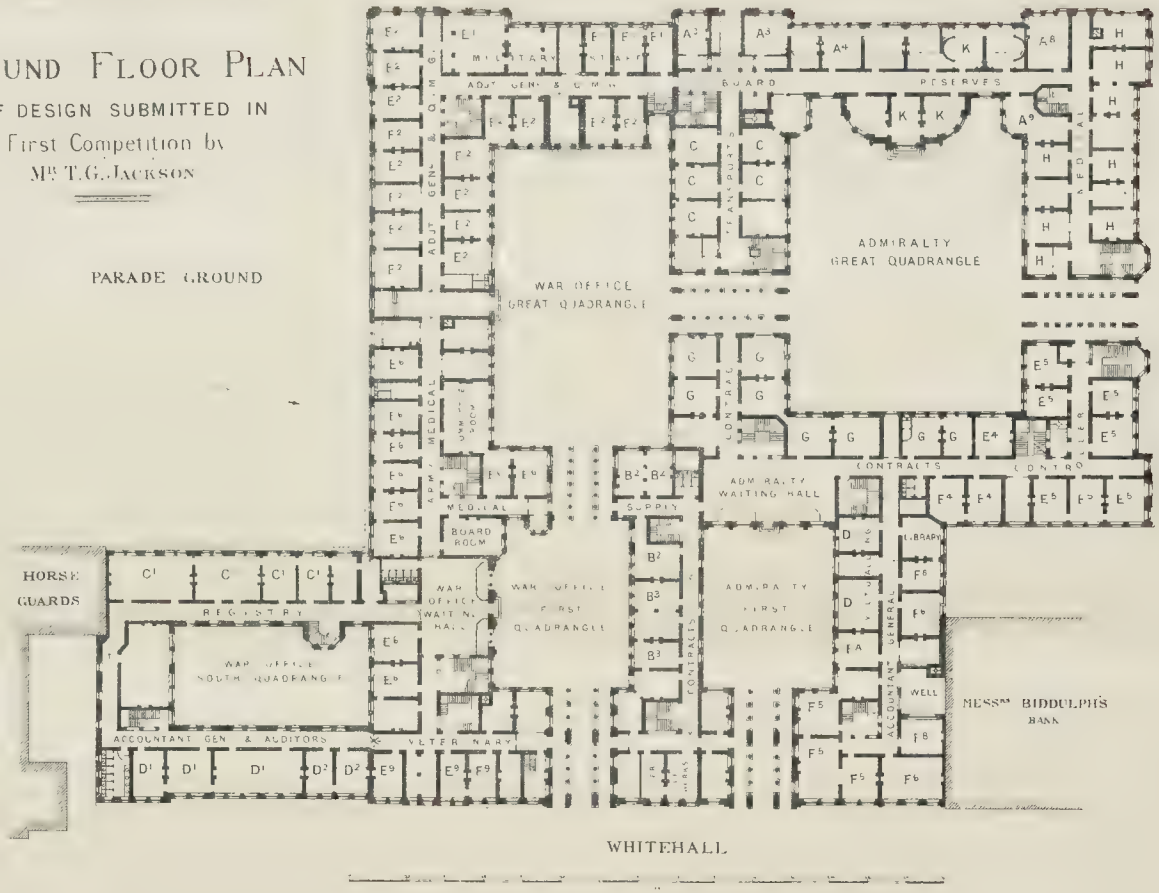
NEW ADMIRALTY AND WAR OFFICE.

# GROUND FLOOR PLAN

OF DESIGN SUBMITTED IN
First Competition by
Mr T.G. JACKSON

PARADE GROUND

ST JAMES'S PARK



# DESIGN FOR NEW ADMIRALTY AND WAR OFFICE.

## GROUND PLAN.

BY MESSRS GLOVER & SALTER.

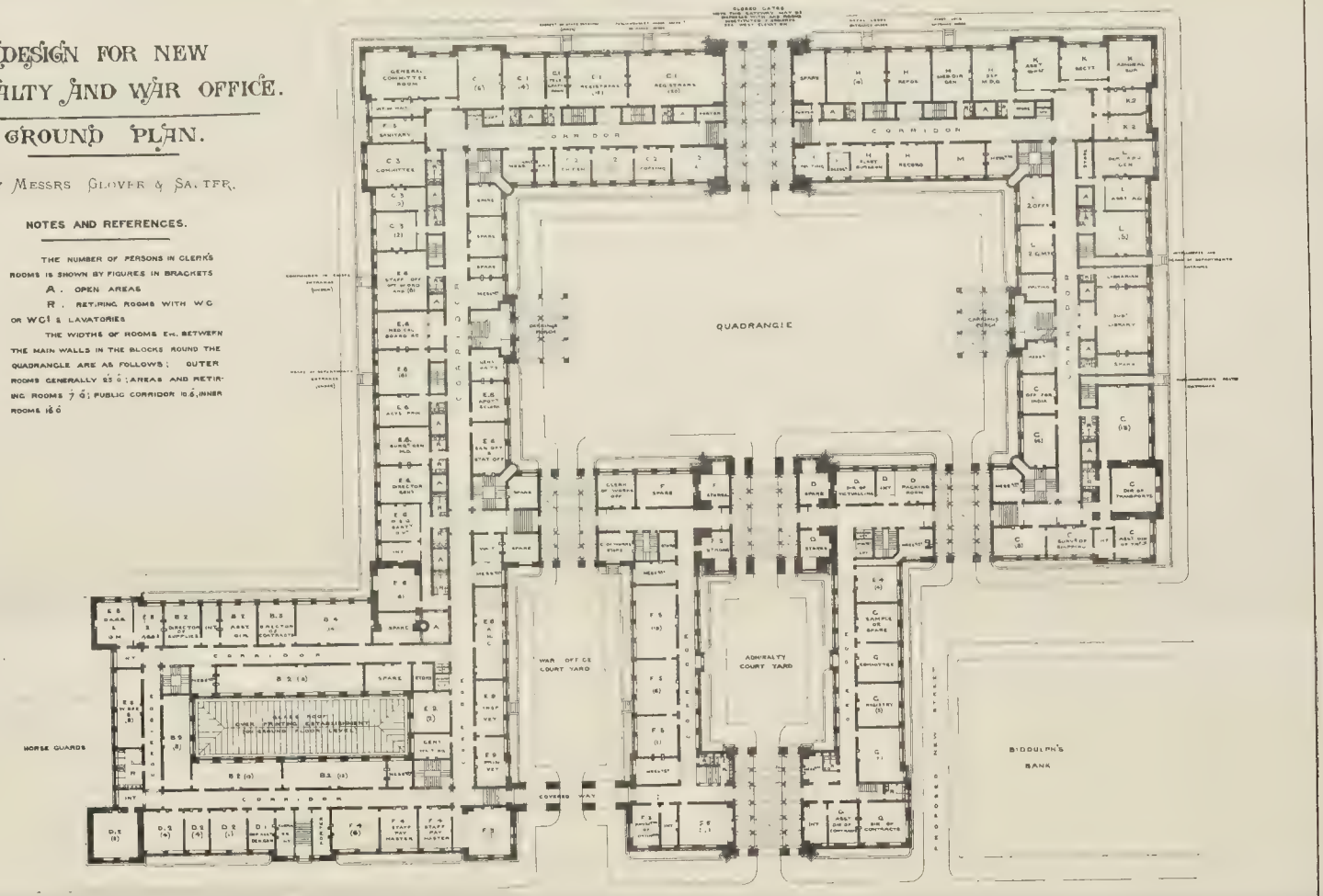
### NOTES AND REFERENCES.

THE NUMBER OF PERSONS IN CLERK'S ROOMS IS SHOWN BY FIGURES IN BRACKETS

A. OPEN AREAS

R. RET.RING ROOMS WITH W.C OR W.C[1] & LAVATORIES

THE WIDTHS OF ROOMS &c. BETWEEN THE MAIN WALLS IN THE BLOCKS ROUND THE QUADRANGLE ARE AS FOLLOWS; OUTER ROOMS GENERALLY 25' 0"; AREAS AND RETIRING ROOMS 7' 6"; PUBLIC CORRIDOR 10' 6", INNER ROOMS 18' 6"






ADMIRALTY

ELEVATION TOWARDS ST JAME




HORSE GUARDS
TO SCALE.

ELE

DESIGN FOR WAR AND

F. Kell Photo. Lith. & Printer



WAR OFFICE ---- RECEDES 282 FEET ---- HORSE GUARDS



OFFICE ENTRANCE — ADMIRALTY ENTRANCE — RECEDES 146 FEET 6 INCHES AND IS HIDDEN BY MESSRS BIDDULPH'S BANK

RDS WHITEHALL.




TY OFFICES (FIRST COMPETITION).

G. JACKSON.

8 Castle St Holborn, London E



F. Kell, Photo-lith. Architect

DESIGN FOR NEW ADM

By Messr

A



LTY AND WAR OFFICES

ER AND SALTER.

*hitehall.*

# DESIGN FOR NEW ADMIRALTY AND WAR OFFICE.

## FIRST FLOOR PLAN

BY MESSRS GLOVER & SALTER.

### NOTES AND REFERENCES.

ALL IMPORTANT ROOMS ON THIS FLOOR HAVE BALCONIES

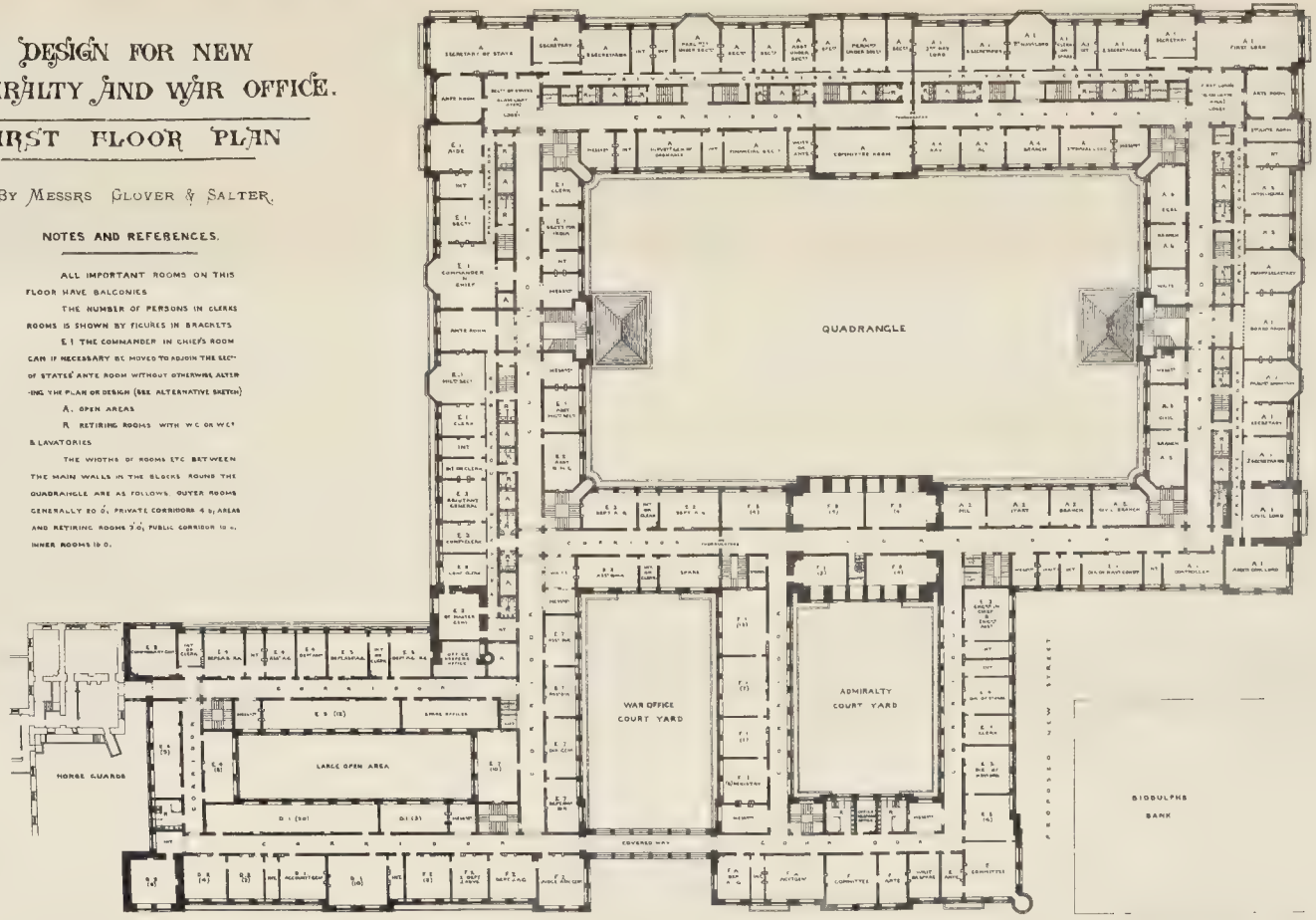
THE NUMBER OF PERSONS IN CLERKS ROOMS IS SHOWN BY FIGURES IN BRACKETS

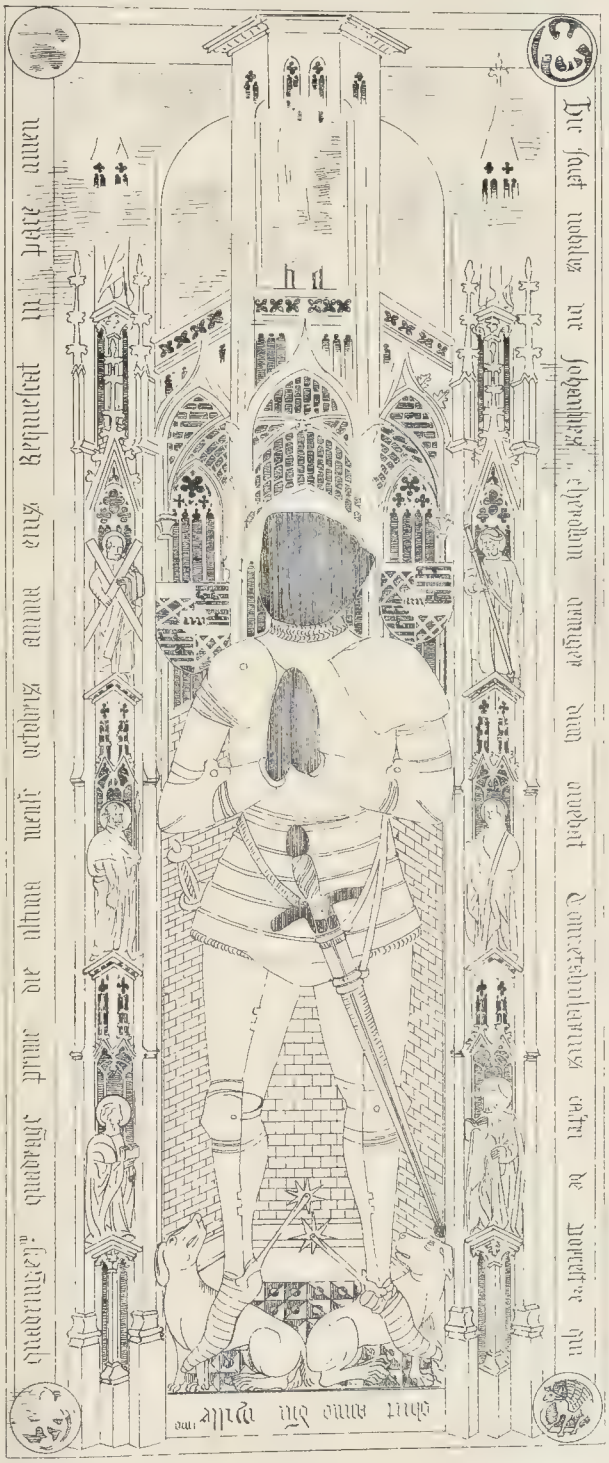
E 1 THE COMMANDER IN CHIEF'S ROOM CAN IF NECESSARY BE MOVED TO ADJOIN THE SEC^Y OF STATE'S ANTE ROOM WITHOUT OTHERWISE ALTERING THE PLAN OR DESIGN (SEE ALTERNATIVE SKETCH)

A. OPEN AREAS

R RETIRING ROOMS WITH W.C OR W.C & LAVATORIES

THE WIDTHS OF ROOMS ETC BETWEEN THE MAIN WALLS IN THE BLOCKS ROUND THE QUADRANGLE ARE AS FOLLOWS. OUTER ROOMS GENERALLY 20 0, PRIVATE CORRIDORS 4 0; AREAS AND RETIRING ROOMS 7 0, PUBLIC CORRIDOR 10 0, INNER ROOMS 16 0.






INCISED SLAB
BRADING CHURCH ISLE OF WIGHT

W. de Faud del 1884

Guards is comparatively a small building. I have shown the latter to scale on my elevation that the relative size of my design may be appreciated.

*Construction.*—The walls would be of brickwork with dressings of best selected Portland stone. In the interio of the quadrangles I should propose to face part of the walls between the dressings with rubbed brickwork, which has an admirable effect mixed with Portland stone. The exterior fronts will probably be best faced chiefly with stone, though even there some brick facing might be employed with advantage. It is, however, impossible to study this to so small a scale as that of the present drawings."

## INCISED SLAB, BRADING CHURCH, I.W.

THE slab here illustrated is one of the finest of its kind in England. It is situated in the chancel of Brading Church, immediately south of the altar, and measures 8 ft. in length, and about 3 ft. 6 in. in breadth. The centre is occupied by the figure of John Cherowin, constable of Porchester Castle, who died in 1441. He is represented in plate armour, with a long sword hanging from the left side, and a dagger visible on the right. The feet rest on dogs, and have remarkably long spurs with rowels. The head, hands, and some of the ornamental parts of the sword hilt and scabbard were formerly inlaid with stone or metal, probably the latter. There is a tradition that the inlay consisted of silver. The figure stands underneath a vaulted canopy, with tracery in the upper part, and brickwork below. Against the tracery, one on each side of the head, are two shields, which are charged apparently with the following arms:—Quarterly, 1st and 4th fretty, a chief; 2nd and 3rd barry of twelve, three martlets. Over all, on an inescutcheon, four martlets.

On each side of the figure rises a tier of canopied niches with pinnacled buttresses. There were formerly eight figures, but only six remain at all perfect. Of these SS. Andrew, Lambert, Peter, and James can be made out, but the other two are somewhat obscure. The lowest on the right holds a book. At the top over the centre of the canopy was the Virgin and Child. Some slight traces of drapery alone remain, and the figures which flanked this niche have entirely disappeared. At the angles are the evangelistic symbols, of which two remain. The inscription is marginal, and runs round three sides of the stone. It is as follows:—"Hic jacet nobilis vir Johannes Cherowin armiger dum vivebat Connetabularius Castri de Porcestre qui obiit anno Domini millesimo quadringes$^{mo}$ quadrag$^{o}$ primo die ultima mense Octobris anima ejus requiescat in pace. Amen." The elaborate details, especially the masonry background, seem to point to the fact that this fine monument is of foreign workmanship.

The drawing has been reduced from a rubbing, and carefully drawn to scale.

R. W. PAUL.

## THE TRADES' UNION CONGRESS.*

WE now bring to a close our notes of the proceedings of the Aberdeen congress of trade unionists.

*The Employers' Liability Act.*

At the afternoon sitting on Tuesday, the 9th inst., Mr. Woods (cotton-spinner) moved,—

"That this Congress regrets that Parliament has not yet consented to pass the Bill, introduced by Mr. Burt, M.P., Mr. Broadhurst, M.P., and others, to amend the Employers' Liability Act of 1880. The Congress also hopes that these gentlemen will re-introduce the measure next session, and assures them of the continued support of the trades of the United Kingdom until the same be passed in law."

This was seconded by Mr. Jack (Glasgow), and supported by several other speakers, including Mr. Thomas Burt, M.P. It was carried unanimously.

*The Enginemen's Certificates Bill.*

Mr. Swift (Manchester) moved,—

"That in the opinion of this Congress much of the loss of life and injury to workpeople from boiler explosions and accidents to steam engines arises from preventible causes; that many of these causes may be removed or obviated by judicious legislation having for its object the institution of a system of certificated engineers for land engines and boilers as for engines at sea, so that only competent persons may be employed in positions of such responsibility; therefore the Parliamentary Committee is instructed to take immediate action for securing this much-needed industrial reform."

This was seconded by Mr. W. H. Lambton, of Hetton Colliery, who argued that if it was necessary that men who had charge of marine engines should have certificates of competency, it was no less necessary that parties who had charge of steam-engines and boilers on land should have like certificates, seeing that they had so large a travelling public whose lives were dependent on the good or bad management of locomotives, and that so many engines and boilers had been erected in the towns and cities, in the midst of densely-populated places, and in works where large crowds of "hands" were employed. The resolution was supported by three other speakers, and unanimously agreed to.

*Factory and Workshops Inspection.*

Mr. David Holmes (Burnley) moved, in the absence of Mr. Birtwistle through indisposition,—

"That it be an instruction to the Parliamentary Committee to continue to urge upon the Government the necessity for the appointment of an additional number of practical men, and, where expedient, women, as Factory and Workshop Inspectors, pointing out the utter impossibility for the present staff to maintain a due observance of the Act."

He said he did not want to detract from the efficiency of the present staff of inspectors, but at the same time he was of opinion that if practical workmen were appointed, the administration of the Act would be more efficient than at present. With regard to the number of inspectors, he might say that since the consolidation of the Factory and Workshops Acts they could not get the number of workshops,—that it was impossible to get a report, the inspectors having no report to give. That was because there was such a vast number of non-registered workshops. Those of them who were acquainted with the internal working of the factories of Lancashire and Yorkshire knew the necessity of pressing upon Government for an increased staff, while at the same time they should be induced to pay more attention to the fencing of machinery in order to avoid the chapter of accidents inserted in the annual reports of her Majesty's inspectors.

Mr. McLean (Edinburgh), in seconding the motion, said that when the Factory and Workshops Acts were consolidated in 1878, they were looked upon by a vast majority of those who had taken an interest in them to be a wise and beneficent settlement for many years,—setting at rest the question of factory and workshop inspection. So it would have been if the Government had taken any steps to enforce these Acts.

The resolution was unanimously carried, after a long discussion, at the close of which Mr. Neil M'Lean, Edinburgh, in answer to Miss Wilkinson, said he had it on the authority of the Chief Inspector that there was no power under the Factory Act to interfere with underground workshops or premises entirely lighted by gas. Then the amount of breathing space was not stated in the Act. The Chief Inspector himself, upon his own authority, had made it 250 cubic feet, being 100 feet per individual less than they were compelled by law to find for the worst criminals in their country.

*Inspection of Mines.*

On the third day of the Congress (Wednesday, September 10), after the presentation of the testimonial to Mr. Broadhurst (mentioned in our last), Mr. Reid (Durham), moved the following resolution, viz.:—

"This Congress has heard with much satisfaction the promise of the Home Secretary to increase the number of Inspectors of Mines, and therefore instructs the Parliamentary Committee to urge upon the Government the necessity of having these appointments made as speedily as possible, believing that the increased number of mines, in addition to their greater depth and extent of workings, imperatively calls for such increase."

This was seconded by Mr. Fenwick (Northumberland), who advocated an immediate increase in the number of inspectors of mines. At present, he pointed out, there were about twenty-four inspectors of mines, who had under their supervision something like 4,000 mines, or an average of 166 mines to each inspector. It was utterly impossible for an inspector to make a thorough inspection of a mine of any dimensions in less time than a week. The resolution was unanimously agreed to.

*Co-operation.*

On the motion of Mr. John Burnett (London), seconded by Mr. Knight (Newcastle), it was resolved,

"That the Congress, in giving a hearty welcome to the Delegates from the United Board of the Co-operative Union, desires to express its earnest good wishes for the success of all well-conducted attempts to promote and maintain establishments for co-operative production, in which the workpeople shall have a share in the product of their labours, and also for the general progress of the co-operative movement."

*Trade Federation.*

On the fourth day (Thursday, September 11), Mr. A. W. Bailey (Preston), moved,

"That this Congress cordially reaffirms the declaration repeatedly made by former Congresses, namely, that the establishment of a Federation of the Trades Organisations of the United Kingdom would be a source of strength to trade unionists, would promote good fellowship, and would prevent the occurrence of many avoidable trade disputes. But, seeing the want of success which has attended previous efforts on the part of the Parliamentary Committee to introduce a code of rules for a National Federation, this Congress is of opinion that it would be unwise to attempt to promulgate another scheme which would possibly prove abortive. It is, therefore, hereby resolved that it be an instruction to the Parliamentary Committee to assist and put into communication with each other trade societies and trades councils desirous of forming a federation, and to convene a meeting of representatives of such societies and councils whenever and wherever a sufficient number may desire to meet to prepare for themselves an acceptable basis for the formation of a permanent National Federation of Trades Organisations."

This was seconded by Mr. F. Willis (London), and carried by an overwhelming majority.

*Goods Qualities.*

On Friday, the 12th inst. (being the fifth day of the Congress), Mr. Uttley (Sheffield) moved, Mr. Church (Birmingham) seconded, and it was resolved,—

"That the attention of the Congress be called to the ever-increasing necessity of maintaining the excellence of our manufactures in the face of constantly-increasing competition abroad; and seeing that the tendency on the part of many manufacturers is to sacrifice quality to cheapness,—which, while it may tend for the time being to enrich unscrupulous manufacturers and speculators, in the end will entirely destroy confidence in our British manufactures, and eventually bring ruin upon the workmen,—would earnestly commend the attention of the Parliamentary Committee to the question of obtaining some direct and easy method of protection against the present system of falsely marking spurious goods, thus imposing upon the inexperienced purchaser."

*Employment of Young Girls as Ironworkers.*

Mr. Juggins (Darlaston) moved,—

"That it be an instruction to the Parliamentary Committee to use their best exertions to re-introduce the Factory and Workshops Amendment Bill of 1883 that applies to the employment of female children under fourteen years of age at forging nails, chains, bolts, or any such articles that are made from iron or steel."

He asserted that it had not been an uncommon thing for years past in South Staffordshire and East Worcestershire for girls of seven, eight, and nine years of age to be engaged in the manufacturing of nails, chains, rivets, bolts, and so on, a calling which was a disgrace to their sex. This had been allowed to go on, and without extraordinary exertion on the part of the Parliamentary Committee or the bringing to bear on it the influence of the Congress, it must continue to go on unless it was stopped by legislation. In submitting the resolution, he did not wish to interfere in the slightest degree directly with female labour, although he had not the slightest doubt he should be charged with the intention of, as far as possible, preventing the introduction or carrying on of female labour. He considered that the trades best adapted to female labour were those that should be encouraged for females, and not those that were adapted only to males, such as those of blacksmiths and of working in shops. He had travelled through the district of which he spoke, and could tell of a state of matters that would shock the modesty of every man and woman in that Congress; for great immorality, depravity, and pauperism prevailed, and everything that was calculated to lower and disgrace the sex in whose interests he was speaking, and the raising of whom in the social scale he advocated.

The resolution was seconded by Mr. Joseph Arch, and carried by a large majority against an amendment which proposed to instruct the Parliamentary Committee to obtain a Commission to inquire into the cause of complaints made in reference to the employment of females and young persons in the trades named in the proposition. Miss Wilkinson, in seconding this amendment, said she thought that in taking up this question they should remember that the boys wanted protection quite as much as the girls, and if there was a Commission of Inquiry that would be brought out. Mr. Juggins had said he had no intention of directly levelling this motion against female labour, but indirectly he had, because he would keep them from work under 14, knowing that would be as good as keeping them from work after 14. In the

* See p. 362, *ante*.

course of the discussion, Mr. Corbet (Nottingham) said he had seen girls carry away 3,000 bricks in a day, and the distance they had to go was about twenty-five miles, and the weight carried about twenty-five tons in all. Moreover, they would be wet through with sludge from the chin to the toes, and without a bit of shoe on their feet. He thought it was time that female labour was done away with where the workers were under 14 years of age.

*Sanitary Inspectorships.*

Mr. Petrie (Aberdeen) moved,—

"That in the opinion of this Congress it is desirable that only thoroughly practical men should hold the position of sanitary inspectors."

He observed that though the subject might not appear in the eyes of the delegates or of the public to be of much importance, viewed in its wider aspect it would be found to be of first-rate importance with regard to public health. The subject was touched upon the other day by several of the delegates in connexion with the Factory and Workshops Act, and it was pointed out by one of them that the evils to be found could be remedied by applying to the sanitary authorities in the district; but what he wished to bring before the Congress was, that the authorities responsible for the appointment of sanitary inspectors in the large towns should be held responsible for having such appointments made from the ranks of practical men who had wrought at and understood the subject. They never heard of such a person as a practical plumber receiving such an appointment, and this was not as it ought to be, for who knew better than a man who had engaged in, and was thoroughly conversant with the work, and could tell when it was done in a safe and satisfactory manner, or the reverse? From his own experience, he felt the present system to be a great injustice, and the trade which he had the honour to represent there felt it very strongly. That men who never learned, or who, perhaps, had never given any thought to the subject prior to their appointment, should be in a position to dictate to practical workmen who have such work to execute, was a highly unsatisfactory state of things.

The motion was seconded by Mr. Forbes (Aberdeen), and unanimously agreed to.

*Recovery of Wages.*

Mr. Smyth (London) moved:—

"That, in the opinion of this Congress, it is desirable that for the recovery of wages a workman shall have a first lien on the work accomplished by him, and that the Parliamentary Committee take action to so amend the law that a workman may recover his wages by some summary procedure."

Mr. Smyth is reported (in the *Aberdeen Free Press*) to have observed that in the building trade in England men were continually defranded out of their week's earnings by "sloping" employers, who set up to do piecework and at the end of the week vanished, and the men got no money. This was a system which prevailed largely in London and other large towns, and the only way that a man could find redress was by spending about six times the amount of his wages. He considered that every man should have a claim upon the produce of his labour.

Mr. Abrey seconded, and the resolution was unanimously carried.

*Free Libraries.*

On Saturday last the Congress was brought to a close.

Mr. Foster (Hull) moved,—

"That this Congress, being of opinion that a general adoption of the Public Libraries Act would tend to greatly improve the social condition of the people, strongly recommend that the adoption of these Acts should be made compulsory in all towns, parishes, or districts where the Compulsory Education Acts are in force."

This was carried by twenty-seven to twenty-two, against an amendment which sought to make the adoption of the Act optional.

*Sunday Opening of Museums and Art Galleries.*

Mr. Freak (London) moved,—

"That it be an instruction to the Parliamentary Committee to use their best endeavours to secure the opening of the national museums and art galleries on Sundays."

Considerable difference of opinion was manifested on this question, and "the previous question" was moved, and carried by forty votes to twenty-one.

**International Inventions Exhibition.**—The latest date for sending in applications for space has been extended from the 1st October to the 1st November.

## A MANUAL FOR MECHANICAL ENGINEERS.*

This work, which now appears in a third edition, can scarcely be considered as otherwise than a compilation of the investigations of eminent authorities upon mechanical science. The author is frank enough to give a detailed list of those he has "consulted or quoted," and consequently we may be forgiven if we say that there is nothing really new in this volume but the evidence of a vast amount of patient and careful research. Unfortunately, the author seems to have fallen into the same error which is characteristic of most modern scientific writers, viz., that of crowding into a book a multitude of tables and other data which have already been exhaustively treated as specialities. Surely, in a work such as Mr. Clark claims this to be, it is hardly necessary to introduce the well-worn "geometrical problems," especially as he aspires to produce a high-class text-book for mechanical engineers; nor is it satisfactory to find plane trigonometry finished off in a page and a half. Thus, the first thirty pages are devoted to an attempted elucidation of the elementary principles of mathematics, which, we are of opinion, might well have been omitted. Again, his subsequent chapter on "Mathematical Tables," he gives logarithms up to 1,000, but only in six places of decimals, so that in abstruse calculations, where an accurate result is essential, these tables will be almost valueless. The book illustrates, too, a bad habit on the part of scientific writers of swelling their volumes with reproduced matter, which can be obtained in a more convenient form elsewhere: thus we have in this book over 120 pages of such matter, all of which is contained in "Molesworth" or other equally well-known hand-books.

Under the head of "Weights and Measures," the author produces some valuable information, which is arranged in a very useful form. Commencing with water and air as standards, which are very clearly dealt with, he proceeds to treat the question of "Imperial Weights and Measures of Great Britain" in a most exhaustive manner, dealing with the various "wire-gauges," and our national standards of measurements and weights, with their decimal equivalents. That this chapter will be found extremely useful there can be no doubt, its value being enhanced by the comprehensive arrangement of the weights and measures of various nations. Not only mechanical engineers, but members of other branches of the profession require to use very frequently the standards of weights, measures, &c., of foreign countries; and we can, so far, confidently recommend this work, which clearly places before one the relative value of the standards of all parts of the world, as compared with our own country; indeed, we know of no other work which contains such concise and useful information upon the subject. Again, the following chapter on "Money" will be found to be extremely useful to those professional men who have business transactions abroad, enabling them, as it does, to reduce the value of work into the currency of the particular country in which they may be engaged. Of course, this chapter can only be considered as typical, as the rate of exchange, especially on the Continent, is constantly changed; but, notwithstanding, the information herein contained will be found to be invaluable. The following chapters and tables, on the weight and specific gravity of various materials, present nothing new really, but the tables are arranged usefully. In his treatment of "the weight of iron and other metals," the author has adopted the system of giving the equivalents of length to weigh 1 cwt. This will be found extremely useful for Continental and foreign work, in which the question of shipment and freights enter largely into one's calculations. With some elaboration, the author deals with the "fundamental mechanical principles," and especially that of the "inclined plane," which is very clearly demonstrated.

Under the heads of "Heat" and "Steam" are collected some very useful and interesting information, accompanied by copious tables; equally with a short chapter on the "Mixture of Gases and Vapours," with a clear description of the hygrometer. A brief consideration of combustion in its various phases introduces a very elaborate treatment of the question of "Fuel," dealing with British, American, French, Indian, and other coal in a most comprehensive manner; as also wood, wood-charcoal, peat, peat-charcoal, liquid fuels, and coal-gas. It is by the arrangement of such information that a work of this character will be found chiefly valuable, and we are pleased to be able to bear testimony to the satisfactory accomplishment of the evident object of the author. Again, under the head of "Application of Heat," will be found information of the highest value and assistance to those who are interested in warming and ventilation, treated, as the subject is, with an evident desire to be as complete and authoritative as possible.

The question of "the strength of materials" has evidently taxed the author's faculties to the uttermost, as, with few exceptions, he is obliged to traverse familiar ground. At the same time, we must commend the very clear way in which he elucidates some well-known theories, aiming at clearing up rather than creating difficulties, and we are especially impressed with those pages devoted to "the shearing stress of beams" and the "deflection of beams." The "strength of timber," illustrated by the results of experiments of M. Morin, MM. Chevaudier and Wertheim, Laslett, and others, will prove very valuable, backed up as they are by a carefully-arranged table of results. Cast iron, under varying circumstances, is dealt with by an elaborate analysis of the investigations of some of the most eminent authorities; whilst wrought iron is considered in a most exhaustive manner, giving the results of German, American, and other experience. Upon the subject of steel, the author has much to say, dealing almost historically with its manufacture, but there is nothing novel in his treatment of the question. We must confess that we are disappointed that so important a question has not received the attention it deserves, taking, as it does, so prominent a position in construction. "The strength of elementary constructions" is treated in a series of short chapters, of which the first on "Rivet Joints" will be found to be both interesting and useful; as, not only does the author deal with the question in a practical way, but he has arranged a series of experiments based upon the highest authorities. The succeeding chapter on "Pillars and Columns" is equally valuable, by the comparative results placed before the student. There is, of course, nothing new on cast-iron beams, though the volume would be incomplete without reference to what is now an almost obsolete form of construction. In the chapter on "Wrought-iron Flanged Beams or Joists" an excellent opportunity of dealing with this now universal system of construction has been lost, and the efficacy of the work is marred. A short chapter on "Railway Rails" forms a compilation of reliable information, which in this case cannot be found in a collective form elsewhere. The strength of ropes, chains, beltings, &c., is treated in some detail, and renders the work all the more complete; whilst upon the question of "bolts and nuts" the author appears to have consulted the highest authorities with a very satisfactory result. Some useful data is given in reference to hollow cylinders, but really nothing new; and this section of "Strength of Elementary Constructions" is concluded by a very well-considered and useful chapter upon "Framed Work." Although devoid of novelty, there is much in this chapter of a commendable character; for a somewhat difficult subject is clearly set forth, in a way likely to prove of great assistance to the student.

Under the head of "Mill Gearing" the author deals in a very comprehensive manner with the various mechanical appliances, especially toothed gear. This section has been most ably considered, more particularly with regard to the horse-power transmitted by toothed wheels. A very brief notice of "Frictional Wheel-gearing" is considered sufficient, but a half-page can hardly be deemed adequate for so important a question, whilst the following twenty-four pages deal with belt-pulleys and belts, and shafting, in a clear and complete manner. The "Evaporative Performance of Steam Boilers" in this and other countries is dealt with in great detail, and forms one of the most interesting features of the book, indicating a vast amount of very careful research. This is followed by an elaborate chapter on the steam-engine, with copious tables of results of experiments and actual practice, notably Table No 297, of the "Net Cylinder Capacity, with relation to Steam admitted, and total actual

* "A Manual of Rules, Tables, and Data for Mechanical Engineers." By Daniel Kinnear Clark, Mem. Inst. Civil Engineers. Third edition. Blackie & Son, Old Bailey.

Work done." Under the head of "The Practice of expansive Working of Steam" the author is enabled to give some very interesting results of the experience with some of the principal condensing engines extant, in America and France as well as in this country. Two able chapters, one on the "Flow of Air and other Gases," and the other on the "Work of Dry Air and other Gas, compressed and expanded," deal with this important question in a very comprehensive manner, illustrated as they are by records of the experiments of the highest authorities at home and abroad. We regret that the author did not see his way clear to treat the important subject of "compressed air machinery" in more detail, an opportunity being thus lost to enhance the value of the work; indeed, he treats the whole question of "air machinery" in a very cursory manner. The chapter on "Flow of Water" would have been better omitted, and the same may be said of that on "Water-wheels"; the author elects to pass over so important a question as the effective power of turbines, contenting himself with simply reproducing well-known data. It is upon subjects like these the value of such a work is tested; and when, under the head of "Machines for raising Water," no notice is taken of the "Pulsometer" and other modern appliances, we feel it to be our duty to protest that the volume under notice can hardly claim to rank amongst the standard works upon mechanical science. A useful chapter on "Frictional Resistances" brings this work of nearly a thousand pages to a conclusion, and the impression left upon our mind, after a very careful perusal, is that for some things it will be found of unquestionable use, but the information might easily have been contained in a book of much less size, and we are all the more convinced that the tendency of authors to crowd a well-intentioned work with useless and inadequate elementary tables is to be strongly reprehended.

## CONCRETE-BUILDING IN NEW ZEALAND.

### BAKER'S CONCRETE MACHINE.

JUDGING from a recent number of the *New Zealand Industrial Gazette*, concrete-building is growing in favour in the colony, and among Auckland industries one of the most important appears to be the production of hydraulic lime by Messrs. Wilson & Co., who, according to the periodical in question, have been forced, by the prejudices of the local builders, to enter into the business of building, "in order to provide an outlet for their own produce, and to practically demonstrate that concrete made of their lime is a reliable and cheap substitute for bricks or stone, the relative costs of brick and concrete per cubic yard being:—brick, 33s. to 40s.; concrete, 22s. to 25s. In fact, the difference between a concrete and a really good wooden house is estimated at 10 per cent. only." An interesting account of the manufacture is given by the *Gazette*, from which we gather that Messrs. Wilson & Co. are determined to pit their hydraulic lime against Portland cement, which has to be imported.

An indication of the extent to which concrete is coming into use in the colony is afforded by the production of "Baker's Combined Gauging, Mixing, and Compressing Concrete Machine," which is the invention of the patentee, Mr. Robert Baker, manager of the Union Sash and Door Factory, Auckland. Mr. Baker, we are told, has had much experience in connexion with concrete work in America and other countries, and the invention is the result of numerous experiments suggested by this experience. Mr. Baker's machine is thus described:—

"About 10 ft. from the machine's foundation is a platform which slopes to the 'gauger,' so that the materials fall into the gauge boxes by their own weight. The gauger consists of a series of compartments, the number and sizes of which may be regulated to requirements by means at once simple and effective. These compartments have movable bottoms, that is to say, they are bottomed by a peculiarly constructed iron wheel, working horizontally, of course, the movements of which are regulated by an ingenious clutch on a vertical shaft. The compartments being supplied, the revolution of the horizontal wheel admits the required quantities of each of the ingredients into the receiver. To the vertical shaft just mentioned are fixed arms, which most effectually mix the contents of the receiver, while the water is added in an even and easily regulated shower by means of a perforated iron tank, fixed to the underside of the horizontal wheel already spoken of. The mixture is constantly passing from this receiver or mixing-pan into two chambers immediately below, one on the right and the other on the left side of the machine. These chambers are very cleverly fitted with the object of submitting the material to a very different process of mixing to that of the horizontal revolutionary motion which it undergoes in the pan above. The chambers in their turn deliver the perfectly mixed concrete into a mould beneath. . . . . The mould is fixed on a set of trolly wheels, running on rails spiked on to the top of the travelling bed, which is steadily moving backwards and forwards beneath the chambers and compressors. When the mould is nearly full, two compressing rollers speedily bring the concrete to a perfectly even and level surface. The trolly containing the block is then run off the travelling bed to a convenient place to set and harden, another trolly with empty mould taking its place. From the tipping of the materials from the dray to their reappearance as concrete blocks, no hand labour whatever is employed: it is a self-feeder and a self-deliverer. The quantity that can be put through in a day is estimated at from 1,000 to 2,000 cubic feet, in blocks up to 80 cubic feet, or from five to six tons weight. It will also turn out landings and pavings up to 42 ft. superficial, and from 3 in. to 12 in. thick. The machine is capable of being set to forty different combinations or arrangements of proportions. The weight of the machine is between four and five tons, and the power necessary to drive it is from eight to ten horse."

## NEW TOWN HALL, LEAMINGTON.

THE new town-hall at Leamington was opened on Thursday last, the 18th inst. Hitherto the corporate and magisterial business has been transacted at the incommodious and inconveniently-situated edifice in High-street, erected in 1831 at a cost of 2,000*l*. With the incorporation of the borough in 1875, the need of better accommodation made itself urgently felt, and the corporation invited architects to send in designs for a new town-hall, a local practitioner, Mr. John Cundall, A.R.I.B.A., being the successful competitor. Tenders having been invited for the erection of the building, that of Mr. John Fell, of Leamington, amounting to 14,000*l*., was accepted.

The exterior is designed in the Renaissance style, and the materials used are finely-pressed red bricks with stone dressings from the Camden quarries. The Parade façade is 150 ft. in length, and is approached by a terrace formed of Stuart's granolithic pavement. The principal entrance is by a portico supported by twelve massive square stone columns, and six pilasters, with elaborately-carved capitals, surmounted by a stone entablature and balustrade. The lintels from the different pillars are of Portland stone. The portico has a vaulted covering of Camden stone, on which is formed a balcony of granolithic. For the erection of the portico a separate contract was made with Mr. Fell, the cost being 2,000*l*. The central block is entirely of stone, with carvings, mouldings, fluted columns, cornices, and other embellishments. The central pediment,—which is surmounted by the heron, an indigenous bird,—is especially noticeable (according to the *Leamington News*), the sculpture being relieved by a mosaic representing Hygeia, who is holding in her right hand a goblet and in the other a serpent, while a couple of cherubs are supposed to be offering libations of Leamington water at the foot of her throne. The pediment in the northern wing, which contains the Court-house, has a sculptured tympanum, illustrating Music, Science, and Art. Similar subjects are portrayed in the spandrels over the west window of the Court-house. The pediment in the south wing, over the oriel window of the Council-chamber, contains sculptured subjects illustrative of Wisdom, Justice, and Authority. The elevations are lofty and imposing, those of the wings being 60 ft., while that of the central feature is 70 ft. The main entrance in the Parade is provided with iron gates, manufactured by Hart & Son, of Birmingham and London. Leaving the stone vestibule, with its granolithic floor, enriched with panels of ceramic tesseræ, and its groined roof, the visitor passes through a pair of large folding mahogany and pitch-pine swing doors, with English oak framing, the lead lights above having been filled up with coloured glass by Mr. Holland, St. John's, Warwick.

The corridor on the ground floor,—which is several feet above the street level, and extends the whole length of the building,—is 10 ft. wide, 14 ft. in height, and floored with Stuart's granolithic paving. From this corridor access is obtained to the various offices of the Corporation officials. On the right side of the corridor, immediately opposite to the Town Clerk's quarters, is the Surveyor's office, which is lighted from the Holly-walk, and fitted with one of Barnard & Barnard's slow-combustion stoves, with Minton tile sides.

The approach to the first floor is by the grand central staircase, facing the main entrance, and consisting of a flight of twenty-eight steps, those in the first flight being 12 ft. in width, and, like the floors of the lower and upper corridors, composed of Stuart's granolithic. The staircase has a stone balustrading and handrail all the way on each side. At its base rise two massive square stone columns, supporting the landing above the corbels, consisting of sculptured figures.

The Council-chamber on the first floor is situated at the south end of the upper corridor, which extends to the Court-house at the north end. Opposite to the main entrance to the chamber the first object which arrests attention is the richly-carved and moulded chimney-piece of Portland stone. This is the work of Mr. Boulton, of Cheltenham, who also executed all the stone-carving throughout the buildings. The walls are panelled with mahogany and pitch-pine, to a height of 12 ft. At the east end is a gallery for the accommodation of the public. The apartment is lighted by five windows on the south side, and an oriel window, flanked by two side-lights in the Parade front. Stained glass is largely inserted in the windows, the best specimen being the six-light window presented by the Mayor, Mr. S. Flavel, jun. Five of these lights contain designs taken from Shakspeare's "As You Like It," and depict scenes in the Forest of Arden. The design of the remaining light is "Shakspeare reading his Plays to Queen Elizabeth." This window was executed by Mr. Holt, of Warwick. The wood-carving is the work of Mr. James Flower, Dale-street.

The Court-house, 80 ft. by 40 ft., has an elliptic ceiling, which is relieved with panels and enrichments, with centre flowers, two of which, with Boyle's ventilators fixed through the roofs, answer a useful purpose. From the sixteen pairs of double pilasters on either side of the room rise enriched curved ribs, which extend across the ceiling 30 ft. high, from which at intersections of the main ribs depend gaseliers on each side.

The Tower, at the east angle of the southern frontage, is 130 ft. in height, and contains a granolithic staircase, which was intended by the architect to lead to the School of Art, had that portion of the original design been carried out. It now forms an approach for the public to the Council-chamber, and also to the upper portion of the building. The clock has four illuminated dials, and strikes the hours upon a bell weighing about 15 cwt., cast by Messrs. Taylor & Co., Loughborough.

The contractor, as before stated, was Mr. John Fell; Mr. C. Franklin was foreman of plasterers; Mr. William Robbins was foreman of bricklayers; Messrs. Robert Lines and H. Smith were foremen of carpenters; and Mr. Henry Smith was foreman of masons.

The furniture was made from Mr. Cundall's designs by Messrs. Plucknett & Stevens. All the stained and coloured glass windows were supplied by Mr. Holt, of Warwick. The heating apparatus was manufactured by Mr. Jenkins, Leamington. The brass gas-fittings are by Messrs. Barwell, of Hampton-street, Birmingham. Mr. E. W. Atkins was the clerk of works.

## THE DOME OF ST. PAUL'S.

SIR,—I agree with your correspondent, Mr. W. Cave Thomas, that the experiments in decoration now on view in St. Paul's prove that Thornhill's idea is the best yet put forward; and that to translate it into colour would be desirable.

It is capable of improvement, however, and that with little difficulty, its principal defect being in the *painted* architecture. Granting that the vertical divisions are right, the rapid diminution of the architectural features of which these are composed (sham pilasters or columns), is most unpleasant, and the arches they seem to sustain are ridiculous in proportion to their supports, and appear necessarily distorted, from being on a curved surface, as real arches could not be. Here the painter's skill could mend the evil by obscuring the arches and pilasters. The figures of angels with spread wings would do this service for the former, and bold decoration on the latter would suffice for them. Then the grand simple spaces left are just what would give scope for the painter's art on a proper and sufficient scale, and such as Wren contemplated. This would be far better than the *petite* and confused treatments of circular panels suggested to be substituted for them.

JOHN P. SEDDON.

## NEW ADMIRALTY AND WAR OFFICES.

SIR,—While thanking you for the accurate and excellent plans and view of the design for the above building given in the *Builder* of this date, allow me to point out that you have inadvertently reversed the order of the authors' names, that of Mr. Aston Webb having hitherto invariably, and properly, held the first place. E. INGRESS BELL.

Sept. 13th, 1884.

## SKETCHING AT THE HEALTH EXHIBITION.

SIR,—Whilst examining the plans, placed on the walls for public inspection and instruction, of the "sanitary" and "insanitary" houses, their sewerage and drainage, it struck me an improvement would be effected by a slight alteration in the ventilating pipe or shaft; and I began to copy on a small piece of paper this portion of the work, with the view of showing therein the proposed alteration, but had scarcely commenced when a police constable on duty immediately stopped me, as acting under orders to that effect. I dare not venture to question the policy of such proceeding; but permit me, through you, to ask the Commissioners and other authorities having the management of this Exhibition of Health instruction, whether they have, in fact, issued any such prohibiting order; and if so, whether, to prevent any unnecessary irritation on the public by coming in contact with the police, they have caused printed notices to be affixed at the several entrances of the building and other suitable places for the guidance of the public?

A VISITOR.

## PARTY WALLS.

SIR,—I should be greatly obliged if any of your numerous readers could inform me where I could obtain a good book relating to the laws and rights of party-walls?

I am about to build a house attached to another I sold a short time since, reserving to myself the use of the end wall as a party-wall to rest beams in, &c., or other supports as are generally required. But in building this new house adjoining I want to build *on* the party-wall, as I have to build an additional back bedroom.

The question is, Can I raise on this party-wall, without the consent of my co-partner? Of course, there would be no lights or obstruction in the said wall intended to be raised, and I should have to protect my co-partner from any injury to his house, and hold him free of any cost in the matter.

An early answer will oblige, SUBSCRIBER.

## A COST CLERK'S DIFFICULTY.

SIR,—Will you kindly allow one of your correspondents to instruct me upon the following:—

I am engaged as a cost clerk. Having booked up the time on the various jobs, I next proceed to book up the stores and miscellaneous charges: such charges are not booked direct on each job, but are spread proportionately over each; the miscellaneous charges consist of foreman's, labourers', &c., wages.

Now, the doing so seems to me to be incorrect. Say, for instance, that the wages are for one week, 20*l.* or 30*l.*, and the stores and miscellaneous charges amount to 6*l.* or 8*l.* Posting up such charges proportionately on the bulk of jobs seems to be utterly wrong. Jobs of the value of 5*l.* will have, perhaps, 1*l.* or 2*l.* for such charges, whilst others of 10*l.* will have, say, 5*s.*, such items depending upon the weekly charges distributed over the various amounts for labour.

Will you kindly say if my method is correct, and if not, point a more suitable way of keeping such costs? The nature of the material does not enable me to book the exact quantities used on each job.

A CLERK.

*** Our correspondent seems to have failed to express his precise meaning. If the charges are, as he says, distributed "proportionately," how can the disproportion suggested arise?

## RESPONSIBILITY FOR ACCIDENTS TO WORKMEN.

SIR,—In answer to the inquiry of "A Surveyor" [p. 374, *ante*], if a sub-contractor undertakes the labour of constructing the scaffolding, he alone is responsible for the manner in which it is constructed. X.

## "A PERIODICAL QUESTION."

SIR, Cockroaches may easily be got rid of by mixing one teaspoonful of dry red lead with three teaspoonfuls of good dry flour. When well mixed, place some on the bottoms of inverted plates, throw some loosely into corners and holes where they are seen to come from. Mix again fresh in, say, forty-eight hours, and soon you will be quite free. The flour must not be in the least sour.

WM. HOSKEN.

See p. 340, *ante*.

## PROVINCIAL NEWS.

*Wigan.*—It will be remembered that a new infirmary was erected in Wigan about ten years ago, and opened by H.R.H. the Prince of Wales. This building (known as the Royal Albert Edward Infirmary) provided accommodation for about 100 beds, and the success of the undertaking has been very complete and satisfactory to those who supported and inaugurated it. So much is this the case, that it has been found necessary to enlarge the building, and a detached wing is now in course of erection, containing accommodation for twelve special wards for severe cases, children's wards, and a separate nurses' home of twelve rooms, with the necessary kitchens, lavatories, bath-rooms, &c. These will be connected to the main block by a glazed corridor, which it is proposed to make into a winter garden and exercising-place for the convalescent patients. Mr. Thos. Worthington, of Manchester, was the architect of the original building, and Messrs. Worthington & Elgood are now carrying out the additions in a similar manner. Mr. J. Preston, of Wigan, is the builder employed, and his contract for the portion of the works already decided upon amounts to abont 3,600*l.*, exclusive of the internal fittings and other works.

*Derby.*—A Fine Art Exhibition is to be opened at Derby, by the Mayor, on November 3rd. The exhibition is inaugurated for the encouragement of amateur art work, such as painting on china, terra-cotta, silk, tapestry, Lincrusta-Walton, designs for Christmas cards, wood-carving, etching, &c. The awards to successful competitors will comprise thirty-six silver and bronze medals, a silver badge, twenty guineas in money prizes, statuettes, vases, &c., and one hundred diplomas of merit. The exhibition is being organised by Mr. W. W. Winter, of the Alexandra Fine Art Galleries, Derby.

*Weymouth.*—The new banking premises for Stuckey's Banking Company, on the Parade, at its junction with Bond-street, have now been completed. The style adopted by the architects is French Renaissance of the Burgundian type, the elevations being of red brick and Portland stone, while the roof is covered with green slates. Internally, the only apartment admitting of special treatment to harmonise with the exterior is the banking-room. The entrance to it (from Bond-street) is through a handsome semicircular-headed doorway, the principal feature in the whole of the stonework. Pitch pine is the material used for all the woodwork in the banking-room, except the counter and desk tops, which are of mahogany. Connected with the public room is the bank parlour, which also communicates with the manager's residence. Upstairs the oriel windows, facing Bond-street and carried upon stone corbels, give large additions to the drawing-room and three bedrooms, besides a sea view to each. The architects are Messrs. Paull & Bonella, of Chancery-lane, London; the builder being Mr. Albert Clarke, of Weymouth.

## CHURCH BUILDING NEWS.

*Drayton Beauchamp.*—The east end of Drayton Beauchamp Church has just been enriched by the addition of a new oak reredos, designed by Messrs. Carpenter & Ingelow, as a memorial to the late rector. The design is of the Perpendicular period, to assimilate with the architecture of the church. In addition to much richly-carved detail, it contains a sculptured representation of the "Sermon on the Mount," also in oak. Mr. Forsyth, of Finchley-road, Hampstead, was the sculptor.

*Newark.*—A costly reredos has lately been erected in North Clifton Church, Newark, to the memory of the late Mr. George Freeth, of North Clifton Hall. The designs were made by Mr. John T. Lee, architect, of 26, Great James-street, Bedford-row, London; and are intended to illustrate the doctrine of the Incarnation. The reredos contains panels, in which are figure-subjects, painted in gold and colours. The centre panel, over the altar, represents the Epiphany, with the shepherds and wise men adoring the infant Saviour. The centre group is flanked by two panels, representing the Annunciation, one containing the figure of the angel Gabriel, the other the blessed Virgin Mary receiving the message. The side panels are surrounded by foliage of the vine, wheat, olive &c., and represent the busts of the four evangelists who wrote the history of our Lord. Above them are standing figures of the four great prophets, viz., Isaiah, Jeremiah, Ezekiel, and Daniel. Above the east window the vine ornament is again introduced on a larger scale, to form the ground-work for three medallions with angels. The framework of the reredos is executed in oak, by Mr. Earp, of Lambeth, from the designs of the architect, and is decorated in the style of the best examples of the old Norfolk screens. The decoration of the walls and the reredos are by Messrs. Heaton, Butler, & Bayne, of Garrick-street, London.

*Bristol.*—On Monday last the Bishop of Gloucester and Bristol laid the foundation-stone of St. Lawrence Church, Lawrence-hill, Bristol. The parish has, in accordance with the scheme of the Bristol Church Extension Commission, been formed, principally from the large and overgrown parish of Holy Trinity, and partly from St. Matthew's, Moorfields. The district contains a population of 4,500, almost entirely of the labouring classes. The style of architecture adopted for the building is Early English. The site, which is hemmed in by neighbouring properties, presented many difficulties to the architect, especially in the matter of lighting. The church will consist of narthex, nave, north and south aisles, tower and spire, western gallery, chancel, chapel on south side, organ chamber, and vestry. The total internal length will be 115 ft., width across the nave and aisles, 56 ft.; and height from the floor level to the apex of the nave roof (which will be open-timbered), 58 ft. For the general walling, Pennant stone will be employed, with dressings of Bath stone. The walls on the inside will be stuccoed. Arches of Bath stone and brick will divide the aisles from the nave; the columns which are to support them will be of rubbed and sanded Pennant stone. The windows are to be filled with rolled cathedral glass in geometrical patterns, supplied by Mr. Ben Gay. Sitting accommodation will be provided for about 700 worshippers, the seats and gallery being of red deal, varnished. The gangways and narthex are to be paved with Staffordshire tiles, and the chancel with encaustic tiles. Artificial heat is to be imparted to the interior by one of Grundy's heating apparatus. The west elevation, with its tower and spire rising to a height of 115 ft., will present an important frontage to the main road. The accepted estimate for the first portion of the church is 3,200*l.*, and a provisional contract has been entered into for the completed work, inclusive of upper portion of tower and spire, for 590*l.*, making a total of 3,790*l.* The work has been entrusted to Messrs. Wilkins & Sons, of Surrey-street; Mr. Honey acting as clerk of the works. The architect is Mr. John Bevan, of Unity-street, Bristol.

## SCHOOL-BUILDING NEWS.

*Peel (Isle of Man).*—On his recent visit to the Isle of Man, his Grace the Archbishop of York laid the foundation stone of the Isle of Man Navigation, Grammar, and Mathematical School, which is being erected on a site close to the new church at Peel, of which we gave some particulars on p. 374, *ante*. Messrs. T. D. Barry & Sons, of Liverpool, are the architects of the building.

*Goudhurst.*—A large and substantial block of buildings has just been completed here for the Rev. J. J. Kendor, for a ladies' college. The buildings are in the form of the letter H, the centre being the residence, on the right the school, and on the left the dining-room, bedrooms, lavatories, and other necessary conveniences. The walls throughout are built hollow, on account of the elevated and exposed position of the building. The sanitary arrangements and water-supply have, we are told, been well cared for. Accommodation is provided for about fifty boarders, besides teachers, family, and domestic offices. This is the second large establishment erected in the locality, besides additions to a third (the two latter being boarding-schools for boys), the builder in each case being Mr. A. Martin, of Horsmonden, Kent, and the architect Mr. William Theobalds, of Watling-street, City.

**Architectural Association.**—As will be seen by an advertisement on our front page, Session 1884-85 of this Association will commence early in October.

# The Student's Column.

## HINTS FOR THE STUDY OF THE HISTORY OF ARCHITECTURE.—XII.

RENAISSANCE (CONTINUED), AND THE REVIVALS.

ON page 162 of Professor Roger Smith's "Gothic and Renaissance," the author remarks that "design in Renaissance buildings may be said to be directed towards producing a telling result by the effect of the buildings taken as a whole, rather than by the intricacy or the beauty of individual parts; and herein lies one of the great contrasts between Renaissance and Gothic architecture."

In Italy, which was treated of in the last article, this distinction was aimed at from the very beginning by Brunelleschi, and still more by his contemporary, Alberti, whose Church of St. Andrea, at Mantua, and Rucellai Palace at Florence, fulfil the above-named definition as completely as possible.

In other countries this submission to rigid rules of composition was delayed, and, in the meantime we find a coy flirtation going on between the styles of the soil and the elegant stranger, which it is most interesting to watch. In the end they all gave way to the Classic influence, as the universally fashionable thing to do.

After Italy, Fergusson, in his "History of Modern Architecture," goes on to Spain, where the good points of Gothic work asserted themselves bravely before giving in. See the illustration on page 148 of the Court of the Archiepiscopal Palace at Alcala, built early in the sixteenth century, in which the entablature over the upper column is carried by very pleasing (though "incorrect") brackets. In other examples, such columns support flat cusped arches inherited from the native architecture. These flat arches survive in the Paranimfo, a State apartment, though here they are placed between more correctly Classical pilasters and entablatures. At the same time the ceiling of the apartment is panelled into a pattern of hexagon and six-pointed stars that is quite Moorish in style. The palace of Charles V., at Granada, 1527, though quite an "orderly" design, has more circular windows and medallions about it than one would find in Italy. When it came to building the Escurial, a huge palace, including a cruciform domed church, in 1563, the design, prepared by Gianbattista of Toledo, and executed by the celebrated architect Herrera, is quite Classic. So, of course, is the palace at Madrid, rebuilt after the fire of 1734, from the designs of Ivara, an Italian architect. The palace at Mafra, in Portugal, of about the same date, is as Classic, but with a skyline pleasingly broken by spires and lofty roofs over certain portions.

In the provinces, Fergusson hints at the existence of a more national style, but regrets that Renaissance art in Spain has not been illustrated. Street has since drawn and described her Gothic work; there is an opening for an equally good professional work on her Renaissance buildings.

Turning now to France, we find that Francis I., 1515-1546, was, to use Fergusson's expression, fairly bitten by the Italian mania of the day; and that, after visiting Italy, he brought back Leonardo da Vinci to France, and that he invited thither Benvennto Cellini, Primaticcio, and Serlio, and occupied them all on his works at Fontainebleau and elsewhere. Soon there followed a group of palaces and châteaux, that have all the play of plan and outline belonging to Gothic buildings, combined with refined Renaissance details,—a very beautiful phase of architecture. The Louvre and Tuileries were treated in a comparatively formal manner, but the châteaux of Blois, Chambord, Amboise, Fontainebleau, Chenonceaux, Madrid, Gaillon, Vallery, Verneul, Charleville, and Ecouen, are enumerated by Fergusson, page 164, as examples of the graceful architecture of the day. Churches were the exception among those buildings. That of St. Eustache at Paris is an example, dating from 1532, which is completely Gothic in all its arrangements, with Classic details, attenuated to do duty in novel positions, and thereby losing all their proper proportions. It is thus an adaptation of the two styles one to another, but not an amalgamation of them, and soon there came the inevitable "orders," very much as we find them in Italy, but mixed with all the vagaries affected by the Jesuits. From this there was a reaction which, under the eminent architect, Jules Hardouin Mansard (nephew of François Mansard), produced the dome of the "Invalides," in Paris (see page 172 of Fergusson), a building that may fairly be compared with our contemporary St. Paul's.

This Mansard also designed the extensive Palace of Versailles, of which Fergusson says, on page 211, that its dimensions are probably unsurpassed by those of any in ancient or modern times, the entire length being 1,320 ft.; but the design is very monotonous.

The completion of the Louvre at Paris seems to have passed through the hands of several architects. François Mansard was consulted, Bernini was sent for from Rome, Marot and Lemercier presented designs, and ultimately the design of Perrault was preferred before those of all the other competitors. Although Fergusson admits that no design of that day (1670) can at all compete with the eastern façade of the Louvre, he proceeds to heap critical abuse on it for a couple of pages. If, however, an external "telling result" is what we look for in Classical buildings, surely this façade fulfils the requirement most satisfactorily. Let any student run over to Paris and rush to this end of the Louvre early in the morning, before the sun goes off it, and he will not regret the trouble.

The French have gone through their fair share of slavery to Classic art, but, after all, they have now assimilated it very satisfactorily, and evolved a modern style of which they may be justly proud.

Besides their ecclesiastical and domestic architecture, the French have produced public trophies, triumphal arches, fountains, &c., that show their taste in these matters to be far ahead of that of other nations.

Altogether, a stroll in the streets of Paris on a fine day is a thing to be enjoyed, and renders the contrast with the streets of London a painful one; in fact, it always takes many days before we can reconcile ourselves to our dingy disorganised capital on returning to it, especially if we are intent upon getting at the beginning of the Renaissance in England.

For this purpose we must go to the Rolls Chapel, near Chancery-lane, and after getting due permission, and probably a lantern, see what we can of the monument of Dr. Young. This is said to be the earliest example of the imported style, and to have been executed by Torrigiano, the sculptor who broke Michelangelo's nose, which fact will assist one in remembering the date of the monument, 1516. It was followed by a more important one, namely, that which Henry VIII. erected to the memory of Henry VII. and his Queen, in his chapel at Westminster.

In time the style spread to structures of greater size; perhaps the earliest example of a building is at Layer Marney, 1525, and we have records of gateways at Whitehall, designed by Holbein, who was chiefly known as a painter,—another of those foreigner artists whom our many-wived king encouraged. St. James's Palace is another instance of the dawning Renaissance, as may be seen in the carving of the spandrels over the four-centred arches of the main gateway. Another foreigner, this time from Cleves, namely, Theodore Have,—or Havenius, as the Classic fashion required him to be called,—designed the Gate of Honour at Caius College, Cambridge, in 1574 (see page 247 of Fergusson). Here, four-centred arches and "orders" are cleverly put together, but hardly united. This University and Oxford, being of course the headquarters of learning, contain many examples of the "learned" style. At the Schools, Oxford, we have the five orders piled one over another, according to the Vitruvian precept.

Yet another foreigner, John of Padua, is said to have designed, in 1567, Longleat, in Wiltshire, the present seat of the Marquis of Bath. There is certainly much Italian feeling in the treatment of the wall surfaces, though the plan of the house is essentially English; that is to say, the chief windows command the views of the surrounding country, and do not look into a courtyard, according to the Italian fashion.

This continued importation of foreign talent had led to a rising on May Day, in 1517, with the intention of cutting to pieces all the strangers in London, amounting, it was said, to 6,000 or 7,000, and so it is satisfactory to find that in the time of Queen Elizabeth the fashionable architect was John Thorpe, who designed many of the houses which have gained the name of "Elizabethan" for the style of her period. Many of these are to be found illustrated in Shaw's "Elizabethan Architecture," 1 vol., quarto; Richardson's "Old English Mansions," 4 parts, folio; Richardson's "Specimens and Observations on Elizabethan Architecture"; J. Nash's "Mansions of the Olden Time," 3 series, folio; Hakewill's "Elizabethan Architecture," 1 vol., octavo, in which the style is compared with Italian work, but the mullions and transomes are omitted from the English work. Last, but not least, John Thorpe's original drawings are to be seen at the Soane Museum in Lincoln's-Inn-fields, and are, in a sense, the most interesting of all.

The style goes on through the reign of James I., but by the time of Charles I. an English architect, Inigo Jones, had been to Italy to study the fashionable architecture at the fountain-head, and after erecting a few buildings in which he retained mullions and transomes, he threw off even these vestiges of Northern custom, and went boldly and entirely for Italian, treating it, however, with great originality and ingenuity. The banqueting-hall (now the Chapel Royal) at Whitehall, is a very small portion of an intended enormous palace that he designed. This elevation may not look anything out of the way on paper, but any one who passes slowly under it must become aware of the great amount of variety introduced into its seven bays. Except in the very centre, there are not two consecutive columns or pilasters alike, and the great projection of the pediments over the windows, gives great play to the perspective of the whole front, as seen from below.

After Jones,—to whose numerous works Fergusson specially devotes eight pages,—he goes on to pay a still larger tribute to Sir Christopher Wren, whose grand opportunity was afforded by the Fire of London in 1666, and who graced the City with a forest of steeples so varied and beautiful that we jealously begrudge the present removal of some of them because the resident population of the City has, for the moment, migrated into the suburbs. When the secret of smoke-consumption has been found, men of business may be glad to "live over their shops" again as in days of old, and then they will regret the want of church accommodation.

Wren's buildings are so numerous that we can only name one or two besides St. Paul's Cathedral. Every student should enter St. Stephen's, Walbrook, near the Mansion House, to see the elegant arrangement of a dome carried on eight Corinthian columns. The interior of St. James's, Piccadilly, is a good example of a church with galleries, which were the fashion in those days, and for which most of the churches were so specially designed that one stands aghast at the removal of them and the consequent utter destruction of proportion that has, since the Gothic Revival, been placidly effected here and there.

Of Wren's steeples (for which A. Taylor's Prize Essay at the Institute, since published by Batsford, is a handy companion), that of Bow Church is considered the best. Greenwich Hospital,—where he followed Inigo Jones,—Chelsea Hospital, and Hampton Court Palace, are examples of his secular work.

After Wren there were several architects who have formed a fine school of Anglo-Italian work, among them Hawksmoor, Vanbrugh, Kent, Gibbs, Sir William Chambers, the brothers Adam, Taylor, and Dance. The latter designed Newgate Prison, which is as expressive a piece of architecture as the world has ever seen.

The domestic architecture of this period, the eighteenth century, became painfully symmetrical, as may be seen from the illustrations of Keddlestone Hall and Holkham, on pp. 294-295 of Fergusson's "Modern Architecture," the plan of the former resembling one of those insects that rest on the water poised on four long legs, representing the corridors leading to four outlying symmetrical departments.

As has been said above, the beginning of the present century introduces us to yet another phase of imitative architecture. Hitherto the Classic styles have been adapted. Now they became adopted. Fergusson attributes this to the publication of illustrated works upon Roman, and more especially Grecian architecture. He says, "once the fashion was introduced it became a mania." He instances

the new Church of St. Pancras, in the Euston-road, designed by Inwood, as giving us a very exact reproduction of Grecian Ionic, and also of the caryatid portico of the Erechtheium at Athens, and, so far, we may be thankful for it. There are several other dead bones in our midst.

While men's minds were still in this state of resignation to anything so long as it was correctly ancient, the revival of Gothic architecture came as a welcome change. While equally inexorable in its demand for correctness, it had the advantage of re-introducing the style of our climate, and, whatever may be preached to the contrary by votaries of the mouldy picturesque, its attendant mania for "restoration" has done (on the whole) more good than harm.

"Correct" Gothic has lately been found either too expensive or else inappropriate for ordinary domestic buildings, and we are now gradually developing something quieter and more in harmony with our tastes and habits, and in which there shall be no sense of frantic *effort*,—either to copy a past style, or to suddenly invent a new one. "*Ars est celare artem.*"

## THE SACRAMENTS-HAUSLEIN AT NUREMBERG.

SIR,—May I venture, with all due respect to the able writer in the Student's Column [p. 341, *ante*], to suggest that he is possibly mistaken in thinking the summit of the spire of the Sacrament-Hauslein at Nuremberg was bent beneath the vaulting because it was too high to stand upright? It is my humble opinion that it was originally designed so, to represent a crozier; and I am confirmed in that opinion by the fact that a somewhat similar sacred receptacle was erected by one Veit Stoss in St. Mary's, at Hersbruck, a small town of the ancient territory of Nuremberg, that has an unmistakable crozier as a final.

The minor pinnacles seem to be curled over from mere caprice.

I send the above that I and others of my acquaintance may be put right,—if we are wrong.

REUBEN G. NORMAN.

*London*, Sept. 11, 1884.

*** Mr. Norman and others of his acquaintance *may* mean a bishop's *pastoral staff*, which terminates in an ornamental crook, while an archbishop's *crozier* always terminates in a cross" (Hook's "Church Dictionary," p. 307); but if this spire-head be unbent, it will be found to continue the *sloping* lines of the rest, whereas a pastoral staff is straight until the crook begins.

In Lonsdale and Tarver's "Costume" will be found, on plate 9, an archbishop of the thirteenth century with his crozier, and on plate 36 a bishop of the fifteenth century, with his pastoral cross. The latter is taken from Boutell's "Brasses," in which also will be found the brass of Archbishop Cranley, A.D. 1417, with his crozier.

If the example illustrated in Fergusson's "Handbook," p. 759, be *earlier* than that at St. Mary's, Hersbruck, which the writer has not seen, the suggestion of a pastoral staff may have been carried out in the latter.

Probably the real fact is that the designer of the Sacraments-Hauslein turned the finial because he liked doing it.

## BUILDING PATENT RECORD.*

### APPLICATIONS FOR LETTERS PATENT.

*Sept. 5.*—12,019, W. Potts, Edinburgh, Apparatus for Ventilating Purposes.—12,020, W. Potts, Edinburgh, Burning Fuel for Heating Purposes.—12,037, C. F. Newman, London, Drain-pipe for effecting junctions with Brick and Pipe Sewers.—12,053, J. B. Cochran, London, Cooking Ranges.—12,060, H. Godwin and W. Hewett, London, Manufacture of Tiles.

*Sept.* 6.—12,067, E. V. Bailey, Birmingham, Spindling Knobs for Locks and Latches.—12,097, J. Maclaren, Cupar, Composite Paving Brick.—12,098, W. Sargent, London, Flushing Water-closets, &c.

*Sept.* 9.—12,158, W. C. Haigh, Manchester, Fire-lighters.—12,181, W. Babre, London, Preventing the Slamming of Doors.—12,188, R. Booth and R. W. Booth, Dublin, Flooring Clamp.—12,192, S. A. Hugh and P. G. Hugh, London, Water Waste-preventing Cistern without Ball-valve.—12,200, T. J. Constantine, London, Close Ranges and Stoves.—12,217, E. T. Lambert and E. J. White, London, Self-closing Valves for drawing off Water.

*Sept.* 10.—12,246, F. Wilkes, London, Asphalte Pavement.

*Sept* 11. 12,272. J. H. Kenyon, Manchester, Flushing Water-closets, Drains, &c.—12,290, W. H. Hindle, Halifax, Water-closets.—12,291, J. E. Walsh, Halifax, Portable Hand-bolt for Doors and Windows. Com. by F. Lebacq, Brussels.—12,299, C. Wall, London, Jointing of Sanitary Pipes, &c.

* Compiled by Hart & Co., Patent Agents, 188, Fleet-street.

### SPECIFICATIONS ACCEPTED.*

*Sept.* 9.—164, F. Lea, London, Lever Catch Fasteners for Windows.—4176, W. R. Cornell, Grays, Concrete Building, &c.—8,345, W. H. Chapman, Lewisham, Ventilating.—11,021, A. Hübner, Cologne, Retaining Walls.

*Sept.* 12.—145, J. Bate, London, Fire-grates and Stoves.—6,370, J. Carter, London, Window Sashes.—10,381, S. Turner, Barrow Haven, Clapper for forming Ridges, Finials, &c.

* Open to public inspection for two months from the dates named.

## Miscellanea.

**New Vicarage House for St. Bride's, Fleet-street.**—The parish of St. Bride, Fleet-street, has not hitherto had the advantage of a clergy-house within the parish, but this is about to be remedied by the erection of a new vicarage, which has already been commenced. The site fixed upon for the new building is a portion of the vacant land in Bridewell-place, situated between the police station and the London City Mission Buildings. The principal frontage of the new vicarage faces Bridewell-place. It is 44 ft. in length, and 48 ft. in height from the pavement line to the ridge of the roof. The style of architecture may be described as a mixture of the Elizabethan and Queen Anne. The building will be faced with red Farcham brick, the dressings, architraves, and cornices being in gauged brick, with a free introduction of carving and ornamentation. The building will contain a basement, together with ground-floor, first and second stories, and attics, having alternate arched and pediment windows. The basement contains the kitchens and other offices. The ground-floor, which will be approached at the entrance by a flight of steps, contains a spacious entrance-hall, dining-room, library, and offices. The first floor contains the drawing-room, a bed-room, and bath-room, while the second and attic floors contain together six bedrooms, with dressing-rooms in addition. Mr. Basill Champneys, of Buckingham-street, Strand, is the architect, and Mr. B. E. Nightingale, of the Albert Works, Lambeth, is the contractor. Mr. Goodchild is clerk of the works, and Mr. J. Snook the foreman.

**The State of the Thames.**—Mr Edmund Kimber, of Walbrook, has addressed a letter to the Secretary of State for War, calling attention to the fact that the Royal Commission appointed to inquire into the condition of the Thames, and to report upon what remedies ought to be adopted to meet the grievance, has now been sitting for about a year and a half, and has not yet reported upon the remedies. "In the meantime," says Mr. Kimber, "cholera has been, and is now, raging in France and Italy, from whose ports ships daily enter the Thames, and the people on the banks of the Thames have been afflicted with diarrhœa and dysentery. Were it not for the otherwise cleanly habits of Englishmen there is no doubt these maladies would have turned long since to cholera, and would have decimated the working men and officials in the Royal Arsenal, Dockyard, and Barracks at Woolwich, with the greatest certainty. Even as it is, many of the working men have complained to me of the horrible and loathsome stench coming from the river as they are working in the Arsenal, bringing on, as it does, a certain weariness and sickness, which prevent them from doing their work properly. Now, this is manifestly a great loss to the nation, especially at this time, when the greatest care, skill, perseverance, and nicety are required on the part of the men in preparing for the Nile expedition." Mr. Kimber urges the Secretary for War "to cause the Royal Commissioners immediately to send in their report, or else to advise her Majesty to discharge them. They might," Mr. Kimber thinks, "very easily have reported long ago."

**Metallic Cement for Repairs.**—Messrs. Dreyfus & Co. call attention to the use made by them of Tabary's patent metallic cement in repairing the stonework of the pediments and columns of St. Peter's, Eaton-square, and also in one of the bays of the Houses of Parliament. They state that "the process of restoration consists of hacking off the decayed portions of stone and facing it with the cement, instead of removing the block of stone and replacing with new. It consists of a pure stone reduced to powder and reconstituted to its primitive state, producing a stone impervious to all atmospheric effect; it is carved in the same manner as ordinary stone."

**Hot Blast, and Economy in the Blast-Furnace.**—At a meeting of the South Staffordshire Institute of Iron and Steelworks Managers, held at Dudley on the 8th inst., Mr. A. E. Cowper, of Middlesbrough, read a paper on this subject. The wide adoption of the system in the North of England had led the Staffordshire furnace proprietors to inquire more closely into its suitability for South Staffordshire, where at present only a few establishments have adopted it, amongst others the Spring Vale Furnaces of Mr. Alfred Hickman, where the pigs are obtained for the New Staffordshire Steel and Ingot Company's Works. In the discussion which followed the reading of the paper, the general opinion was in favour of the stoves. The Chairman, Mr. Hudson (president of the Institute) said they had two furnaces,—one with the temperature at 900° and the other at 1,500°,—and they found the difference in favour of the hot-blast stove to be from 3½ cwt. to 4 cwt. of coke to 1 ton of iron. Moreover, the coal and slack, which amounted to 6d. or 9d. per ton of iron produced by the iron pipe stove, was entirely saved, since no coal or slack was needed in the hot-blast stove. The only repairs necessary during eight years of use had been one change of the gas valves and an occasional change of the hot-blast valves.—*Mining Journal.*

**Harrogate.**—The three windows of the south transept of St. Peter's Church, Harrogate, have just been filled with stained glass, presented by the Mayor, Mr. Nicholas Carter, and his brother Richard Carter. The transept has two tall three-light windows, surmounted by a rose in the gable. In the upper part of the north-eastern window, and in the central light, there is the figure of St. Gabriel, the angel of the Annunciation, while in the corresponding central position, in the other window, is that of the Blessed Virgin, thus portraying the subject of the Annunciation. In the light below there are figures of several Biblical characters and early Christian martyrs, with legends and scrolls, all having a bearing either on the Incarnation of our Lord, or suitable to the figure over which they are placed. The windows are given in memory of four sisters by their brothers. They have been successfully carried out by Messrs. Burlison & Grylls, under the direction of Messrs. G. F. Bodley, A.R.A., and T. Garner. By the same donors and designed by the same architects, a carved and painted reredos has also been added. In the centre of it is a painted panel, the subject being "The charge of St. Peter."

**Cadzow (near Hamilton, Glasgow).**—On the 7th inst. the new Roman Catholic Church at Cadzow, dedicated to Our Lady and St. Anne, was consecrated and formally opened for divine service. The church is situated on the Eddlewood Estate, about midway between Quarter and Cadzow. The buildings stand on an elevated site, one acre in extent, facing the Quarter-road. They are in the Early English Gothic style, with a frontage of 90 ft. and a depth of 80 ft. The church and a commodious presbytery form one group of buildings. The chapel is entered by a side porch with arched doorway, and internally measures 70 ft. by 26 ft., with side transept 20 ft. by 18 ft., and small sanctuary. It is fitted with stained and varnished convertible seats and desks, suitable for school and chapel purposes. The architect of the buildings was Mr. William Ingram, Bath-street, Glasgow, and the contractors for the principal works were—Messrs. Brown & Henderson, Hamilton; Mr. Thom, Uddingston, and Messrs. M'Ewan & Savage, Glasgow.

**Difficulties of the Historical Painter in a New Country.**—At Washington the grand historic fresco designed to belt the rotunda of the Capitol has been brought to a stand in an unfinished state by an unforeseen obstacle. The artist who has the work in charge declares that "there isn't history enough to go round." The fresco begins with the landing of Christopher Columbus, and at present it finishes with scenes of the Mexican War. To take designs from the scenes in the recent Civil War would hardly be in good taste under the circumstances; the time has not yet come for the artistic commemoration of that great chapter in the annals of the United States, at least in the building where Congress meets. So a serious blank remains to be filled. An Emancipation panel has been suggested, but objections have been raised to this also. The indications at present are that the work will linger on till more history has been made.—*Furniture Gazette.*

**Typhoid Fever and Rainfall.**— In the last number of the *Archives Italiennes de Biologie* (tome iv., p. 26) is an interesting paper by Professor Louis Pagliani on the "Oscillations of Typhoid Fever in Paris," in relation to the quantity of rainfall and the conditions of sewage. He finds, from an examination of the weekly bulletins, that for the last three years a heavy rainfall is followed about two weeks later by an increase in the number of cases of typhoid reported as admitted to the hospital, and in about four or five weeks by an increase in the number of deaths from this cause. As the disease has a period of incubation of from one to two weeks, and, if fatal, is usually so in from the third to the fifth weeks, this coincidence, which he finds repeated several times, would seem to be something more than a mere chance occurrence. Professor Pagliani does not find that the same thing happens in other localities having a soil as impure as that of Paris, and therefore concludes that rainfall and filth are insufficient by themselves to develope the disease, and that the reason for the effects observed in Paris is connected with its system of sewerage, and more especially with the effects produced by heavy and rapid rainfall in gorging the main sewers and obstructing the flow of sewage proper from the houses, or even causing a reflux of foul water into the cellar. Many of the smaller sewers have very little fall, and are readily obstructed. The explanation is somewhat doubtful, but the fact seems established.—*Health.*

**Notes on Coal.**—The beds or seams of coal form but a small portion of the thickness of the great geological group of strata to which they for the most part appertain. This group is called the *carboniferous*, and not uncommonly "The Coal"; but even where coal is most abundant, it forms only a minute part of the whole mass. Thus it has been estimated, Sir Charles Lyell tells us, that in South Wales the thickness of the carboniferous strata amounts in all to between 11,000 ft. and 12,000 ft. (or more than two miles); "but the various coal-seams do not," according to Professor Phillips, "exceed in the aggregate 120 ft.," or little more than one-hundredth part of the whole. In North Lancashire the carboniferous strata occupy a depth of more than three and a half miles, with the same relative disproportion between the thickness of the coal-seams and that of the complete series of strata. Again, in Nova Scotia, the coal-bearing strata attain a thickness of more than three miles. Here no fewer than eighty seams of coal have been counted (seventy-one having been exposed by the action of the sea); but these seams are nowhere more than 5 ft. in thickness, and many are but a few inches thick. Thus it is evident that the formation of coal can have been in progress but for a short portion of the time during which the great carboniferous series of strata was in process of deposition. Throughout by far the greater portion of that time other minerals were being deposited.—*Mr. Richard A. Proctor, in "Knowledge."*

**Large Sale of Building Land and Ground Rents on the Clapham Park Estate.**—Last week, at the Auction Mart, Mr. G. Brinsley, of New Bridge-street, disposed of an extensive quantity of freehold building land and freehold ground-rents, forming a portion of the Clapham Park Estate, near Clapham Common, which is between 35 and 40 acres in extent. The property submitted at the sale covers an area of about nine acres, comprises thirteen plots of freehold building land with frontages to several new roads which have been made upon the estate. The sale also included several other plots of land which had been let to various builders upon building agreements for the erection of private dwelling-houses on the estate at ground rentals amounting in the whole to 424*l.* per annum; and likewise freehold ground-rents amounting to 395*l.* per annum, arising out of houses already built upon the estate. The sale took place under an order of the Court of Chancery in the case Nicholson *v.* Haynes. The whole of the several properties were submitted in one lot, and were sold for the sum of 25,000*l.*

**National Art Training School, South Kensington.** — The winter session of the National Art Training School at South Kensington will commence on Wednesday, the 1st of October. The first examination for the forthcoming session will be held on Tuesday, the 30th inst.

**Public Library and Art Gallery for Auckland, New Zealand.**—Some time ago the city authorities of Auckland invited designs from architects for a new public library and art-gallery for that city, adjoining the Albert Park, and the first premium of 200*l.* has been awarded to the design bearing the motto, "Literæ, Scientiæ, et Artes," from the twenty-seven designs sent in, which was prepared by Messrs. Grainger & D'Ebro, architects, of Melbourne. The style of architecture adopted is Early French Renaissance. The principal entrance is situated at the intersecting corner of the two streets, where there is a tower which, judging from a view given in the *Australasian Sketcher*, is the least satisfactory feature of the design. The whole of the building will be carried out in cat stone, with fireproof construction.

**A New R.C. Ecclesiastical Seminary at Boston, U.S.**, is to be opened on the 22nd of this month. The architect of the new building (says the *Boston Pilot*) is Mr. J. H. Bassarick, and the estimated cost is 150,000 dollars (about 30,000*l.*) When finished it will be a quadrangular pile.

**Builders' Ironmongery.**—Mr. James Hill, of Queen Victoria-street, has just issued a useful price list of builders' ironmongery of a serviceable description. The price list and previous catalogues devoted to architects' specialities form a complete compendium of locks, door furniture, and general ironmongery.

**Surrey Bells and London Bell-founders.** A book with this title, by J. C. L. Stahlschmidt, is announced by Mr. Elliot Stock. The work is very fully illustrated by wood-cuts and *facsimiles*; it will furnish information concerning some of the early bell-founders which has not been hitherto published.

**Hamilton (Glasgow).** — The new Free Church in Hope-street, Hamilton, was formally opened on the 10th inst. The building is Gothic in character. The church internally is 50 ft. long by 42 ft. wide, divided by means of light iron columns into nave and aisles of four bays, each bay being lighted by a two-light window with tracery on the head. There is a gallery at the sides, two seats deep, and a larger gallery at the end extending over the entrance vestibule. At the farther extremity, within an arched recess, is placed a pulpit with canopy, and over all a large marigold window, filled in with stained glass by Messrs. Ballantyne, Edinburgh. The carpentry of the roof is all exposed to view, framed of pitch pine, varnished, and of its natural colour. The seats, with solid bench-ends, the doors, and other joiner work, are also of pitch pine, varnished. Instead of the usual wood lining round the church, which is so liable to rot, the walls are lined to a height of 4 ft. with a dado of red pressed bricks. The front elevation to Hope-street has, at the left-hand angle, a tower 17 ft. square, rising up to a height of 50 ft., provided with a deeply-recessed belfry window of two lights on each of the four sides, and crowned with a spire, rising to a total height of 138 ft. Adjoining the tower is the main gable. The walls are faced with square ragstone from the Lanark quarries, and with hewn freestone from Wishaw. Messrs. Martin & Symington, Carluke, were the masons; Archibald Millar, Motherwell, the joiner; Thomas Lithgow, slater and plasterer; James Wood, plumber; Robert Symington, painter—all of Lanark; Meikle & Sons, Glasgow, glaziers; Messrs. W. & J. Hay, Liverpool, architects; and Mr. William Cassels, Lanark, clerk of the works.

## CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Public Library, &c. | Swansea Corporation... | H. Holtom | Sept. 22nd | ii. |
| Crane for Gateshead Quay | Gateshead Corporation | ..... | Sept. 23rd | xviii. |
| Buckhurst Hill Drainage | Epping Union R. S. A. | Lewis Angell, C.E. | Sept. 25th | ii. |
| Drainage Works, &c. South Eastern Hospital, Deptford | Met. Asylums Board ... | Keith D. Young | do. | ii. |
| Hospital at Chaseville Park, Winchmore Hill | do. | Pennington & Bridgen | Sept. 26th | ii. |
| Enlargement of Station, Perth | Perth Gen. Statn. Com. | Blyth & Cunningham... | do. | ii. |
| Public Offices, and other Buildings | Widnes Local Board ... | F. & G. Holme | Sept. 29th | ii. |
| New Offices, Bewick-street, Newcastle | Tyne Improvment Com. | R. J. Johnson | Sept. 30th | ii. |
| Alterations, &c., Workhouse | Grdns. of Croydon Un. | Berney & Monday | do. | xviii. |
| Paving Works | Greenwich Bd. of Wks. | *Official* | October 1st | xviii. |
| Stone for Road-making | Wanstead Local Board | do. | October 2nd | ii. |
| Battery Drill Shed and Offices, Maryport | Admiralty | do. | October 3rd | ii. |
| Blue Guernsey Granite, &c. | Acton Local Board | do. | October 7th | ii. |
| Cast-Iron Pipes, Valves, &c. | Southampton Corprtn. | do. | October 14th | ii. |
| Extension to Laundry, Vauxhall | Not stated | B. Swinstead | Not stated | i. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Surveyor | Northampton Cor. | Sept. 22nd | 200*l.* per annum | xvi. |
| Surveyor and Inspector of Nuisances | Maldon Union R. S. A. | Sept. 29th | do. | xvi. |

## TENDERS.

For works of sewerage and water supply, for the Rural Sanitary Authority for the District of Petersfield. Mr. W. Barns Kinsey, engineer, Westminster:—

| | |
|---|---|
| T. Hall, Portsmouth | £8,757 6 6 |
| Bottome Bros., Battersea | 7,976 0 0 |
| J. Crook, Northam | 7,480 0 0 |
| J. Poole, Gravesend | 7,385 4 0 |
| J. M'Kay, Southsea | 7,118 17 3 |
| Crook & Smith, Southampton | 6,993 0 0 |
| T. B. Hayter, Landport | 6,749 0 0 |
| B. Cooke & Co., Batterseа | 6,718 0 0 |
| T. Adams, Moorgate-street | 6,437 0 5 |
| W. H. Dearle, Eastbourne (accepted) | 5,980 0 0 |

For new premises on south side of Market-place, Leicester, for the Corporation. Messrs. Wheeler, Hollands, & James, architects, 119, Cheapside, E.C. Quantities by Messrs. Evans & Deacon:—

| | |
|---|---|
| R. A. G. Barnett | £3,310 0 0 |
| J. O. Jewsbey | 3,241 0 0 |
| C. Bass | 3,175 0 0 |
| J. C. Kellet & Sons | 3,169 0 0 |
| H. Bland | 3,150 0 0 |
| J. C. Tyers | 3,100 0 0 |
| A. Plant | 3,088 0 0 |
| C. Wright | 3,059 0 0 |
| F. Major | 3,049 0 0 |
| W. & H. Herbert | 3,028 0 0 |
| T. Duxbey & Sons, Northampton-street, Leicester (accepted) | 3,000 0 0 |

For enlargement of the cemetery, for the Corporation of Southampton:—

| | |
|---|---|
| J. Crook, Northam (accepted) | £2,237 10 0 |

[Two tenders received.]

For the erection of St. Barnabas's Church, Blackburn. Mr. William S. Varley, architect, Blackburn. Quantities by the architect:—

| | |
|---|---|
| R. Ibbottson | £6,600 0 0 |
| T. Fawcett | 6,269 0 0 |
| J. Fecitt | 6,246 0 0 |
| W. J. Woof, Cronshaw | 6,110 0 0 |
| B. Abbott & Son | 6,100 0 0 |
| Marshall & Dent (accepted) | 6,098 0 0 |
| W. & J. Arkwright | 6,075 10 0 |
| J. Whittaker | 6,040 0 0 |
| Kenyon & Moulding | 5,987 0 0 |
| T. Higson & Son | 5,997 0 0 |

[All of Blackburn.]

For new factory at South-place, Euston-road, for Mr. U. G. Eavestaff. Messrs. Tolley & Son, architects:—

| | |
|---|---|
| Faulkner | £977 0 0 |
| Marriage | 945 0 0 |
| Lamble | 869 0 0 |
| Gould & Brand | 837 0 0 |

For the erection of a sanitary hospital at Bournemouth, Hants, for the Bournemouth Commissioners:—

| | |
|---|---|
| J. Crook, Northam, Southampton*... | £2,687 12 9 |

* Accepted.

[Two tenders received.]

For the erection of gardener's lodge and outbuildings at Oak Lodge, Sevenoaks, Kent. Mr. H. Percy Monckton, architect, Great James-street, Bedford-row, W.C.:—

| | |
|---|---|
| C. King, Sevenoaks (accepted) | £575 12 6 |

For the erection of a range of hot-houses at Oak Lodge, Sevenoaks, Kent. Mr. H. Percy Monckton, architect:—

| | |
|---|---|
| Boulton & Paul, Norwich (accepted) | £315 10 0 |

For the erection of schools, with boundary walls, at Newhaven, for the Newhaven School Board. Mr. Geo. Fuller, architect, Lewes and Eastbourne. Quantities by Mr. J. C. Pike, Brighton :—

| | | | |
|---|---|---|---|
| Rogers & Hubard, Eastbourne | £3,182 | 0 | 0 |
| Chapman, Newhaven | 2,890 | 0 | 0 |
| Houghton, East Grinstead | 2,848 | 0 | 0 |
| Peters, Horsham | 2,794 | 0 | 0 |
| G. R. Lockyer, Brighton | 2,768 | 0 | 0 |
| J. Donovan & Son, Eastbourne | 2,750 | 0 | 0 |
| E. Cornwell & Son, Eastbourne | 2,750 | 0 | 0 |
| Woolger, Newhaven | 2,690 | 0 | 0 |
| Kemp, Brighton | 2,679 | 0 | 0 |
| Morling Bros., Seaford | 2,650 | 0 | 0 |
| Hall & Hunnisett, East Hoathly | 2,624 | 0 | 0 |
| Charlwood Bros., East Grinstead | 2,590 | 0 | 0 |
| Longley, Crawley | 2,440 | 0 | 0 |
| J. Reynolds, jun., Hove, Brighton* | 2,249 | 0 | 0 |

* Accepted conditionally.

For alterations, &c., at the Brunswick Arms public-house, Old Kent-road. Messrs. Bird & Walters, architects :—

| | | | |
|---|---|---|---|
| Gold | £1,859 | 0 | 0 |
| Birch & Co. | 1,817 | 0 | 0 |
| Williams & Son | 1,770 | 0 | 0 |
| J. Anley | 1,730 | 0 | 0 |
| W. Shurmur | 1,694 | 0 | 0 |
| Stilling | 1,399 | 9 | 0 |

For alterations to the Desborough Arms public house, Harrow-road. Messrs. Bird & Walters, architects :—

| | | | |
|---|---|---|---|
| F. Mark | £1,076 | 0 | 0 |
| R. Marr | 1,065 | 0 | 0 |
| Jackson & Todd | 1,049 | 0 | 0 |
| W. Shurmur | 990 | 0 | 0 |
| Steel Bros. | 978 | 0 | 0 |
| Birch & Co. | 977 | 0 | 0 |
| C. Goad | 975 | 0 | 0 |

For the erection of mission church, New-lane, Enfield. Mr. W. D. Church, architect :—

| | | | |
|---|---|---|---|
| Mills | £1,477 | 0 | 0 |
| T. Royce | 1,450 | 0 | 0 |
| Staines & Son | 1,389 | 0 | 0 |
| W. Shurmur | 1,386 | 0 | 0 |
| Cook | 1,295 | 0 | 0 |
| Fairhead | 1,295 | 0 | 0 |
| Patman & Fotheringham | 1,258 | 0 | 0 |
| Tinson | 1,184 | 0 | 0 |

For alterations at the Friend-at-Hand public-house, Russell-square. Messrs. Bird & Walters, architects :—

| | | | |
|---|---|---|---|
| J. Anley | £990 | 0 | 0 |
| W. Shurmur | 989 | 0 | 0 |
| Jackson & Todd | 949 | 0 | 0 |
| Steel Bros. | 919 | 0 | 0 |
| Birch & Co. | 895 | 0 | 0 |
| Yeo | 865 | 0 | 0 |
| Ridout | 837 | 0 | 0 |

For alterations, &c., to the Perseus public-house, Green-lanes, N. Mr. W. West, architect :—

| | | | |
|---|---|---|---|
| Godden | £2,095 | 0 | 0 |
| Spencer & Co. | 1,870 | 0 | 0 |
| Roach | 1,750 | 0 | 0 |
| Mills | 1,626 | 0 | 0 |
| W. Shurmur | 1,586 | 0 | 0 |
| Jackson & Todd | 1,325 | 0 | 0 |

For residence and stabling, Monkton Combe, near Bath, for Mr. W. Vaughan Jenkins. Mr. George Rhodes, architect. Quantities supplied by Mr. F. Warburton Stent :—

| | | | |
|---|---|---|---|
| J. R. Hunt, Bow | £4,660 | 0 | 0 |
| Pack Bros., Brixton | 4,578 | 0 | 0 |
| Bladwell & Parsons, Bath | 4,150 | 0 | 0 |
| Macey & Sons, London | 4,155 | 0 | 0 |
| [Surveyor's estimate | £3,953 | 0 | 0] |

Accepted for additions to stables, &c., at Fern Lodge, Orpington, with extra works to the house. Mr. St. Pierre Harris, architect :—

| | | | |
|---|---|---|---|
| W. & F. Croaker | £339 | 0 | 0 |

[No competition.]

For repairs and alterations to Inchcape, Chislehurst, for Mr. L. Fry. Mr. St. Pierre Harris, architect :—

| | | | |
|---|---|---|---|
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| | | | |
|---|---|---|---|
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# The Builder.

VOL. XLVII. No. 2173. SATURDAY, SEPTEMBER 27, 1884.


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### *The Strength and the Weakness of Art.*

THESE words were the text selected by Mr. Beresford Hope for his address as President of the Art Section of the Social Science Congress,—an address which, both in diction and in thought, sounds a higher note than is usually heard now in discourses on the subject of Art. For it is a characteristic of the decided emphasis which has of late years been laid upon the importance of a sound and complete technique in art, that many who discuss the subject have come to speak of technical excellence as if it were the one thing needful, and too many artists have put this thought into act in works destitute of any very apparent aim beyond that of exhibiting technical mastery. It is somewhat remarkable that this material way of regarding art should be, as it certainly is in great measure, the outcome of the movement in favour of a greater earnestness in art which in the younger days of this generation was called pre-Raffaellitism. The men who initiated that movement meant an earnest protest against slackness of execution and cold conventionalism in the choice and treatment of subjects. They would have been heart and soul in sympathy with the spirit of Mr. Hope's remarks at Birmingham. But the doctrine of close and precise study of technical correctness was more easily adopted and carried on than its correlative doctrine of earnestness and loftiness of aim and feeling, and we have the result in a prevalence of works of art of which the subjects interest us little, and in which technical achievement seems the principal object. This tendency to exalt technique disproportionately may be said to be the besetting "weakness" of the artist, considered as a craftsman; while the tendency to think more of the spirit and meaning of the work than of its technical power or shortcoming is the special weakness (for it is a weakness when carried too far) of the amateur. Mr. Hope's address was essentially that of an amateur, though not an ordinary one. For there are amateurs and amateurs; and it is worth while for artists to pay regard to the remarks of an amateur who thinks and feels strongly on the subject of common interest to both.

There has always been a little difficulty, since the Art Section of the Social Science Association was inaugurated, in drawing the line between that which is pure and unadulterated art-criticism and that which is within the proper scope of the association, the consideration of the relation of art to our theory of life and of social organisation; or rather, the line has sometimes not been drawn at all, and the audience have listened to addresses the proper locality for which would have been the lecture-platform of an academy of art. Mr. Hope, as he observed at the close of his address, set himself to find a connecting link between art and "social science." And he finds it, in the first place, in calling our attention for a moment away from the mere question of artistic execution and artistic success, to consider the origin and the meaning of art itself in the widest sense of the word. Objects of art are manifold; art herself is "the one informing, harmonising, life-giving spirit which runs through all the visible creation"; and Mr. Hope boldly but happily presents it as synonymous with what is truly styled "wisdom," "the breath of the power of God, and a pure influence flowing from the power of the Almighty," of which wisdom art is the visible sign. And the deduction from this is that art cannot be regarded as existing for itself alone; it is strong in proportion as it is the helpmate and the herald of morality, and weak in proportion as the artist worships himself, and deals with his art as if it were the end as well as the means.

"This is a position on which I very emphatically insist. It is important at all times, and it never was more so than in the present day, when æsthetic perceptions,—for the old word 'artistic' is quite out of fashion,—would, if we would believe the depth or precision of thought of excited and gushing votaries, seem ready to pose as the substitute of old-fashioned morality and generally accepted common sense. As you love art, and if you love art, resist this. True art never can be immoral, for it remembers of what it is the influence. False art,—that is, art which thinks of itself and not its mission,—has only self to rely on, and self's perceptions; and in its weakness it must become sensual."

How many pictures on the walls of contemporary exhibitions in England and France illustrate this position it is hardly necessary to remark. Mr. Hope, though declining any claim to be a critic, in the strict sense, of pictorial art, goes to the painters of the past for an example, in a parallel or contrast between Rubens and Fra Angelico; the one confessedly great in all attributes of art except the very highest; the other, with no vestige about him of the heroic, yet so absolutely self-forgetful in his enthusiastic devotion to the higher aim of art as to have a claim to be cited as showing forth the strength of art.

The comparison is, perhaps, not entirely just to Rubens. He is an exceptional figure among artists. Of a large proportion of eminent painters, sculptors, and musicians it might be said that what was highest and best in them came out in their art. With Rubens it appears to have been the reverse; he was an instance of the less numerous class of whom it may be said that the man was higher than the artist. All that we know of Rubens shows him to have been a man of high stamp, a man eminently healthy and noble in character; and it might perhaps be more truly said that it was in artistic rather than in moral elevation that he was, as a painter, defective. Rubens's real sin in his paintings is against "good taste" rather than against any more serious or important canons of life and conduct, and against that sin a higher and keener artistic sense would have safeguarded him. That he was not possessed by any very serious aim in his painting, however, must be conceded. He was a man who took life joyously and easily, but he seems to have had the great merit of living a life of prosperity and affluence in a thoroughly healthy and generous spirit. In speaking of Angelico Mr. Hope admits the weak side,—the want of human nature in his work,—involving partial failure, because "the painter was forgotten in the friar." In the case of Rubens we might say that the painter was a little forgotten in the man. The daily life of the man was wholesome and honest, what may be called in a sense princely (the word seems somehow to fit Rubens well), but he did not cherish any ideal beyond it.

For that is what, as Mr. Hope says, the matter comes to; the strength or weakness of art consists in the conformity or divergence of the artistic product from an ideal, "the closest representative of which, allowing for the poverty of language in lending itself to abstract thoughts, would be morality." When we attempt to apply the same principle of reasoning to architecture, another element is introduced. Architecture is not only occupied with beauty of composition, but with soundness of construction; it has the morality of construction as well as the morality of composition. So Mr. Hope puts it. It is surprising that he should entirely pass over the immense difference between the nature and degree of the possible moral element in painting and sculpture, which represent actual ideas and characters, and reflect life, as compared with that possible in architecture, which is only an abstract or metaphysical form of art. Some one has said of music that it has the privilege, as an art, of being incapable in itself of expressing a wrong or pernicious idea. The same holds true of the art which is in the realm of form what music is in the realm of sound. Architecture, pure and simple, cannot express an idea of *morale*, right or wrong. The distinction is really, when we come to speak of the morality of art, a tremendous one; to pass it over was to let slip one of the points of the subject. In a lesser

and more special sense, however, there is no doubt a kind of moral right and moral wrong in architecture. There is truth or falsity of architectural style, regarded as the expression of constructional fact; and there is, what is more important and touches more nearly upon serious moral ground, soundness or falsity of construction, in all its branches, statical and sanitary. It is only in regard to this latter part of the subject that the morality of architecture can be spoken of as a matter involving serious moral praise or reprobation. The question of truthfulness of style, as an expression of construction, involves the question of good or bad reasoning, and of more or less true artistic perception, but these are hardly matters of morality, unless we come to the extreme case, that in which an architect deliberately puts up some architectural features which are not wanted and have no relation to the construction, in order to give a more attractive and important appearance to his building. The capability of doing even this, however, though it is no doubt in one sense a sham and a falsehood, hardly involves moral culpability. It would not surprise any one to find that a man who put up useless columns or buttresses for mere garniture in his buildings, was nevertheless generally truthful in his speech, and paid his bills honestly. But a man who would habitually, to save trouble, time, and money, build houses which were unsafe in construction and insanitary in arrangement, we should not be surprised to find would take advantage of his fellows in other immoral ways; we should regard him as a man not to be trusted in any relation of life. This latter kind of defect implies real immorality of principle; the former only implies vulgarity of mind.*

It is only this question of refinement and truthfulness of expression which is really concerned in the battle of the styles, to which Mr. Hope referred at some length, and in regard to which he might have said "*quorum pars magna fui*." According to his view, the whole battle of the styles was a conflict for the two architectural moralities, the morality of construction and the morality of composition. But we do not see what the morality of construction has to do with that question. Mr. Hope retraced some former ground and fought some old battles over again in defence of Gothic architecture, saying with fresh point and emphasis what has been said before, and what in the main few of us would question; only that there are other sides to the matter which were not represented. But Mr. Hope concluded by speaking strongly in regard to the importance of the constructive morality of building, in whatever style. The engineers on the one hand, he said, if they invade the province of the architect, "must condescend to those principles of composition, of dignity in masses, of grace in details, which are the features which make a building delightful to an unscientific eye." Would the Thames Embankment, he asks, have been worse if the artist's hand had been visible in the details, and particularly in the parapet? But the very fact that the engineers have to some extent, and not with happy results, invaded the field of architecture, should make the architects the more careful not to fail in the practical problems in which the engineers are their real rivals. It was a blow to Gothic architecture when the most eminent Gothic architect of his day was forced by official orders into Classical harness. But, says Mr. Hope:—

"Talking in this connexion, I must say that, in my opinion, a more severe blow was dealt to the credit of Gothic architecture by the discovery that, with all the pains which the chief of Gothic artists had taken to prove how gracefully he could dance in the fetters of that alien style which official prejudice had forced upon him, he has yet shown himself so strangely unappreciative of the responsibility which rests on every architect to master, and so bestow his personal care upon the sanitation of his building, than by the apparent readiness with which he ever assumed those fetters; for an ill-drained building produced by an able man must be weak, lamentably weak, in the trappings of whatever style it may be garnished."

That unfortunate defalcation from architectural principle in the matter of the Foreign Office has evidently never been forgiven by the Gothicists. The perpetrator of the deed is to them a "A lost leader,"—

"Just for a handful of silver he left us!"

and may, like the hero of the poem, be "pardoned in Heaven," but not here. But Mr. Hope should be impartial. Is there no other Government building, of pure Gothic type, the practical deficiencies of which have caused it to be regarded by many as a blow to Gothic architecture?

However, we are grateful for an address which holds up so high a principle throughout, in such dignified and manly language, and which was more directly practical even than at first appeared, seeing that, as Mr. Hope observed, his subject had led him from Fra Angelico to the drainage of public offices; not unaptly reminding us, by this long transition, how large a field is covered by the subject, how many things in life are more or less connected with and acted upon by the strength or weakness of art.

* Here we may be reminded, perhaps, of the moral dictum of the mother in *Punch*,—"It is worse than wicked, child; it is vulgar."

## TECHNICAL EDUCATION IN ITS APPLICATION TO BUILDING UNDER THE CHRISTIAN BROTHERS.

IN the rooms devoted to the display of the educational exhibits of the Christian Brothers of France and other foreign countries, in the new building of the City and Guilds of London Institute, South Kensington, the builder, the building workman, and the young architect and engineer too, will learn not a little to their advantage. As a preliminary we would, however, recommend the intelligent and practical-minded visitor to rid himself of his bias and local prejudices, if he has any, and judge whatever objects meet his view on their intrinsic merits alone. We are not concerned in this journal about the peculiar political or religious views of any party, and certainly, in the important matter of technical education in its application to our building industries, we are desirous of assisting, as far as it lies in our power, any and every movement judiciously directed towards that end, whether without or within this country. It therefore affords us pleasure to direct special attention to the practical character of the teaching in connexion with building construction imparted by the Christian Brothers, and so well and elaborately illustrated by the diversified exhibits shown in the French Department of the Health Exhibition in the room already mentioned. The system pursued by the Brothers is the suiting of their instruction to the places in which their schools are established, and they make a special study of building materials in connexion with practical geometry, of which they have thousands of specimens. A noteworthy feature in the system is that no pupil is allowed to do anything mechanical till he has, as a matter of sketching and designing, shown that he fully understands what he is about to undertake. The many designs that may be seen, hung up or in the portfolios free to inspection, will prove that this is practically acted upon. In France the Brothers have a large number of public elementary private day and boarding schools, as well as technical and agricultural schools. Besides ordinary schools and colleges in Belgium they direct art schools and training colleges. Again, in the United States and Canada the community have numerous schools, academies, and colleges, and everywhere the same general methods are followed of teaching, modifying, however, the details to the custom of the country, and varying the programme to meet local requirements and growing wants. It may not be amiss *en passant* to say here that the Institute or the Society of the Brothers was founded in France, so far back as 1680, by J. B. de Salle, Doctor of Divinity and canon of the metropolitan church of Rheims. Educational reforms, as well as social and sanitary ones, as is proved by the course of history, take a long time to carry into effect. La Salle appears, though fully bent on the moral improvement and training of the young, to not only have realised the wants of his age in France, but, to some extent, to have anticipated, paved the way, or provided for some of the educational wants of unborn generations. The Brothers were essentially from the beginning an order or society of teachers, and as such, under La Salle, in France, public primary education was established. Of course, as at first, special attention is still given to religious instruction in the schools of the order, but it is remarkable that La Salle required the Brothers to make the vernacular tongue the basis of their teaching, instead of Latin, which up to his day, if not later, had been the language of the schools. Modern languages, mathematics, drawing, and architecture entered into the programme of La Salle upwards of two centuries ago, and formed the course of instruction.

Coming to the fine art exhibits, the Brothers show in the rooms of the City and Guilds of London Institute their educational manuals or books on the various kinds of drawing, with corresponding charts, diagrams, and models in the flat, supplemented by a large number of working models in wood and plaster of masonry, stone-cutting, carpentry, and joinery, including several well-executed models in staircase construction. The method of drawing exhibited by the Brothers, though applicable to individuals, is chiefly for class instruction, and as such it is used in their primary schools, and so graded as to lead the student by easy steps to the applications of art to industrial design. The course includes (1) freehand, ornament, and figure drawing; (2) drawing from nature; (3) tinting and the theory of shadows (sciography); (4) building construction and design; (5) machine construction and drawing. Comprised in the foregoing there is also, firstly, a manual for the master's use to render the teaching methodical and for facilitating oral explanation; secondly, model copy-books, with numerous exercises for reproduction under the direction of the master. Thirdly, a number of models and objects to be drawn to a given scale. Models which bear more directly upon technical instruction are provided with the principal sections required for professional demonstration, but there are others specially constructed to illustrate planes in space,—their intersections and projections. Fourthly, a collection of charts, comprising some of the more important subjects of the models copy-books reproduced in bold but clear outline for class teaching. Fifthly, there is a model illustrating the principles of Perspective. In the albums and portfolios (numbering 390), which are certainly arranged with the view of facilitating inspection, will be found the work of the students. These comprise architectural drawings from actual measurements, sketches of machinery made by the students when visiting large factories and engineering workshops, field-books of compass and theodolite surveying, together with a number of the corresponding designs and plates fully developed. The following schools contributed the largest number of ornamental drawings:—The schools of Paris, Rheims, Marseilles, Aurillac, Lille, Rome, Caen, and Toulouse. The more important geometrical collections came from Béziers, Commentry, Rheims, Le Gua, Dreux, La Motte, Dijon, Avignon, Douai, and Bordeaux. An unpublished folio work on drawing is exhibited by the Brothers in charge of the class at Rheims.

We would specially direct the attention of our young building workmen who are seeking to qualify themselves for the position of foreman or clerk of works, to the collection of plaster and wooden models on view, illustrating sundry of the most difficult pieces of work or masonry, carpentry, and joinery, that occur in building construction. There is no guesswork, groping, or "rule-of-thumb," evidenced in the models of the students on view. Each voussoir, on stone, or whole course, whether it appertains to an oblique arch or bridge, a niche, a groin, the soffit of a circular-headed door or window, in a circular wall, a spiral stair, a cylinder, a wreath, or any other form in stone or wood of double curvature, each and all are the outcome

of practical geometry applied to the development of surfaces in building construction. Difficult though some of these problems may be on the drawing-board in the building workshop, the construction is here made easy to the intelligent youth who has mastered but little more than the rudiments of practical geometry. Several of the models in plaster of Paris are exceedingly well executed to scale. The joints are all shown on every external face, and though the model in itself is solid, as it were, certain sections or stones are made to lift off to show the development of the faces of the through joints or inside surfaces that abut against each other. Thus at the intersection of a groin, the central stone atop is made to lift out; and in the model of a circular stair one of the treads can be lifted off, and so in other models designed to illustrate various forms of masonic construction. The plaster modelling by the students (some of them not halfway yet in their teens) is not only good in point of execution, but affords a good technical lesson to the young building workman visitor who may not have had in this country an opportunity of seeing how work of a similar kind is "set-out" and performed. In some of the drawings we examined in connexion with stone-cutting and joinery we were much struck with the powers of delineation displayed by students in the schools of the Christian Brothers. A mere outline plan, say, of a cylinder of a staircase, to a youth or an apprentice in one of our workshops, may appear to his eye merely a curve, but when developed and projected with its winding surfaces, even on paper, it speaks to his mind more palpably, and shows something approaching an embodiment in fulness and form, though not actually so, until the science in the drawing is applied to the construction in wood or other material. A youth must learn to draw before he can learn to model, but, at the same time, modelling and drawing can proceed by easy stages together. There are many young building hands in our workshops still who scarcely understand anything about plans, although they may be passably good workmen at certain branches of their trade. A model of a house or other building would be easily understood by the majority of such operatives. With the plan of the house in their hands, together with the model of it before them, a more practical lesson, of course, would be conveyed to them, but this sort of lesson under present circumstances in this country seldom occurs. We, however, in this journal many years ago advised the construction of models when both private and public buildings of importance were about being erected.

Returning to the art-teaching of the Christian Brothers, the school of St. Luke, at Ghent, comprises a comprehensive programme of Christian art. The courses include, in addition to drawing and painting, modelling, sculpture, and architecture, and extends over seven years. There is an essential difference in the method followed to that pursued in the State schools of Belgium and other countries. Specimens of the work done will be found in the Belgian Courts. The technical schools conducted by the Brothers are represented by a large number of various exhibits from the New York Catholic Protectory, the school of La Salle at Lyons, the Orphanage at Versailles, and from the schools of St. Nicholas, Paris. The Protectory dates back twenty-one years, and was founded for the purpose of caring for the destitute children of New York, and teaching them useful trades. Part of the day is spent by the boys in the class-room, and part in the workshops. The handicrafts include chairmaking, silk-weaving, tailoring, printing, and electrotyping. Examples of the work done are on view. The school of La Salle admits a number of the most successful students of the school at Lyons free of expense, who desire to acquire a theoretical and practical knowledge of local industries. In addition to modern languages, political and social economy, the courses include descriptive geometry, plane trigonometry, with its applications to surveying, experimental physics, organic chemistry, along with the various kinds of drawing and industrial design. Laboratories and workshops are provided in which the students are afterwards instructed in analytic chemistry, cabinetmaking, and particularly in silk-weaving, which is an important local industry. A certificate of proficiency is given to the students who satisfactorily complete the course. The exhibits at South Kensington in connexion with this comprise,—(1) fifty specimens of different coloured silk, (2) albums of patterns and designs; (3) specimen-frame, containing the arms of the City of London (specially prepared for the Exhibition); (4) senior albums of drawing, some of which contain the rough draft; and (5) school work generally. There are several very notable features in connexion with the Agricultural Schools, the schools of St. Nicholas, and the school museums under the management of the Brothers, of which a large number of exhibits are shown. The courses in the first extend over three years, students of seventeen who pass a satisfactory preliminary examination being admitted. The instruction is not confined to the lecture-rooms, physical and chemical laboratories, and natural history museums, but includes systematic work on the model farm, comprising 370 acres. The students are also required to visit the best farms in the vicinity, and to attend certain markets and sales of live-stock, with special professors. They also have to accompany the Brothers on appointed field-days for the practical study of botany, geology, and entomology. Among the exhibits of the schools, besides seeds and grains, plants peculiar to certain soils, fodder plants, injurious plants, graminæ, and cereals, are geological specimens and samples of various woods indigenous to the district. In the schools of St. Nicholas, which are conducted on a large scale, the boys are put through a regular course of instruction, special attention being paid in the higher classes to subjects connected with technology. There are several workshops in which are taught various kinds of carving in wood and stone, engraving on wood and metal, cabinetmaking and printing, and the construction of scientific instruments, levels, telescopes, microscopes, &c. Some of the workshops and other rooms are illuminated by electric light, a steam engine and a Gramme dynamo-electric machine being provided. Edison's incandescent lamps are utilised in the physical and chemical laboratories. Including the branch establishments at Issy and Igny, the St. Nicholas schools have an aggregate of upwards of 2,500 boys. The exhibits at the Health Exhibition of these schools are as a whole very commendable, though many of them are the work of mere youths. Among these exhibits are walnut bookcases, cabinets, lathes, microscopes, and telescopes, bronze statuettes, sundry specimens of modelling, and numerous specimens of carving, printing, engraving, and bookbinding. The Brothers are alive to the importance of providing museums as a portion of the machinery of practical education. Indeed, the founder of their order, two centuries ago, was of the same mind, and anticipated some of the educationists who came after him. The list of the museums sent from the schools of the Brothers in France, Italy, the United States, and Canada, though incomplete, is a remarkable one, and as it will serve an educational purpose, it will not be out of place to include it in our notice: — (1) Annecy. — Specimens of the geology, mineralogy, and flora of Savoy, and of the local industries, with analysis of the principal mineral waters. (2) Marseilles. —Specimens of local trades and industries (oils). (3) Beauvais.—About 1,500 specimens of various handicrafts. (4) Rome.—The marbles and principal earths of Italy. (5) Rheims.—Specimens of the local woollen industry. (6) Dreux.—A number of separate classified collections, showing among other matters the successive stages in the manufacture of needles, combs, clocks, flutes, mirror-making, wood gilding, printing, &c. (7) Memphis, U.S.A.—Numerous specimens of cotton. (8) Quebec.—Specimens of Canadian woods presented to the Brothers' Commercial Academy by Sir Theodore Robitaille, Lieutenant-Governor of the Province of Quebec. (9) Havre.— Objects imported from various parts of the world. (10) Chambéry.—Specimens of the industries of Savoy. (11) Le Gua.—Varieties of coal and iron ore (local). (12) Arles. — Insects, molluscs, herbaria. (13) Trévoux.— School herbarium and objects of local industry.

The collections are well worth examination and study, and they are suggestive of similar work that ought to be done over the three kingdoms. True, we have a number of field naturalists' clubs, entomological, microscopical, and composite clubs and societies, in whose mixed "Transactions" archæology, geology, natural history, botany, and other studies are reported, but these, for the most part, are for grown men or otherwise for those blest with means, and who have ceased to be boys or youths long since. Systematic study and instruction of the kind we have noticed is not as yet to be found in connexion with our school system.

## NOTES.

THE past summer has yielded to American enterprise an abundant archæological harvest. America has its archæological school at Athens (when is England to have the like?), and it is the discoveries of a member of this school,—Dr. Sterrett,—during the past summer that are shortly chronicled in the *Nation* of August 21st. When the full report appears in the papers of the Athenian school, we shall hope to notice the discoveries in detail. Meanwhile, we may mention that Dr. Sterrett has directed much of his attention to the identification of ancient sites in the interior of Asia Minor. He has also investigated the ruins of Antioch, where considerable sculptural remains are still extant. He has collected above sixty unpublished inscriptions at Antioch, and upwards of a hundred in other parts. Dr. Sterrett has a special claim to English sympathy, because his work has been carried on to a great extent in conjunction with a member of our own Hellenic Society, Mr. Ramsay, whose discoveries in Asia Minor have been a notable feature in that Society's work. By an arrangement between the two, Dr. Sterrett is to publish the inscriptions, Mr. Ramsay the topographical discoveries made while the work was undertaken in common.

THE ever-recurring question of house-drainage has for the past week been under discussion in the columns of "the leading journal," but we cannot say that any new facts have been brought forward. It is natural enough that any one who has suffered from the consequences of bad drainage should feel sorely aggrieved, and that he should be strong in his denunciations of architects and builders,—without always stopping to inquire whether an architect had anything whatever to do with the construction and sanitary arrangements of the house that may be in question. As we have frequently pointed out, architects are not engaged by speculating builders to supervise the execution of the suburban "villas" and "terraces" which spring up with such mushroom-like rapidity on what were but yesterday meadows and market-gardens. We have always been, and ever shall be, strenuous advocates for efficient sanitary arrangements in dwellings; indeed, we insisted upon their vital necessity many years ago, but it is only now that the importance of what we urged so long ago is beginning to be generally recognised. By all means let the builder who "scamps" his work, and particularly the drainage arrangements, he brought to book and adequately punished. But we are afraid that the public is not altogether blameless even for the builder's sins of omission and commission. We some time ago heard a builder of good repute deploring the fact that his houses, which were soundly-built and properly "sanitated," would not sell, because they were either less "showy" or slightly higher in price than those of a less scrupulous rival. The moral of all this is that house-purchasers or intending lessees should take competent professional advice, and that the law which requires the local authorities to see

to the proper drainage of every house should be enforced. As one of the correspondents of the *Times* points out, in nine cases out of ten "it is not the law in England that is wanting, but the strict administration of it." But in justice to the speculating builders, we are bound to say that some of them show a laudable desire to arrange the sanitary fittings of their buildings on the most approved principles, even as to details regarding which they are under no legal compulsion. For instance, in many new houses which we have seen lately in the metropolis, the sink-wastes have been carried through the wall to the external air, so as to discharge over an open gully, thus avoiding direct communication of the sink-pipe with the drain,—a communication which is a constant source of illness in households.

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AS usual the annual autumnal building operations have been undertaken in Cadogan-place during the month. When the inhabitants of this part of London return to their homes they will find three or four more houses raised a story, and presenting an appearance of even a more dreary monotony than the plain old red brick fronts, which are sometimes pleasantly varied with verandahs and creeping plants. Cadogan-place is one of the best sites in London, with the great length of fairly broad garden stretching from one end to the other, and with an important thoroughfare beyond. Moreover, it is the property in its entirety of Lord Cadogan, and the leases are only renewed on certain conditions as to rebuilding and enlarging the houses: consequently there existed an opportunity of improving the appearance of London by re-facing and enlarging the houses with good architectural supervision and according to picturesque and attractive plans. Lord Cadogan might thus have not only directly added to the beauty of the capital, but have given an example to smaller and less important landlords. But, so far from having done this, the style of the enlargement is of the most common-place, characterless, and ugly kind, and the whole of Cadogan-place will, in a few years, present a line of gray and dreary monotony, to serve not as an example, but as a warning. It will serve also to show that a great deal which is urged in favour of large properties in our times, on the ground that their rich owners are able to improve the general appearance of a town more than single individuals, is quite false. Had Cadogan-place been owned absolutely by individuals it would certainly by this time have been a far more attractive spot than it is at present, when what small amount of picturesqueness which yet exists has been destroyed under the supervision of Lord Cadogan's surveyor.

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AT the Social Science Congress Mr. John Hamer, the author of the paper on "The best means, legislative or otherwise, of securing those improvements in the dwellings of the poor which are essential to the welfare of the community," entered very fully and vigorously into the question. Most thoughtful persons will agree with him in the prominence which he has given to the necessity of efforts being made so to instruct the people as to enable them to learn for themselves their real state. "The condition of thousands of our fellow subjects is what it is because they do not know what it is." The Council have wisely adopted the principle long ago laid down by the Charity Organisation Society. No distribution of charity is made, but help is afforded to those willing to help themselves. One of the remedies in course of prosecution, that of buying-up bad properties and erecting proper dwellings on their sites, called forth some discussion, not so much as to the desirability of removing the objectionable dwellings, as to the agency by which the operation should be carried out. The view that the provision of the requisite improved accommodation should be left to private enterprise under effective State supervision seemed to commend itself most to the judgment of the meeting, and was supported by Professor Gairdner, of Glasgow, who considered that it would prove "the best preventive against the monstrous evils which had occurred in many towns."

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IN his paper before the Social Science Congress Mr. Walter Besant struck the keynote of a very important question in his remarks regarding the failure of the Bethnal Green Museum to meet the ends for which it was founded. "It was," he said, "an institution intended to be a great educational centre"; and, "had done none of the things for which it was intended. It was simply a dumb and silent gallery. There was no teaching." The charge thus plainly put forward is one by no means confined to the Bethnal Green establishment; it may be made, with equal truth, against most if not all our Museums. The thousands of visitors who frequent them wander about in a listless manner, and a certain amount of wonder and astonishment is kindled in their minds; but do the visitors, taken in the mass, derive any real, artistic, or educational benefit from what they see? We seem to have failed to fully grasp the educational use of a Museum. Once let there be commenced a series of open public lectures in the galleries of our large Museums, and we shall see how the people will appreciate them. A gentleman who for several years has had experience in lecturing, especially to working men, furnishes the following illustration of the value of a tour through the galleries of the British Museum when a few simple explanations of the meaning and value of the treasures there exhibited were given. "Three or four working men," he says, "were one day staring in blank wonder at the Assyrian marbles when I was taking a party of friends through the collection and explaining some of the inscriptions. I noticed the men listening to the remarks, and presently one of them came to me and asked if they might follow us round. Permission was readily given, and the men commenced to take notes of what was said. Some months after I met one of these men taking some of his fellow-workmen round and using the notes he made on the former occasion to explain to them the objects exhibited." Here, then, is a practical proof of the value of even casual instruction, and of the willingness of working men to listen to and benefit by it. It may be said that the officials are too much occupied with departmental duties to find time to prepare and deliver lectures. But this is a difficulty which is perhaps over-estimated. The general public are not likely to require elaborately-prepared discourses such as might be submitted to a learned society; it would be sufficient if the lecturers were fairly well up in their subjects, and acquainted with the most typical and important examples in the collections to be used as illustrations. Short conversational lectures by men possessing these qualifications would entail no hard work or great loss of time, and good results would soon make themselves manifest, especially among the younger students. Very strong testimony as to the educational value of a museum as an adjunct to a public school was recently given by the head-master of Rugby at one of the educational conferences at South Kensington.

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WE may call the attention of our readers to the full description given in another column, accompanied by illustrations, of the details of plan and construction of the Temporary Infectious Diseases Hospital recently formed at Liverpool, under the direction of the City Engineer, Mr. Dunscombe. The enthusiastic young draughtsman, to whom architectural study means the opportunity of making effective sketches of piquant points of ancient building, may regard two such pages as of slight interest to his æsthetic mind; but they represent what forms the very basis of practical architecture, the provision for the most healthful conditions for life. We have noticed elsewhere some recent remarks touching on the "morality" of art and architecture; and part, and a much neglected part, of architectural morality consists in securing sanitary completeness in a building. The care which seems to have been taken in securing the best sanitary conditions in this hospital, where sanitary completeness is exceptionally important, renders it a useful and typical example of its kind, and hence we have thought it worth while to give some space to the full statement of what some may regard as rather dry details.

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CONSIDERABLE difference of opinion has been expressed, and continues to find expression, as to the best means of sewer ventilation. The question is one of much importance, involving as it does to a great extent the principles to be observed in the construction of the sewers themselves, for properly-designed and well-constructed self-cleansing sewers will obviously, under normal conditions, always be sweeter than badly-constructed sewers, — such sewers of deposit, for instance, as some of the older London *cloacæ* are, if they still exist. Notwithstanding the outcries occasionally made against the London system of ventilating the sewers by means of openings in the crown of the street, a large number of engineers of repute and experience adhere to the opinion (in which we are disposed to agree with them) that, all things considered, the London method is the best, provided that the openings be sufficiently numerous and therefore sufficiently near each other. It would seem, however, that this system of street openings is likely to be supplemented, in that limited part of London which is under the control (for sanitary purposes) of the City Commission of Sewers, by the use of shafts. We notice that at the last meeting of the Commission, on Tuesday, Mr. Altman brought up a report from the Streets Committee, relative to the suggestion of Mr. J. S. Scott, "That in all instances where new houses are being erected the Commissioners of Sewers place themselves in communication with the building or other owner, and treat with him or them for the construction of a proper ventilating shaft in the chimney breasts or party or other walls, for the purpose of ventilating the sewers, carrying the ventilating shafts well above all adjoining roofs," and recommended that the same be acted upon. The Engineer to the Commission (Colonel Haywood) said this was their custom at the present time. The Commissioners were quite prepared to erect ventilating shafts at their own expense. We are glad to see that Mr. Alderman Lawrence urged the importance of carrying the shafts sufficiently high so as not to be detrimental to other buildings, to which we would add: "nor to the occupants of the buildings to which the shafts are attached," for it is matter of actual experience that drain-ventilating shafts and soil-pipe heads are sometimes so placed that the foul gases emitted from them will, under certain conditions of atmosphere and temperature, pass down chimney-flues and through dormer windows into bedrooms and other apartments.

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THE common tradition that the timber of old churches was frequently of chestnut seems to have been exploded by the researches of the French chemist, M. Payen, who procured a large number of pieces for examination, and pronounced that they were not chestnut, added to which, chestnut trees, whatever their abundance in old times, are now extremely rare. We are told that if letters are drawn upon oak and chestnut planks, by means of pure sulphate of iron dissolved in distilled water, the characters appear at once in black upon the oak and in deep violet upon the chestnut, while ammonia produces a short-lived red upon the chestnut, which is much paler and less distinct upon the oak. Another mode of examination is by making sections of the wood, which cannot well be mistaken, as chestnut timber possesses only concentric layers, while all French and American varieties of oak show the medullary rays crossing the woody fibre from the centre across the circumference.

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A NEW paint, consisting of a mixture of zinc white with zinc chloride, has been for some time in successful use at Brest for painting wood and metals; it becomes very hard, and can be washed or brushed without injury. It should not be applied, however, in

rainy or frosty weather, as it then becomes mealy and scales off easily. Chloride of zinc is not the only salt which possesses the power of forming a mastic by its mixture with zinc white, for Sorel long ago showed that the proto-chlorides of iron, manganese, nickel, and cobalt were good bases for mastic. The Dock-yard authorities at Brest have extended their experiments, and have shown that the sulphate and nitrate of zinc, the nitrate and chloride of iron, and the sulphate and nitrate of manganese, all form good mastics with zinc white.

## THE PUBLIC WORKS OF EGYPT.

AN account of the Barrage of the Nile, the greatest work executed in Egypt since the fall of the Thirty-third Dynasty, is by no means easily accessible in this country. We have sought in vain in the best scientific libraries for information on the subject; and not only so, but we have also been unable to discover a section, or to obtain any other exact information, of the now dismantled railway from Cairo to Suez. We have pleasure, therefore, in calling attention to a work just published in Paris by M. Felix Paponot, a French engineer, under the title "L'Égypte, son Avenir Agricole et Financier," which, while chiefly intended to advocate the project of a sweet-water canal from Ismailia to Port Said, gives a fuller account of the *régime* of the public hydraulic works of Egypt than can easily be met with elsewhere.

M. Paponot commences his work with a re-iteration of a well-known fact. "It is without dispute admitted and recognised that Egypt has been from all time a fertile country, of great productive wealth, but on condition of a good rise of its unique river, and of an intelligent distribution of its water." The cultivable soil of Egypt is the creation and gift of the Nile; but the construction of an enormous reservoir designed to regulate the inundations of the river is ascribed to King Amenamhat III., the sixth monarch of the Twelfth Dynasty, who reigned at Thebes, according to Brugsch, 2,300 years before Christ. At this date, as appears from rock-cut inscriptions, collected by Lepsius during his stay in Nubia, the inundation reached at Semne and Koomme a point 8·17 mètres above the greatest height ever attained at present. M. Linant, to whom we owe the best map yet made of Egypt, has proved that the ancient lake Mœris was situated in the south-east part of the province of the Fayoum, where the depression of the ground and the ancient dykes exactly define its site. At the epoch of the inundation the waters of the river entered by means of a canal into the lake, where locks retained them. At the time of low water the gates were opened to irrigate the great plains of the districts in the neighbourhood of the lake.

Stupendous as the work of this lake was, the amount of water which it could store depended on the height to which the Nile rose, in any particular year. In this height there is a great variation. The flow of the river varies from a minimum of 480 metric tons per second in June to a maximum of 7,457 metric tons per second in October, according to the measurements of Mr. Fowler. The mean flow, of 2,874 metric tons per second, is about one-third of the mean flow of the Danube, at Pesth, or almost exactly sixty times the mean flow of the Thames. The area of Lower Egypt, according to a report to the Viceroy from the International Commission on the Suez Canal, dated 7th December, 1855, forms a triangle covering 1,375 square leagues (or 8,071 square statute miles). The cultivable lands of Lower Egypt are estimated in the same report at about 3,800,000 feddans, or Egyptian acres, each of which is equal to nearly 1·46 English acres. The water required for irrigation, according to the same report, is equal to 20 cubic mètres per feddan in twenty-four hours; requiring, for the service of the 950,000 feddans which the barrage of Saïdieh was intended to supply, 19,000,000 cubic mètres per twenty-four hours, or not much less than half the minimum flow of the Nile as ascertained by Mr. Fowler.

The recent efforts of the engineers in the way of regulating the flow of the Nile have been directed either to the damming up the river at selected points, so as to divert a flow of water into artificial canals made at a sufficient height to irrigate the surrounding districts, or to pumping the water by steam power into similar canals. As to this, it is stated, in the report to the Viceroy of Egypt before cited, that there is only one point in the course of the Nile through Upper and Middle Egypt, where the spurs of the mountains descend to the bed of the river; and where, in consequence, it is possible to construct a solid and substantial barrage, founded on the rock. This is at Silsilis, which, on Brugsch's map, is marked at about 24° 40′ N. latitude, and this is too far above Cairo to have been regarded as suitable for the erection of a great controlling work of this nature. The spot selected for the barrage actually constructed was Saïdieh, at the origin of the Delta, where a massive brick viaduct was constructed, and finished in 1853. This work, which crosses the two branches of Rosetta and of Damietta at their origin, is founded on a wide, but not very deep, mass of concrete. The length of the barrage across the Rosetta branch, comprising sixty-one arches of about five mètres span each, and two locks of twelve and fifteen mètres in width, is 465 mètres. The total length of the barrage across the Damietta branch, which contains ten arches more than the former, is 545 mètres. In the original plan it was projected to close the arches of the viaduct partially during the low water by means of iron sluices, so as to raise the level of the water above the viaduct to a height 4½ mètres above that below it. By this means it would have been possible to supply the canals of Lower Egypt with water at such a level as to render unnecessary the laborious methods now in use of the "sakiehs" and "chadoufs," or rude machines worked by men and by bullocks. Lower Egypt, it was thought, would be thus rendered independent of the rise of the Nile; as, by regulating the floodgates, the quantity of water applied to cultivation might be increased or diminished at will.

The water-way afforded at low water, with all the sluices and flood-gates open, by the barrage, is about 990 square mètres, a larger area than that of the cross-section of the river about 2 kilomètres lower down. At the height of the inundation in 1874, the current occupied an area with a cross-section of 7,000 square mètres at the barrage, while the water-way at the bridge of Kasr-el-Nil, was 6,500 square mètres, and that at Querrematt, about 114 kilomètres above the barrage, was 6,850 square mètres.

Just, however, as were the calculations as to water-way afforded by the barrage, which it will be seen is such as to allow a full Nile flood to pass at a speed very little exceeding a mètre per second, the execution of the work was not such as to admit of the intended benefit resulting from its use. The soil at the spot, which has been tested by boring to a depth of 40 mètres, consists (as is the case in the greater part of the Delta) of a fine Nile silt, readily pervious to water. In consequence, it is said, of the haste, and of the positive orders, of the Viceroy, the foundations of this costly work were laid at an altogether inadequate depth. "My conviction is," reported Mr. Fowler in 1876," the foundations of the apron have been laid at an inadequate depth, and if the barrage is to be repaired and finished in such a manner that it may be exposed without fear and for many years to the action of the waters of the Nile, costly and important works must be added in order to put it in such a state as it would have been in if the foundations had been carried, in the first instance, to the proper depth." The apron, or submerged platform, as shown on the plates of M. Paponot, has only a depth of from 4 to 5 mètres below the bed of the Nile, and a width of 34 mètres. The zero of the Nilometer given is 28·21 mètres; the level of the lowest water 27·75 mètres; and the top of the apron is from 26·96 to 26·46 mètres above the datum. The piers, each 2 mètres wide, are continued up the stream as dolphins or breakwaters, and the apparatus of the iron sluices is fixed at the end of the dolphins. The apron is laid on a mass of uncemented stones, the depth of which is shown on the drawing as 16 mètres; but as to the careful construction of which evidence is wanting. "Great part of the concrete on the Rosetta side," says Mr. Fowler, "was simply laid on an uncompacted mass of detached stones, 12 mètres in height, through which the current must necessarily and continually have filtered, carrying away the cement before the mass was solidified." At all events, this mass of stone, with the interstices filled with silt, is pervious to water. Thus the whole structure of the barrage is liable to be undermined, and, in the event of a head of water being raised to such a height as to counterbalance the weight of the structure, is liable to be thrown up by hydrostatic pressure. How far it is due to calculation and how far to experience, we are not told; but, instead of 4½ mètres, or 14·76 ft., 1½ mètre, or 4·92 ft., is the greatest difference of height which it is considered safe to produce by the sluices. It will be obvious that under these circumstances it is not so much the simple hydraulic pressure due to height that has to be regarded, as the effect of the movement of water, or the velocity due to the head, or difference of level. As to this, a head of 13 ft. was found at Birkenhead to produce a current which the solid masonry of the culverts was unable to resist. A head of 14·76 ft. of water gives a pressure of 920 lb. per square foot, and a tabulated velocity of 30·33 ft. per second.

The unique character of the elevation of the Nile barrage, architecturally regarded, is due to the erection of a small tower on the northern or down-stream end of each pier. In the plates of M. Paponot the towers or turrets on the Damietta branch are shown as square, and those on the Rosetta branch as round. The height of these turrets, which are battlemented above the heavy line of the parapet of the viaduct, or main structures of the barrage, is about 3 mètres. The object of the arrangement does not appear from anything adduced by M. Paponot.

Such being, in the opinion of Mr. Fowler, the state of the foundations of the barrage that it would be unsafe to expose them to any greater pressure than they actually experience, as "they would be entirely destroyed and carried away by the water passing beneath at the pressure and with the speed originally projected," the question arises how the loss of 3 mètres in the height of the water taken for irrigation is to be met. To this end Mr. Fowler proposes the construction of a second series of sluices, built on foundations carried to a great depth, immediately below the present apron, while he would protect the bed of the river from erosion by additional works. By this means there would be two steps, or differences of elevation, in the water confined by the barrage; the one of 1½ mètre, caused by the present work, and the other, of 3 mètres, based on the cross wall to be run athwart the bed of the Nile, reaching to a depth of 18 mètres below the surface of the present apron, which, moreover, is to be covered with a layer of ashlar masonry ½ mètre thick.

M. Paponot, on the other hand, proposes the construction of a cross-wall, or diaphragm, descending to a depth of 20 mètres, on the south or up-stream side of the present apron. Above this diaphragm he would place a mass of loose stones, protected by a line of iron piling, of ingenious design, which he distinguishes by the name of "*pieux-palplanches*." The additional head required for the water he would give by the construction of entirely new barrages, of which he considers that no less than six should be erected on different parts of the river. He does not propose to emulate the magnitude of the existing work, but to construct movable barriers, resembling the needle weirs erected on the Seine, at Bois le Roi, of which he gives engravings taken from photographs.

The cost of the rectification of the barrage is estimated by Mr. Fowler at a million sterling, involving, for interest and maintenance, an annual cost of 100,000*l*. The interest and maintenance on a pumping establishment with the adjuncts necessary to provide an equivalent amount of water for irrigation is estimated at 280,450*l*. per annum, or nearly three times as much. The advantages to be derived from a proper system of irrigation are twofold. In the first place the cultivators of the soil will be relieved from a vast amount of costly and laborious work, and will be enacted to devote their time to remunerative labours. In the second place, not only will the soil actually under cultivation be more adequately watered than at present, but its area may be doubled or trebled; and thus not only will a given area be rendered more productive, but land now desert will become fertile. The Commission of 1837 calculated that in the six specified provinces 262,772 men, or nearly one half of the men existing in the districts, were employed in agricultural labour. The mere saving of the annual work of deepening the irrigation canals, which would be rendered unnecessary by raising

the head of water, would save forty days' labour in the year for each of these men; amounting, at the pay of 1½ Turkish piastre per day, to 15,766,320 piastres, or upwards of 140,000*l.* per annum; a sum which the saving effected in the same manner on the Katabé and Cherkieh canals would raise to about 196,000*l.* per annum.

In addition to this saving of human labour, 50,000 "sakiehs and tapontes," or contrivances for raising water worked by bullocks, would be rendered unnecessary. (This is without counting the chadoufs, which are worked by hand). The allowance for these machines is three oxen apiece, with one man at least to each machine. The time for which the irrigation is carried on by these means is six months. The food of the oxen costs two piastres a day each. Thus the cost amounts to 5¼ million piastres for the cattle, and to 13½ million piastres for the men. To that has to be added the maintenance and repairs of the sakiehs, at 120 piastres each, giving a total of 73,500,000 piastres. One hundred piastres go to the Turkish or Egyptian pound, which is worth 18s. of English money. Thus a saving to the country, over about one-fourth of the area which will be cultivable under a well-planned system of irrigation, amounts to 657,000*l.* per annum from the simple suppression of the "sakiehs and tapontes."

In addition to the sum of 853,000*l.* per annum thus saved, and to the product of the labour so economised when applied to directly remunerative work, the Commission reported that the water power due to the construction of the barrages would be equal to 12,000 horse-power, which, at 20 piastres per day per horse-power would amount to 51,120,000 piastres a year. How far this water-power,—the existence of which is, of course, matter of very simple calculation, would actually be utilised in Egypt "for founding factories and new workshops, and for replacing the motor powers now used," is of course liable to question. But in a country where fuel is so rare and costly that one cause of the decreasing fertility of the soil is the consumption of the animal manure as a combustible, the utilisation of so cheap a power as that of water is not to be disregarded. It was the outcome of the labours of the Commission, the detailed exactitude of which can be studied to great advantage in the pages of M. Paponot, that the whole of the estimated cost of the works projected would be replaced, in three years, by the increased value of the productions of the country. This is equal to a net return on capital of 33 per cent. per annum. Enormous as it seems, there is, at all events, a *primâ-facie* case in its favour made out, and that not by speculators or schemers, but by Ministers of State, and Military, Civil, and Mining Engineers, native, English, and French. The view which these gentlemen submitted to the Viceroy is consistent with the long established character for fertility of the Egyptian soil, and it should be observed that the experience of 1861 is such as strongly to confirm the statements. The Suez Canal Company purchased, in that year, what is called the Wady domain, which at that time contained 4,500 inhabitants, who cultivated about 6,000 feddans of ground, with a resulting profit of about 4,000*l.* In 1866 the inhabitants had increased (under the irrigation system introduced by the Company) to 14,000; the soil under culture was over 12,000 feddans; and the revenue derived by the Company amounted to an average of 270 piastres, or 70 francs, per feddan, or 33,400*l.* per annum.

The work of M. Paponot, which is published at the Libraire Polytechnique, 15, Rue des Saints-Pères, Paris, is extremely opportune, and will be read with interest by a large class of readers, whether their tastes incline to the architectural, the engineering, or the agricultural details of the book.

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**Monumental.**—A large number of the Hertfordshire Freemasons, with their Provincial Grand Master, Mr. Thomas F. Halsey, M.P., assembled in Watford Cemetery on Friday last, to unveil a marble memorial they have erected to their late deceased Deputy-Provincial Grand Master, Doctor Wilson Iles. On the removal of the covering by the sculptor, Mr. James Forsyth, the Grand Master addressed those assembled. The monument consists of a tall Latin cross, with kerbing to enclose the ground, executed in Sicilian marble.

## CHANGES IN ALDGATE.

A FEW months ago Mr. Birch addressed a meeting of the St. Paul's Ecclesiological Society, collected within the church, upon the early history of St. Katharine Cree, in Leadenhall-street. Could he have foreseen the occurrences of the past three or four weeks Mr. Birch might have been tempted to say a little about a neighbouring thoroughfare,—Bevis Marks,—whereof the outer aspect was then as curious and picturesque as of any in Aldgate Ward. But, together with the demolition of part of Castle-street, fully one half of Bevis Marks, on the northern and southern sides, has disappeared likewise, with all its quaint old tenements, including one which was once popularly known by the sign of the Blue Pig; perhaps from reminiscences of Richard III., at Crosby Hall. A continuation of Wormwood and Camomile streets,—their titles commemorating those herbs which grew plentifully there,—Bevis Marks forms with them a link in the chain of thoroughfares along which lay the course of old London Wall.* Its very name has a peculiarly genuine and characteristic sound of its own. Stow, who lived in St. Mary Axe, in the adjoining Lime-street Ward, derives it from a house which, having passed from the Basset family to the abbots of Bury, was "therefore called Buric's Markes, corruptly Bevis Markes." The property then came into possession by the Heneage family: hence the present Bury-street (where Dr. Watts used to preach), Bury-court, and Heneage-lane; also Mitre-square and Mitre-street. In course of time Bevis Marks, with many other thoroughfares in its immediate vicinity, was appropriated by the Jews, who thronging into London under Cromwell's favour extended to Rabbi Manasseh Ben Israel in 1655, found but insufficient room at their former haunts of Jewin-street and Old Jewry. On its southern side may be seen the principal gateway of the Spanish and Portuguese synagogue, which, with the Jews' school adjoining, lies between King-street and Heneage-place. This synagogue was established here in the year 1656, and was rebuilt in 1701, when the learned Rev. D. Nieto was Chief Rabbi of the Portuguese community. Eastwards of St. James's, more generally called by its recent name of Duke's-place, is the German and Polish Jews' synagogue, dating from 1692. Upon the passing of the United Synagogue Act in 1870, this has ranked and is known as the Great Synagogue. With a far less imposing interior it is larger than the other we mention. Close by in St. James's-place stands the *Beth*, or as a German Jew pronounces it, the *Bise Hamedrash*, House of Learning, an autocratic court, yet one whose decisions are always observed, for the summary adjustment of minor differences, mainly of a monetary nature, arising amongst the inhabitants.

A warehouse along the south-eastern side of Mitre-square occupies the site of St. James's Church, built in 1622, and graveyard. The latter were demolished about six or seven years ago. The parish was united with that of St. Katharine Cree, when some monuments and tablets were removed to St. Katharine's Church, and the remains of interments taken to the cemetery at Ilford. We should regard St. James's Church as a representative of the ancient Holy Trinity Priory. The establishment of the Priory is attributed to the deservedly-popular consort of King Henry I. The history of its endowment is somewhat involved, but may be briefly given as follows:—Between the fens where Fenchurch-street now runs and the open space of Moorfields, Maud, or Matilda, owned a little property, or soke, by Aldgate, near the end of the highway for which she built the bridge at Stratford, in lieu of the Old Ford where she is said to have once narrowly escaped from a flood higher up the many-channelled and slowly flowing Lea. Just beyond her soke extended outside of the wall that of the Knighten-Guild, whose head was portreeve in St. Eadward the Confessor's days and for some while later. Influenced by the pious exhortations of one Norman, an Augustinian monk, her confessor, and who himself owned land and advowsons, &c., in the City, the Queen gave her soke, together with, as some would say, her property in Ald Gate for a house of canons regular to be dedicated to the Holy Trinity or Christchurch. This house supplanted a church which Suedyr, a canon of St. Paul's, had erected in honour of the Trinity and St. Mary Magdalen, and of which the dean and chapter of Waltham were wont to receive yearly 30s. Matilda acquitted her priory of this incumbrance, giving the dean and chapter a mill in exchange. At his wife's death Henry confirmed her gifts to the priory, and shortly afterwards a similar gift by the Knighten-guildmen* of their property to this same house. Holy Trinity, burial-place of the great Henry Fitz-Aylwin, ultimately grew into one of the most important and wealthy monasteries in England, insomuch so that up to the Dissolution its prior sat as alderman for Portsoken Ward, which had arisen upon the Knighten-Guild liberties. King Henry VIII. bestowed the priory upon his Lord Chancellor, Sir Thomas Audley; but the residents were granted their existing privilege of choosing their alderman. By his marriage, for his second wife, with Margaret, Baroness of Walden, daughter and heir of Audley, Thomas (Howard) fourth Duke of Norfolk, succeeded to the estate; and in his house here died Hans Holbein, who was buried at St. Catharine's Cree. Duke Thomas shared his father's untoward fate in 1572; his son Thomas, by the Lady Margaret of Walden, was created Earl of Suffolk. He sold his inheritance at Aldgate to the Corporation, and built Audley End, Lord Braybrooke's seat in Essex, with the proceeds. Stow tells us that St. Katharine's Cree Church, standing over the burial-ground of the dissolved priory, derives hence its agnomen,—a corruption of Christ Church. Many views of the conventual buildings, or, rather, the ruins, are preserved in our national collections. The gateway, for example, of R. B. Schnebbelie's drawing is in all probability what was subsequently known as the Thrum, or Mop, Gate, being a place for the hiring of servants. All remains are commonly stated to have been finally demolished early in this century, and these have been followed by the destruction of Norman's little crypt of St. Michael's beneath the roadway of Leadenhall-street. But in a wire-blind maker's shop in Mitre-street (No. 39) the curious will find an archway, well preserved, its base some feet below the shop floor, which, doubtless, is a relic of the monastery. The alteration of the ground level is plainly apparent in the fact that the capital of a pillar within St. Katharine's Cree is only a few feet above the modern church pavement.

The name of Trinity found its way into the adjoining Minories. Here the works for the completion of the Inner Circle Railway have involved the destruction of a portion of the eastern side of the street, together with Fountain-court (originally London Prentice-yard), Harrow-alley, and some of the unique old houses, their ground-floors converted into carcass-butchers' shambles, which faced the Three Nuns Tavern, now rebuilt, by St. Botolph's, Aldgate.† But Trinity Church, a relic from the Fire, and rebuilt in 1706, at the end of Church-street, Minories, is a totally distinct foundation, *pace* Mr. Peter Cunningham and others who blindly follow him, from the priory in Aldgate. For it carries us back to the nunnery of St. Clare, or the Nuns Minoresses. They owed a safe settlement in this quarter to the good offices of Blanche of Navarre, and of her husband, the Edmond, Earl of Lancaster, a brother of Henry III., who lies beneath the beautifully canopied tomb at West Minster. The Minorite Convent was granted by Edward VI. to the Duke of Suffolk, father to Lady Jane Grey: his decapitated head is still preserved in a box beneath the pulpit. The convent farm passed to one Goodman, who gave his name to Goodman's Fields and Goodman's Yard, whilst Vine-street marks the former convent garden. Within this obscure little church lay in state the body of Sir Philip Sidney on the way to old St. Paul's; Edward I.

* We lately adverted to the discovery of relics of the wall which has just been made at this spot. See the *Builder*, p. 311, *ante*.

* The brothers' names are worth recording:—Ralf, son of Algod, Wimarle Doverishe, Orgar le Prude, Edward Hupcornhill, Biskstan and Albyn his kinsman, Albyn and Robert, sons of Leostan, Hugh, son of Wigar, Leostan, the goldsmith, and his son Wizo, Algar Secusun, Orgar Dereman's son, Osbert Drinchepyg, and Adelard Hornpiteson. The Rev W. J. Loftie, in his "History of London," directs attention to so early a mention of Cornhill, and opines that the Dereman, father to Orgar, is the James Deorman (the "Deorman of London" in Domesday Book), to whom, by a charter preserved at Guildhall, the Conqueror gives a hide of land in Gaddesden, co. Essex.

† The Fountain Inn, dating from 1480, which, with the gate of the Holy Trinity Priory, is reproduced in "Old London" at the Health Exhibition, was pulled down in 1796.

deposited within its walls the heart of his mother, Eleanor of Provence, wife to Henry III.; and here was buried he whom King Charles I. bade his son to remember as "the faithfullest servant ever prince had,"—William Legge, ancestor of the Earls of Dartmouth, who attended his sovereign on the scaffold before Whitehall.

## ART QUESTIONS AT THE SOCIAL SCIENCE CONGRESS.

THE proceedings in the two departments of the Social Science Congress in which we are specially interested, the Health and the Art departments, were this year of more than usually interesting and practical character. To Mr. Beresford Hope's address as president of the Art Section we have referred elsewhere. The first question for discussion in this department was "Ought elementary instruction in drawing to be made an essential part of national education?" The subject was opened by Mr. J. P. Seddon, a portion of whose remarks we give as under:—

"This question contains three distinct points of importance requiring consideration:—

1. Is it possible to make even elementary drawing part of a national education?

2. If it be possible, is it desirable; and should it be done at public cost?

3. If both possible and desirable, what should be the character of the elementary drawing to be taught?

Firstly, then, as to the possibility of such an undertaking. This, which is necessarily the preliminary question, may, I think, be answered decidedly in the affirmative; that is to say, that every person of fair, ordinary intelligence can be taught to draw, at any rate to a sufficient extent to subserve many valuable practical purposes. Drawing is, I believe, very much easier to learn than writing, because it is a far more interesting occupation in itself, and the result of it is the more immediately visible and encouraging. Most children of their own accord seek to be permitted to make attempts to draw, and, when allowed to do so, generally follow them up with tolerable persistence, and, if they abide by the well-known motto, '*Nulla dies sine linea*,' they soon make appreciable progress in the art; whereas, on the other hand, as a rule, young people have to be constrained to learn to write, and they look upon the task as one to be avoided if possible; and the proficiency they attain in it is seldom either rapid or remarkable.

The second point for consideration is whether, granting it be possible, it is a desirable thing to do, and so desirable that it ought to be carried out at the public cost. Now it is obvious that this question has to be viewed both in regard to the advantage of the individuals themselves, and in the light of the public policy. In the former case there can be but little doubt but that it would be highly to their own advantage to have opportunity afforded to them of availing themselves of their inherent power of learning to draw, and that this power should be reasonably developed; for whatever be their rank or position in life they would thereby be made more efficient, and therefore more valuable instruments for their special work in the world. They would, in fact, become in consequence more capable and happier beings.

Then, again, from the public point of view, the desirability seems to be equally evident, since the profit and pleasure of the community is very dependent upon the capacity of all its members to be able to perform properly what the rest may require of them. Now in truth a man can hardly be considered human with this capacity for drawing being left so completely undeveloped and in abeyance as it is, as a rule, in England in this nineteenth century. He is not really a being capable of properly ministering to others as he should be. Nine people out of ten, for instance, nowadays, when asked to describe an object or a place, bewilder their questioner with futile gyrations of their fingers; but, if requested to explain their meaning more definitely by means of drawing, at once sadly deplore their inability to do so.

Even, then, for the simple purpose of making people intelligible, it is certainly desirable that they should all receive some elementary instruction in drawing; and in case of those that are not able to afford it for themselves, this should, in my opinion, be provided at the cost of the State, as being more practically useful to everybody than many of the by-roads of literature which are now taught in our national schools.

But drawing in reality does far more than stand for or illustrate words. It teaches, and indeed compels, observation, and thereby becomes in itself a most valuable system of education. Therefore, from this point of view also, its importance is so great that it ought certainly to be made an essential part of the national education. The majority of people are, it is true, in the possession of good eyesight, but unless they have been specially taught, or of themselves learned to draw, paradoxical though it may appear to say so, they cannot, or at any rate do not, for want of this training, see properly; that is to say, they do not really observe with any degree of accuracy. It must have been the want of trained observation that was the cause of the very able painters Claude and the two brothers Poussin remaining all through their lives content to draw, out of their own imagination, trunks of trees tapering like the roots of carrots, and foliage-like bunches of leaves tied on to the ends of sticks. The world has, it seems, condoned the glaring inaccuracy of these artists in these particulars, because of the exceeding excellence of their colouring and the artistic feeling which pervades their work; but really, in all probability, this has been because the fact has escaped its own notice. By the very process of being taught to draw, young persons have the shapes and other details of what they are set to imitate engraved as it were upon their minds. They thus learn what are the points they should notice and how to observe them, and so a valuable habit of attention to details and accuracy in recording them becomes engendered.

There are, besides, several other, perhaps subsidiary, yet obviously moral advantages, as well as a considerable amount of pleasure to be derived from the art of drawing, as an occupation for leisure hours; and it further enables people to enjoy and understand more thoroughly, because more critically, the manifold beauties of nature and art with which they are surrounded. But, after all, in view of the cost of tuition being borne by the public, in case that elementary instruction in drawing should be made a part of the national education, the strongest reason why it should be given is that it would form a most material aid to that technical instruction which has now become to be universally recognised as having a quite vital importance to the English nation. The very stringent competition which it already has to meet in all branches of its manufactures from other countries is likely rather to increase than diminish hereafter. Foreign artisans are fully conscious of the value to themselves of gaining a facility in drawing, and are not likely to neglect this valuable source of self-improvement. Whatever be the trade or the occupation in life, to be able to draw correctly is sure to further its interests, and to improve the character of the work done in it.

I think, then, that I have adduced quite sufficient reasons to prove that it is both possible and desirable to make elementary drawing an essential part of the national education, even if it be at the cost of the public, for those classes who are not able to afford it for themselves. It now, therefore, behoves me, in the third and last place, to consider what should be the character of the elementary instruction in this art which should be given.

With regard to this, it is of the utmost importance to keep prominently in mind throughout the practical technical purpose for which mostly this drawing is needed by the nation in general.

It is not now only the designers, but the whole body of the executants of our multifold manufacturers for whose instruction in the elements of art I am pleading, and the character of the drawing that they require is such that, while it would tend to their practical improvement, it would leave those who are workmen workmen still; but workmen endowed with increased power and intelligence in their own crafts, and not such as would unsettle them by turning them into, or giving them the ambitions of indifferent oil-painters or water-colourists, of pseudo-architects or decorative designers, for so many of whom there would be neither room nor need in the country.

Now there is a right method and a wrong method as regards elementary instruction in drawing, as is the case with most other things in this world: and unfortunately, as so often happens, it is the wrong one which is generally followed. This wrong method has unhappily obtained the curious misnomer of 'freehand,' whereas there is little that can be called free about it. Freedom permits a man to use his own eyes for observation, and his own intellect in its translation by the hand, but this system compels him to follow those of another, and is veritable slavery, leading to mannerism. It consists in teaching drawing by copying drawings instead of objects; and its error lies in its directing the mind to the observation of what is unimportant to the neglect of the important, and what are mere matters of detail to the prejudice of the grasp of the whole.

The damage that this single error in elementary instruction in drawing has done is simply incalculable. It has given a wrong bias to the art of the country. Persisted in, as it commonly is by amateurs, who learn sketching and water-colouring by copying the drawings of their masters, it stifles originality and perpetuates the worst mannerisms, till even the foliage of the various trees are rendered by them with specific dodges of the pencil or brush.

Now, in the instruction that should be made part of national education, it is obvious that there should be no escape from the elementary stage, which is all that the majority need. Therefore the elementary instruction should be both right in character and thorough. What is wanted is simply line drawing; that is, correct draughtsmanship with the pencil or point, without the stump or the brush, without shading or colour, and this gained by drawing from objects and not by copying the drawings of others.

The fact is, that if you give a student a single object to draw, such as a leaf, the construction of which is obvious, or a cast of one as more convenient, his mind grasps at once the problem that has been put to him; he naturally looks at it first as a whole, and with time and some help to begin with, he will soon be able to solve it. Whereas, if a drawing of a leaf be given him instead, he looks merely to the lines, as if they were the problem, and he loses himself in the detail which they represent.

Not only English, but all modern Occidental art, seems to have lost precision, in consequence, as I think, of the wrong bias 'freehand' copies have given, and of the consequent impatience of the drudgery of learning line-drawing properly. The civilised world seems full of amateurs, and even artists, who can produce pretty or pretentious but inexact effects with the stump or the brush; but it is sadly empty of such as can draw clearly and accurately objects with the pencil or the point. Whereas, in comparison, Oriental drawing is altogether better and different. The Japanese, for instance, seem a nation of draughtsmen. They seem able to draw in the fewest necessary lines all manner of natural and other objects, with perfect precision, and to give the essence of their character, as it were, in a species of shorthand. This is totally different from, and superior to, the sort of 'Impressionist' smudges which have to do duty for the like generally in Europe. If England, then, is to undertake to make elementary instruction in drawing an essential part of its national education, depend upon it that to make it serve any really useful technical purpose it must be somewhat after the character of that of the Japanese.

The drawing of the human figure would, perhaps, hardly enter into any general scheme for elementary instruction, but as it is so highly important a branch of the subject, it is impossible to pass it by wholly without consideration. It is, in fact, the ultimate aim of all good draughtsmanship.

The character of figure-drawing wanted by architects, and the workmen connected with architecture or its furniture, is such as will enable them to get the general proportions and poses correctly. This is to be obtained by rapid, though careful, sketching of the human figure in numerous and various attitudes, and not by laborious imitation of the light and shade on its surface, such as, doubtless, painters and sculptors require; and yet the students in the schools of art seem all alike to be put to this latter class of work alone, spending too much time, in my opinion, in furbishing up drawings, as if for exhibition rather than practice, *with the stump*.* Would it not be better, as a rule, for such to have had the opportunity of drawing the outlines and proportions of a dozen figures, than to have elaborated the surface of one? At any rate, I venture to suggest that such should be the limitations of

* We have repeatedly protested against this practice of the schools.—ED.

any development of the artistic instruction that may be established with the aim of furthering the technical education of the country."

Mr. Chas. G. Leland and Mr. Rowland Hamilton followed with papers on the same subject; the former urging the necessity of teaching drawing in schools, on the ground that all children whatever of both sexes should be trained while from eight to fourteen years of age, to develope the constructive faculty by the exercise of certain arts, all of which depend on a knowledge of decorative outline design; while Mr. Hamilton read a paper chiefly enforcing some of the previous arguments in regard to the educational effect of drawing. The feeling of the meeting, so far as it was expressed, appears to have been, we are glad to say, unanimously in favour of the views urged by the speakers.

In the consideration of the second main question, at the Friday's meeting, "What is the value to the ear, the mind, the health, and the disposition of the young produced by class instruction in music?" Mr. Manby Sergison took a line very similar to that taken by Mr. Seddon in regard to drawing; music being the training of observation and of expression through sound, as drawing is the training of observation by the eye and of expression through form; and Lady Macfarren's paper was a more concentrated, more scholarly, and generally better expressed testimony in the same direction. Mr. P. H. Rathbone, on the same day, read a suggestive paper on "The Place of Art in Political Economy," which we must be content to mention now, but which we may give in another number.

In the consideration of the third special question in the Art Section on Monday, "How can a love and appreciation of art be best developed among the masses?" to which we have before referred as a vague and unpractical form of question, Mr. Walter Besant said that his remarks were only based on East London, and must not be taken as applying to any other city whatever. "Even as regards East London, the place is so vast that it is impossible to lay down any proposition which is not open to contradiction. As regards art there are certain limits imposed by poverty; it is impossible to look to house decoration, or any striving after things beautiful where people live from day to day. The most that can be expected is to extend the influence of art into those classes where work, living, and wages are fairly good.

Taking, therefore, the East End of London, let us inquire into the agencies which are at work there for art. First there is the Bethnal-Green Museum. This institution, intended to be a great educational centre, has done nothing of the things for which it was founded. It is simply a dumb and silent gallery. There is no teaching at all; people are expected to teach themselves. It is worth while to study the contents and management of the museum, if only to find out what is not wanted for the people. It is, however, a place which attracts a great many visitors on free days.

The other agencies at work in the East End are one or two institutes, the parish organisations, and the chapels with their systems of meetings, lectures, &c. As yet, however, the people do not show the least enthusiasm for art, and are contented to be amused. We must endeavour to make them desire art of all kinds and follow it, in some one of its numerous branches, of their own accord. This means the establishment of a society for the encouragement of art in all its branches, especially the minor arts, because these can be quickly perceived to have a practical value of their own. There will be local committees, local museums, schools, exhibitions, &c., in which all the teaching work shall be done for nothing, and there shall be,—at all events at first,—no fees. But when the society has been started by voluntary effort it must, if it is to succeed, be carried on by the people themselves, and they will have to be paid,—but at workmen's wage-rate,—for teaching in the schools. So that sooner or later fees will be introduced."

The Rev. W. Tuckwell read a second paper on the same subject, in which he said that the craving for ornament and decoration among the masses is universal, and that the supply is execrable. The most popular, the cheapest, and the loveliest of possible ornaments were flowers. Attempts to introduce these into the poorer parts of Birmingham were mentioned; hints were given for enlarging the enterprise; penny flower-shows, peripatetic lectures, Sunday field-classes, were proposed. Artificial decorations were treated under the heads of wall-paper, ornaments, pictures; cheap and graceful specimens of these were shown.

We may return to some of the discussions which ensued.

## HEALTH IN ENGLAND.

This was the title of the address of Dr. Norman Chevers, the president of the Health Section at the Social Science Congress. We extract the following passages, embodying the impressions of a sanitary reformer who has been long working in a foreign climate, and regards England to some extent from the position of an outsider:—

"No power of concentrating language would enable us to detail, within a space of twenty minutes, even a bare list of the grave sanitary shortcomings which every stranger must perceive within a week after he sets foot on British chalk. I must only attempt to make little more than bare illusion to a very few of the most salient of these defects. Precedence may be given to a question which is sufficiently designated by the title "Our Slum Death-Rates." One of our leading subjects for inquiry is, How far may the average death-rate of a population be considered an efficient test of its sanitary conditions? To this it would be difficult to reply without entering into a little detail. That fashionable and delightful resort, Bilge-Water-on-the-Silver-Sands, is reported to 'enjoy,' to borrow a phrase from its only undertaker, let us imagine, the very exceptional death-rate of ten in the thousand. This singular phenomenon in vital statistics is revealed by an elaborate calculation, and is attributed to a variety of causes, which include the fact that forty-nine fiftieths of its salubrious area are occupied by the Riviera roads, N., S. E., and W., Engadine square, crescent, and parade, and that vast and sublime district the Mount Olympus Estate. Here the mortality-rate of each family is about the same as it would be if they spent one half of the year in a yacht and the other in a Highland palace; but what death-rates prevail in the few remaining lanes of the old smuggling village, Fish-alley, Wash-tub-court, and Blockade Man's-corner? With only an alteration of names, I will give the data as I find them recorded in the unpublished reports of unquestionably high sanitary authority, which I now hold in my hand. The mortality-rate in the Fish-alley group (some call it 'Stinking Fish-alley') is not ten, the general town rate, but has been reported by the eminent health officer as 45 per 1,000 for the last twenty-nine years. Dr. —— writes,—I cite his report to the borough authorities *verbatim*, the names only being changed:—'Calculated on population enumerated at the inspection, the death-rate of the group from all causes, during 1873, was 46·6 per 1,000, ranging from 21·0 in Section C (Smuggler's Point) to 84·4 in Section D (Fish-alley), Blockade Man's-corner being 44·5, and Wash-tub-court 48·7.'

'Yes,' it may be said, 'this is unavoidable; the men and women of the court and alley are a low lot,—always drinking.' 'True,' is the reply; 'let us take, then, the most demonstrative of all slum mortality-rates, the death-rate of the poor little children under five, who never "drink" and seldom eat.' The health officer reports that, at Blockade Man's-corner, which is a comparatively airy locality, the deaths of young children to total are 31 per cent.; in Wash-tub-court they are found to be 64 per cent. It appears to me that, in all future returns, the statements of Slum Death-rates cannot be too strongly accentuated. 'It will never be happy in England' until we have these rates painted in red letters, with the plague motto, 'Lord, have mercy upon us!' over the door-way of every condemned house, as long as the besom of improvement fails to sweep it away for ever.

One of the peculiarities of English house-construction, which is most irreconcilable to the ideas of a stranger who has long resided in the tropics, is that arrangement by which all well-to-do people have secured death as a perpetual dweller in their homes, thus providing that they and their children shall be subject to a high mortality rate. I speak of the *skeleton that lurks in all our cupboards*,—the latrine on the lobby. 'What, a mere skeleton, a poor, quiet, harmless anatomy, whose worst vice is a tendency to clank and chatter a little when autumn draughts are abroad?' No; but, only separated from you by a slender bar, a giant with a drawn sword, who may at any moment leap forth and slaughter your little ones. In the construction of new houses the remedy is clear: the isolation of your skeleton cupboards,—diphtheria traps, and plumbers' happy hunting grounds as they are,—in detached towers. It is in the highest degree needful that this measure should be made obligatory by the Royal Commission on the Housing of the Working Classes.

I wish that I had time to emphasise the absolute contempt, the utter abhorrence, in which all honest workers in the field of public health must hold that most loathsome and futile of all vain conceits, Sanitary Brag. As if one engaged in mortal contest with the King of Terrors should pause every now and then, and exclaim, smirkingly, 'That was a good stroke!' 'I had him there!' 'Aha, I have stamped him out!' Let us do our good work patiently and humbly, expecting fair success hardly and slowly earned; but, assuredly, pretentious quackery, dishonest assumption of power which we do not possess, will never effect the real triumphs of sanitary reform.

It may, perhaps, be said, 'You have spoken to us as a pessimist; you can see no good in our sanitary endeavours,—the God-strengthened war of mortal man against inevitable death!' No, had I not believed with never-failing ardour in this Providence-granted sanitation, I should not have studied and practised it, lovingly and hopefully, for forty years. I should long ago have directed my attention to something more practical. No one esteems and glories in more appreciatively than I do the admirable work done in the past half-century, by such sanitarians as Chadwick, Miss Nightingale, Simon, Sidney Herbert, Sutherland, Parkes, Gavin Milroy, Benjamin Richardson, Netten Radcliffe, and George Buchanan; but I recognise with painful clearness the disheartening fact that without powers, full almost to benevolent absolutism, the benefit conferred upon their suffering fellow-countrymen, even by such enlightened administrators of the public health as these, must always be very tardy in its advance and very narrow in its scope. Why, forty years ago the great sanitary questions which we are now assembled to discuss, especially the drainage and scavenging of towns, the combustion of smoke, and the diminution of our infant death-rate, were very nearly as advanced in men's minds as they are at this moment! I declare that I regard these old and most vitally important, but still absolutely undetermined, questions in that spirit of sickening, wearied disappointment with which we may picture Sisyphus, doomed to interminable fruitless labour, as gazing upon the stone which, throughout eternity, he will never cease to roll up the hill obstruction. To use plain language, the discussion which we are carrying on here is not very unlike the talk which an old officer used to cite, as being held when provisions fell short during a winter's cruise in the North Sea, of good things only to be enjoyed in a painfully indefinite future. I do not, of course, in any way undervalue the admirable work which has been done by many good men in many places, and especially at the meetings of this association, now and in the last twenty-seven years, and which has still to be perfected, in treating great sanitary questions as matters of science and statistics. I merely insist, as all my predecessors in this chair have done, too often in vain, upon the necessity of persuading,—would that I could say of compelling,—the world's blockheads to act upon our scientific teaching. In a treatise on public health and vital statistics, which I published two-and-thirty years ago, I expressed a wish to strike those stolid faces, and I am not ashamed to say that the wish still exists in its original vividness.

I cannot hope to live to see the day, but I confidently anticipate that all who do will find that, in a very short time after the appointment of a Minister of Public Health, invested with great powers, against which all narrow self-interested opposition will be futile, and commanding large means, nothing more will be heard of sewage-poisoned rivers, smoke and fog blocked cities, or of public buildings and attractive suburban retreats constructed upon burial-grounds, quagmires, or abandoned lay-stalls. They will also find that all the great questions which we have been considering here are undergoing practical solution,

and that valid progress will have been made in carrying into effect these urgently needful public measures,—the approximation of the death-rate of our mercantile marine to that of the Royal Navy, a most important question, upon which many, including myself, worked steadily ten years ago, but which, at the present moment, appears to have fallen into undeserved abeyance; the publication of medico-topographical and sanitary reports for all towns and districts in the United Kingdom, a measure which I have lately advocated in the Epidemiological Society; the sanitary administration of our cities upon a uniform plan; and the reform and strict regulation of our systems of medical education and practice.

On one essential point we may feel confident. During the last ten months, I have heard from two competent authorities, speaking of two very important and quite distinct questions, the solution of which is needful for the public good, the expression, "We shall never be able to get those stattstics!" Assuredly neither those nor any other statistics which he may think fit to demand will long be held beyond the grasp of a Minister of Health.

Duly empowered, Britain's Minister of Public Health will work, not as you are working now, struggling, decade after decade, for certain good ends which you can only hope, probably in vain, to achieve by another and yet another of those already innumerable Acts of Parliament, despite which every crime against sanitation is still paramount throughout the realm; he will be able to declare with confidence,—The public health of England is, at length, protected and administered by measures which wortbily claim to be distinguished as a sanitary system.

## FURTHER NOTES AT THE HEALTH EXHIBITION.

### SOME MISCELLANEOUS EXHIBITS.

AMONG the exhibits which we have not yet had an opportunity of noticing, but which are fully deserving the attention of visitors, are many to which we cannot now refer at any length. Of some of these, however, we append a few brief notes.

Stand 376 (South Central Gallery) is occupied by Messrs. Clark, Bunnett, & Co. (Limited), who exhibit some good safety luggage and dinner lifts, as well as iron staircases, ventilating apparatus, and a patent crab, well suited for builders' use.

Mr. John Stones (Stand 382), of Ulverston, exhibits his patent revolving shutters and sound-proof movable partitions. The swivel partitions exhibited are constructed of several leaves or divisions moving entirely independent of each other, and in no way connected except when brought out side by side into position. Their usefulness for schools, as a ready means of dividing up a large room into class-rooms, is obvious. They are also applicable for use in private houses,—and in how many homes would these divisions be appreciated in lieu of the wretchedly-constructed and awkward "folding doors" of which a certain class of speculating builders are so enamoured, but which are continually being anathematised by the unfortunate tenants? The admirable partitions exhibited by Mr. Stones are susceptible of any kind of decorative treatment, and can be made sound-proof by means of felt or other non-conducting substance.

Stand 384 is occupied by Chubb & Sons' Lock and Safe Company, of whose exhibits it is unnecessary to speak in detail, inasmuch as the name of Chubb is a synonym for excellence in locks and safes.

Messrs. Joseph Kaye & Sons (Staud 385), of High Holborn, exhibit their specialities in locks and latches, the merits of which are becoming widely recognised. They are exceedingly simple and strong (and therefore durable), and very easy and quiet in action.

Mr. J. D. Tucker, of Bromley (Stand 397) exhibits some very well constructed sashes and frames, which claim (apparently with good reason) to be water-tight and to exclude draughts and dust. They are very easily opened and closed, and are a safeguard against thieves, as the sashes can be left open for ventilation and locked.

Stand 468 (South Annexe) is occupied by the exhibits sent by Mr. Henry Masters, architect, Bristol, illustrative of his "double-check" system of house drainage, which is well worthy of examination. Mr. Masters has issued a very useful card, on which are set forth "Twenty-five Golden Sanitary Rules." If this card could be hung up somewhere in every house, it would no doubt be the means of getting people to take an intelligent interest in the sanitary or insanitary arrangements of their buildings.

At Stand 734 (West Corridor), Mr. Thomas W. Webber, of Kellyville, Athy, Ireland, shows his patent method of roofing with single slate or glass, which is simple and economical. We have not space to describe it in detail, but it is claimed for it that slating done on this principle costs only 7d. per foot complete with timber, whereas ordinary slating costs 11d., and open slating, 8½d. The stand occupied by the Dowson Economic Gas Company is roofed by this method, which is certainly worth the consideration of all who are interested in finding a cheap roof-covering,—an article constantly in demand for farm buildings and other purposes.

Messrs. Vigers Bros. (Stand 811, East Central Gallery B), of Pavilion-road, Chelsea, exhibit some specimens and sections of solid floors laid with their flooring-blocks as imported from Sweden. Floors constructed on this principle have many advantages, and they have been largely used in Board Schools in London and elsewhere.

Stand 818 is occupied by Mr. Thomas Jennings, of York-road, Lambeth, who shows some admirable flooring specimens, specially prepared and polished on the surface with paraffin, and particularly well adapted for use in hospitals, sanatoriums, &c.

Mr. William White, of Abergavenny (Stand 830) exhibits his "Hygeian Rock" building composition, to the great merits of which, as a damp-resisting and strength-imparting material we have on previous occasions called attention. It may be useful to note that the composition is now materially reduced in price.

Stand 831 is occupied by Messrs. Francis & Co., of Nine Elms, who show a variety of specimens of their material and of the constructive and decorative uses to which it can be applied. An instructive series of specimens of the materials used in the manufacture of the machine exhibiting the manner in which the cement is also shown, together with a testing material is tested for strength. The machine exhibited is Michele's patent. A large tablet illustrates the manner in which Parian cement is used for stuccoing internal walls and for mouldings and other decorative features. The centre panel is, of course, Parian, and, we are told, was painted within twenty-four hours of the time when it was laid on. Altogether this stand affords a very good "object-lesson" to all who wish to understand and appreciate the value of Portland cement. The name and standing of the firm are vouchers for the excellence of the material supplied by them.

Stand 844 (East Gallery) is occupied by Messrs. Craven, Dunnill, & Co., of the Jackfield Works, Ironbridge, who make a very good display of tiles of every variety at present manufactured. Some ceramic mosaics of good design and colour are also shown by these exhibitors, besides some excellent reproductions of ancient tiles, such as were made by the firm for Chester Cathedral and Christ Church Cathedral, Dublin, under the direction of Sir Gilbert Scott and Mr. Street respectively.

Stand 851 is occupied by the Embossed Tapestry Company, who show a new patent wall decoration described as "sanitary" (washable?) and "indestructible."

At Stand 852 Mr. Henry Carr, of Clapham Common, exhibits an interesting series of specimens of arsenical and non-arsenical wall-papers, also an interesting display of apparatus for detecting the presence of arsenic in wall-papers, clothing, &c. The specimens of paper shown make it clear that the non-arsenical papers can be made quite as bright as those which contain the poison, and they also serve to emphasise the fact that other than green papers are arsenical. It is a common belief that only green wall-papers are arsenical. Mr. Carr delivered an interesting lecture on this subject some time ago, and he has done a public service in giving so interesting and instructive an object-lesson as his exhibits afford to the visitors to the Exhibition,—a lesson which should not be missed.

At Stand 856 Messrs. Heywood, Higginbottom, Smith, & Co., of Manchester, exhibit their sanitary washable paperhangings, stated to be printed in non-arsenical colours; they are very effective and suitable in design.

The old-established firm of Woollams & Co., of High-street, Manchester-square, exhibit at Stand 860 an excellent collection of wall-papers. Amongst the specimens we may mention a very effective "tapestry paper," and some good "leather papers." The "Morton" and "Yardley" dado decorations, — which, like all the other exhibits of this firm are free from arsenic,—deserve the attention of visitors. A very rich black-and-gold paper, and the "Peony" and "Lyre Bird" wall decorations shown by this firm, are examples of sumptuousness, while, on the other hand, a simple wall-paper of quiet design is exhibited as having been selected by the Executive Council for the "bed-rooms" of the "Sanitary House." Messrs. Woollams' exhibit affords another illustration of the fact that bright green papers can be had free from arsenic. Messrs. Woollams deserve credit for being pioneers in showing that bright wall-papers could be produced without resorting to the use of arsenic and other poisons. They exhibit an analyst's certificate showing that twenty years ago they were producing non-poisonous wall-papers.

At Stand 866 Mr. J. F. Ebner, of Clerkenwell-road, has an admirable display of accurately-made and highly-finished parquetry. This, which is of Hungarian manufacture, we believe, is well worthy of examination by visitors. The designs are suitable, so that the different combinations of varying-coloured woods have a very good effect, rich though void of vulgarity. Parquetry is a material for floors which has a great value from a sanitary point of view, owing to its close joints and non-absorbent surface, and it is likely to be in considerable demand for a long time to come. The merits of Mr. Ebner's work are sure to secure for it an extended use. Mr. Ebner also shows some good specimens of marble-mosaic and marble concrete work for floors and staircases; also some glass mosaic work for mural decoration. We understand that a great deal of marble mosaic pavement is being laid by Mr. Ebner in the new buildings for the Middlesex Hospital. Mr. Ebner is also an exhibitor in the Belgian Section, being the London agent for the society known as La Construction Industrielle, who, through him, exhibit some very richly-carved and moulded dados and doorways, as well as some school desks and seats capable of adjustment to the exact physical requirements of the particular scholar using them.

At Stand 893 Mr. Chappuis, of Fleet-street, shows to good advantage the merits of his patent day-light reflectors, which in many situations are of great sanitary value, inasmuch as they render it unnecessary to burn gas which would have to be burnt but for the daylight reflected by Mr. Chappuis's valuable contrivances.

Next week we shall proceed to deal with the stoves and grates shown in the Exhibition.

**Sanitation at Brighton.**—There is no doubt that families run great risk of illness from the insanitary condition of the apartments occupied during the usual summer holiday, and were it not for the out-door life they lead under the circumstances, and the ever-open windows and doors to dilute the inner atmosphere of the house, we should hear of more cases of serious illness than is now brought to notice. It is no exaggeration to say that in many of the smaller seaside towns none of the houses comply with the ordinary sanitary requirements of common sense, and it is only in special cases in the larger towns that anything like a satisfactory state as regards individual houses can be pointed to. An example on a very large scale of "sanitary houses" is exemplified at West Brighton, where a number of high-class flats have just been completed by the building owner, Mr. John T. Chappell, of Lupus-street, Pimlico. The various points of sanitation are attended to on the principles laid down for the "Sanitary House" at the Health Exhibition, and it speaks well for the sanitary movement that property of this kind should be carried on in this style without regard to expense, the one idea being consistently kept in mind that whatever is necessary to make it complete is to be included. When we see building owners coming to the front like this, we realise the great advances that are being steadily made in the direction of housing people in a healthy manner.—*Sanitary Record.*

# Illustrations.

## DESIGN FOR WAR OFFICES.

BY MESSRS. VERITY AND HUNT.

THIS design, which, as our readers will remember, was one of the three selected from among the nine of the second competition, for special consideration, shows far more knowledge and capacity in what may be called the technique of Classic design than the selected design evinces, though it would probably not be considered so generally attractive. It has, however, the merit of coherence and consistency in grouping, and has an expression of stability which is in keeping with its purpose. The authors have adopted the system of one large central quadrangle, which is not only better on sanitary grounds than a larger number of small courts, but gives opportunity for a spacious architectural effect in the quadrangle, a view of which we give, as well as that of the Park front. In the latter it will be observed that the design shows what might be termed a *decrescendo* towards the Horse Guards, though there is not a definite attempt to connect the two architecturally. The following is the architects' statement in regard to their own views in the plan and design:—

"In preparing our design, the following appeared to us to be the leading features necessary and of the first importance in a plan which should satisfactorily meet the requirements of these buildings, viz.:—

1. All parts should be thoroughly well lighted and ventilated.

2. The various departments should be arranged and grouped in the simplest way, but upon some definite method.

3. There should be great facility of communication between the various parts of the building; and

4. That, if possible, the building should be so arranged that persons having business with one department need not traverse corridors belonging to other departments. Guided by these requirements, it at once becomes apparent that the usual system of rooms on either side of a corridor, or rooms lighted from internal areas, would be both inconvenient and unsuitable, as either there must be a great loss of space or a serious deficiency of light and natural ventilation; and, further, it would be almost impossible to group and concentrate the various departments upon a simple and intelligible system.

The scheme, however, which meets all these requirements in the easiest and most practicable way, and upon which this plan is worked out, is that of grouping the rooms of each department round a central vestibule or hall, and disposing these halls symmetrically with a series of open courts between them around the extreme limits of the site, so as to obtain one great internal court, which should be large enough to secure efficient light and ventilation. By this arrangement no frontage is lost; all offices look either into the Park, Whitehall, or the quadrangle; only messengers', waiting, and other unimportant rooms being lighted from the internal courts. The departments are grouped in three proper relative positions as nearly as possible in the order suggested in the 'Instructions,' with the more public rooms on the ground-floor, the principal offices on the first floor, and the working staff on the upper floors. For private communication between the heads of departments, the whole of the outer or Park side corridor on the first floor is entirely private from the Controller's room in the Admiralty division to the rooms of the Commander-in-Chief and his staff in the War Office block, it being intended that the staircases in the angles next the court-yard should be for the use of the public, and those on the outer or Park front for officials, so that the inner becomes the working corridor, and the outer, as before mentioned, the private corridor, all the rooms of the chief officials opening therefrom, and each point of access being commanded by messenger lobbies. Great care has been taken to group the civil and military departments in separate blocks. The Secretary of State and the Commander-in-Chief are placed on the Parade front, in the most central position, the secretarial departments extending westward and round the south-west hall, and the military departments occupying and being grouped around the south-east and south halls. In the Admiralty their lordships' rooms are placed on the west and north Park fronts; with their departments grouped around the north-west and central halls; the controller and his departments being grouped round the north-east hall.

The messengers' rooms are everywhere arranged one over another.

Carriage-entrances to the courtyard are provided from Whitehall and Spring gardens in positions where they do not interfere with the general arrangements of the buildings or cut through any departments.

The principal public entrances to the building are placed in the most central position for each division,—the War Office in Whitehall and the Admiralty in Spring-gardens. Private entrances from the Park are also provided to the rooms of the Secretary of State, the Commander-in-Chief, and the Lords of the Admiralty.

The natural gradient of the ground, together with raising the ground-floor 2 ft. 6 in. above the highest part of the site at the north-west corner, gives the opportunity of providing a mezzanine (or what is really a floor above ground) on the Park and Parade fronts, giving thereby all the accommodation required for the various departments which it is desirable to place on the lower floors.

As it is evidently important that those having business in these offices should not have to ascend to a greater height than necessary, no space has been lost merely for the sake of external architectural effect, but in all cases the rooms being of moderate size the heights of the various stories are only sufficient to insure properly-proportioned rooms."

*Key to References on Plans.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. " Supplies.
  B 3. " Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. " " "
  C 2. " " "
  C 3. " " "
  C 4. " " "
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

Next week we propose to give a parallel illustration of the detailed elevations of the three first designs side by side, so that the architectural treatment of each may be better appreciated and compared.

## ANCIENT FRENCH SHIELD.

THE original of this curious and interesting example of relief work in metal is said to have been the property of Henry II. of France; it is now, we understand, in the possession of M. G. Pilon, of Paris.

## TEMPORARY INFECTIOUS DISEASES HOSPITAL, PARK HILL, LIVERPOOL.

THE temporary Infectious Diseases Hospital illustrated in this number has just been erected by the Corporation of Liverpool, from the designs of Mr. Clement Dunscombe, M.A., M. Inst. C.E., City Engineer, and under his immediate supervision.

The primary cause of its erection was a threatened epidemic of small-pox, which, happily, is now subsiding. The proper isolation of infectious cases in a city with a population such as Liverpool, viz., 573,200, has been a most difficult task for many years past, owing to the fact that but a very small area of unbuilt-upon land exists within the city limits upon which hospital accommodation can be provided to meet the most recent requirements of sanitary science.

To meet the present emergency, the Park Hill Estate, 20 acres in extent, was kindly placed at the disposal of the Corporation, at a moderate monthly rental, by the Mersey Docks and Harbour Board, who have recently acquired it, to command the foreshore of the river Mersey and for future dock extension.

The site, which has a south-west aspect, is at a moderate elevation, sloping quickly to the river Mersey, the encampment being between the 70 ft. and 50 ft. contours, the levels being reduced to old dock sill, which is 4·2 below Ordnance datum.

Park Hill House has been utilised as the administrative block in connexion with the encampment, as shown upon the block plan. The out-offices attached thereto have been converted into a steam laundry, disinfecting-chamber, stores, ambulance-shed, &c.; while the mansion-house proper has been fitted up for the use of the administrative staff.

The hospital occupies a site 460 ft. by 220 ft. This area has been carefully under-drained, and two terraces formed 410 ft. by 40 ft. The tents and buildings stand upon a Portland cement concrete foundation, 6 in. deep, laid over the entire area of these terraces, upon which the joists carrying the floors of the tents and buildings rest, adequate ventilation under the same being secured.

The encampment consists of four pairs of double hospital tents of the most recent pattern, and two pairs of iron buildings. Each pair of tents and buildings is connected by a building consisting of nurses' day-rooms, bath-rooms, closets, &c.; a covered footway 9 ft. wide traverses the centre of the encampment, with similar covered ways, right and left, to each of the blocks of buildings placed between each pair of tents or iron buildings.

The footway is formed of 6 in. of Portland cement concrete laid on a suitable foundation. The covering of this footway is constructed of wood and roofed with four-ply Willesden paper painted "light green," the rafters, posts, and battens on roof being finished in chocolate.

The roof at entrance over roadway is similarly treated. On the south side of the entrance there is provided a kitchen, scullery, larder, and airing-room, and a dry-earth store.

The airing-room and dry-earth store are heated by steam pipes from a boiler fixed in the kitchen.

The kitchen, scullery, airing-room, and dry-earth store are built in red brick, tuck-pointed, with blue brick dressings. The kitchens are fitted with complete steam and other cooking appliances sufficient for 200 patients. The larder and store-room are framed buildings covered in Willesden paper, match-boarded on the inside, and finished similarly to the buildings described further on.

The connecting-block situated between each pair of tents or huts in the encampment is built in the Bungalow style, with a verandah in front, and consists of wooden framing covered with four-ply Willesden paper, lined inside with grooved-and-tongued match boarding, the space between the outside covering and inside lining being filled in with silicated cotton, and the woodwork finished internally with asbestos fire-proof paint.

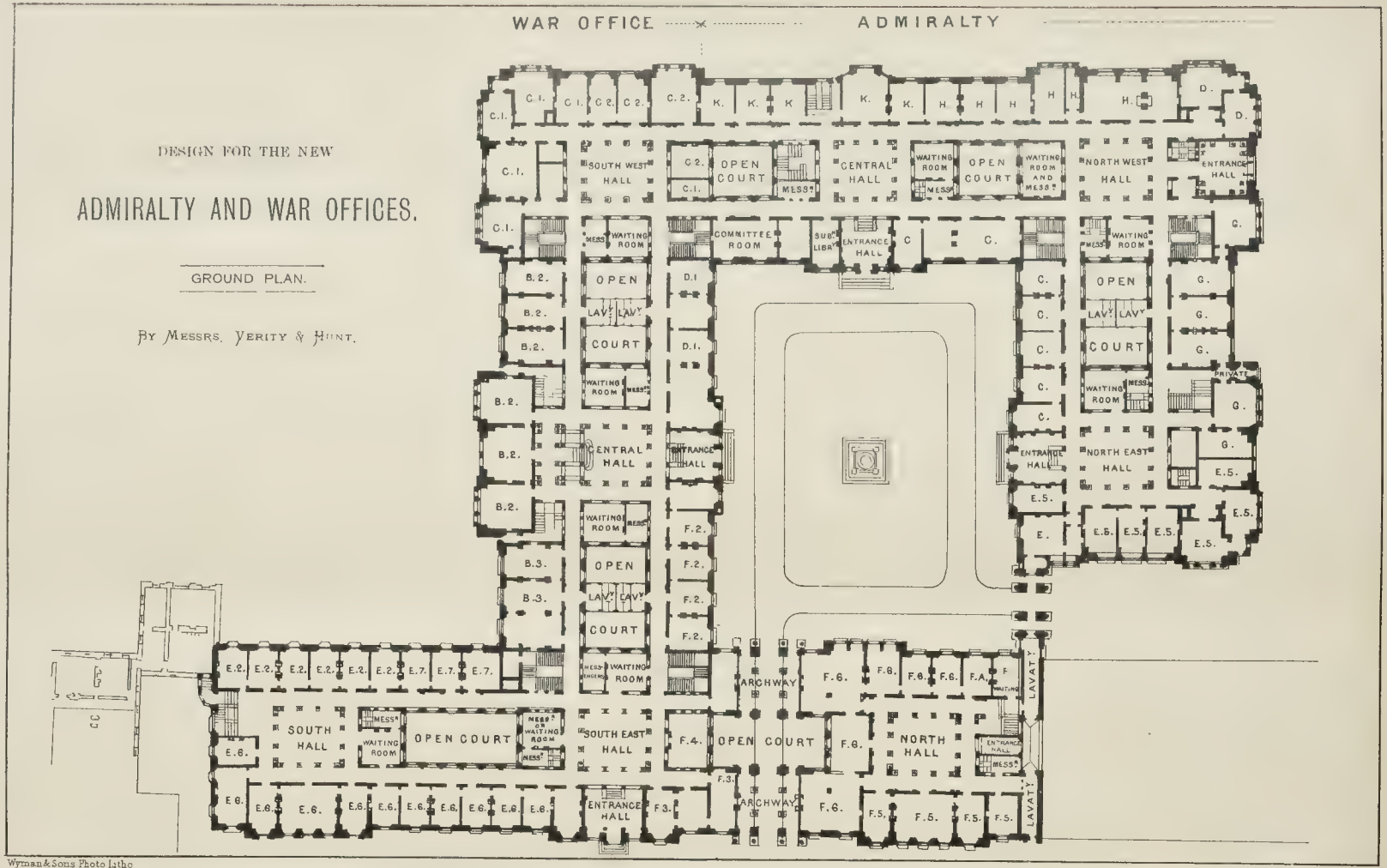
Each connecting-block contains two nurses' rooms and two bath-rooms, each 12 ft. 6 in. by 11 ft. 3 in. and 11 ft. 3 in. by 9 ft. 3 in. respectively, and 12 ft. 6 in. high. A lobby 5 ft. wide, provided with through ventilation, divides each hospital ward. Doors, with top panels glazed, are provided in each nurse,

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

GROUND PLAN.

BY MESSRS. VERITY & HUNT.




Wyman & Sons Photo Litho

C^t Queen S^t London, W.C.

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

FIRST FLOOR PLAN.

BY MESSRS. VERITY & HUNT.




Wyman & Sons Photo-Litho

Cº Queen Sᵗ London WC



DESIGN FOR NEW ADMIRALTY AND WAR OFFICES.—By Messrs. Verity & Hunt.

*View of Internal Quadrangle.*



DESIGN FOR NEW ADMI

By Messrs.

Pa



TY AND WAR OFFICES.

& Hunt.



SHIELD FORMERLY BELONGING TO HENRY II. OF FRANCE.

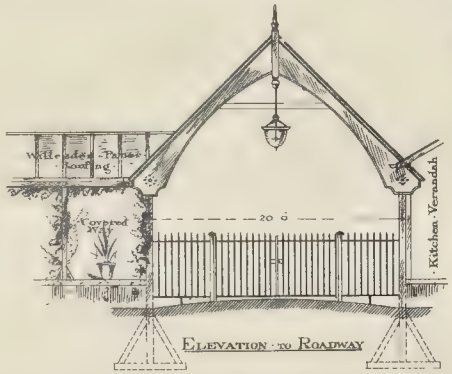
# CITY OF LIVERPOOL.

## TEMPORARY HOSPITAL FOR INFECTIOUS DISEASES.

### KITCHEN, SCULLERY, &c.

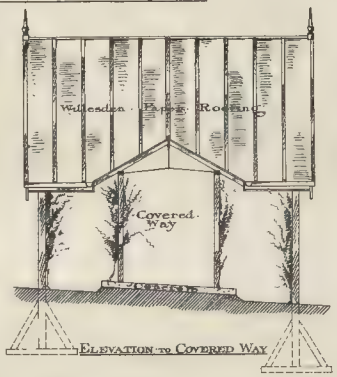


ELEVATION



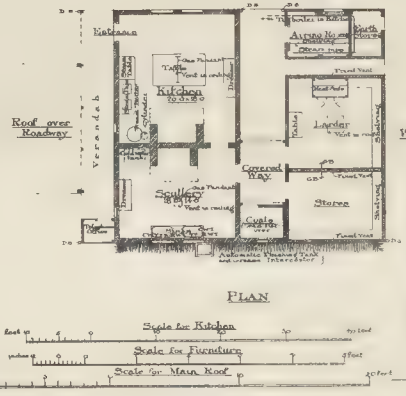

ELEVATION TO ROADWAY

### ROOF OVER ROADWAY




ELEVATION TO COVERED WAY

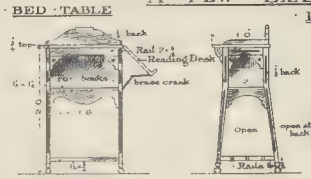
### A FEW EXAMPLES OF FURNITURE




PLAN

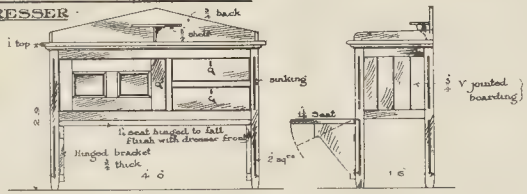
Scale for Kitchen
Scale for Furniture
Scale for Main Roof

BED TABLE



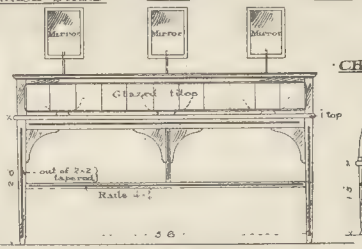

Front Side

DRESSER



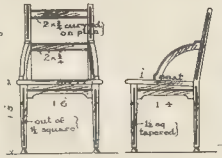

Front Side

WASH STAND



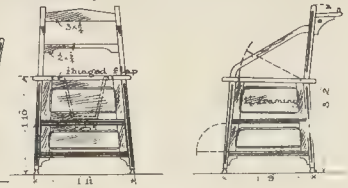

Front

CHAIR



Front Side

NIGHT CHAIR




Front Side

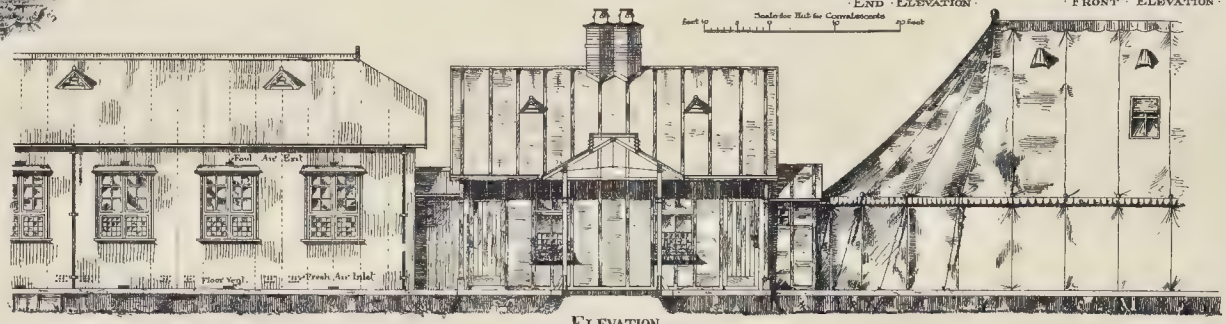
Wyman & Sons Photo Litho 74 Queen St London WC

DESIGNED BY MR. CLEMENT DUNSCOMBE, M.A., M.I.C.E.

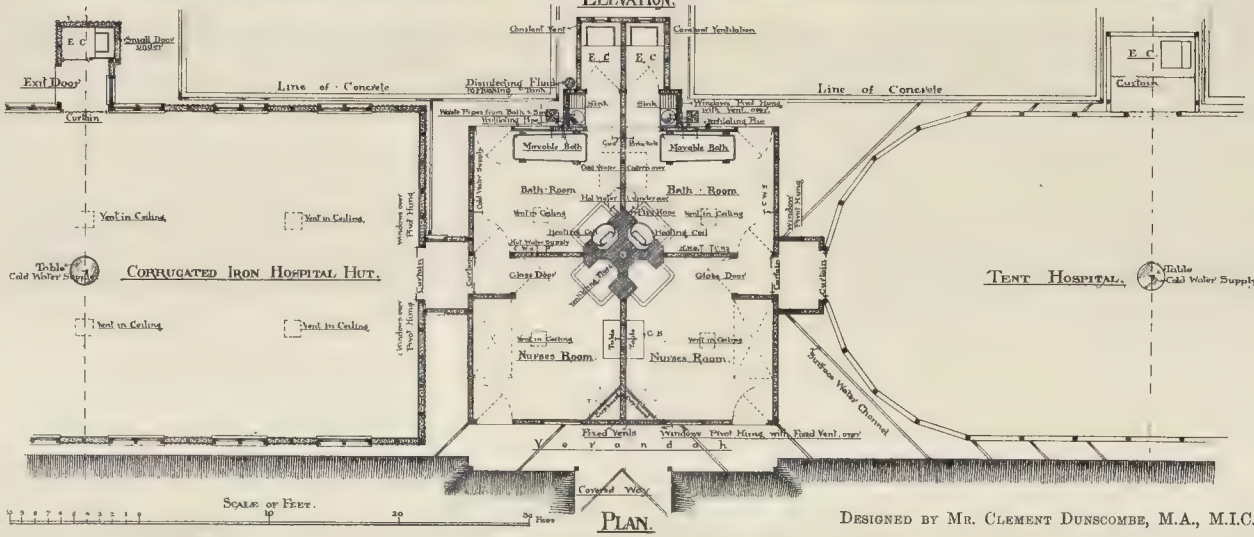
# CITY OF LIVERPOOL.

## TEMPORARY HOSPITAL FOR INFECTIOUS DISEASES




ELEVATION.




Designed by Mr. Clement Dunscombe, M.A., M.I.C.E.

Wyman & Sons Photo Litho

C^t Queen St London W.C.

room to act as inspection windows for the wards.

At the rear of each bath-room there is a slop-sink discharging external to the building, and provided with hot and cold water supplies, placed in a lobby with through ventilation, and beyond are earth closets 5 ft. by 3 ft. provided with constant through ventilation and pivot-hung windows.

The corrugated iron hospital huts are 52 ft. by 25 ft., and 14 ft. average height. The iron roofing is laid on boarding, and internally the walls are boarded with grooved-and-tongued boarding, the space between them being filled, as in the other blocks, with silicated cotton. The roof is ceiled up the rafters with four-ply Willesden paper, the intervening space being also filled with wired silicated cotton, about 1½ in. thick. The walls are finished in two coats of asbestos fireproof paint. There are sixteen windows in each ward,—twelve side windows, 5 ft. by 3 ft. 9 in., and four end windows, 3 ft. 9 in. by 3 ft. 6 in.

Adequate cross ventilation is secured. The whole area of the windows is made to open, the top sashes being pivot-hung. In every case there is a free current of air under the floors, and fresh air is admitted into the wards through a sufficient number of conical air-bricks. Exit ventilators are provided near the ceiling-line and by means of louvres fixed in the roof.

At the end of the encampment a hut for convalescents is provided, 40 ft. by 12 ft., and 12 ft. in height, constructed of wood framing, covered with Willesden paper, and lined with grooved-and-tongued boarding, and finished in the same manner as before described. The space in front is laid out as a garden. In fine weather this hut can be used as a reading and recreation room.

The mortuary and post-mortem room,—the former, 14 ft. by 14 ft., and the latter, 14 ft. by 9 ft., each 11 ft. to the ridge,—are similarly constructed, viz., wooden framing covered with Willesden paper externally and internally, and grooved-and-tongued boarding, the roof being ceiled with Willesden paper. The walls and ceilings are finished in green, with a chocolate dado, and the rafters are dressed and similarly painted. The mortuary is provided with rubbed slate shelves, supported on blue brick tuck-pointed piers; the floor is finished in best black and white tiles on 4 in. Portland cement concrete. The post-mortem room has ample top light, and is similarly finished, except that the dado consists of 6 in. glazed and enamelled white tiles. There is provided a slate post-mortem table, slate sink, with hot and cold water supplies, &c.

A constant-service water-supply is provided throughout the encampment, slate storage cisterns being provided for supplying the hot-water cylinders which supply the baths throughout. In each hut and building, and also in the nurses' rooms, there is provided a drinking supply direct from the main, and a fire supply, with hose attached, ready for use. Hydrants, with hose ready attached, are also provided in suitable positions along the covered ways. The hot-water supply for each block is obtained by means of coil grates fixed in each of the bath-rooms, and these, while acting as an ordinary open fire-grate, the fire-bars of which form portion of the coil, supply through the hot-water cylinder fixed over each pair of bath-rooms an adequate and continuous supply of hot water.

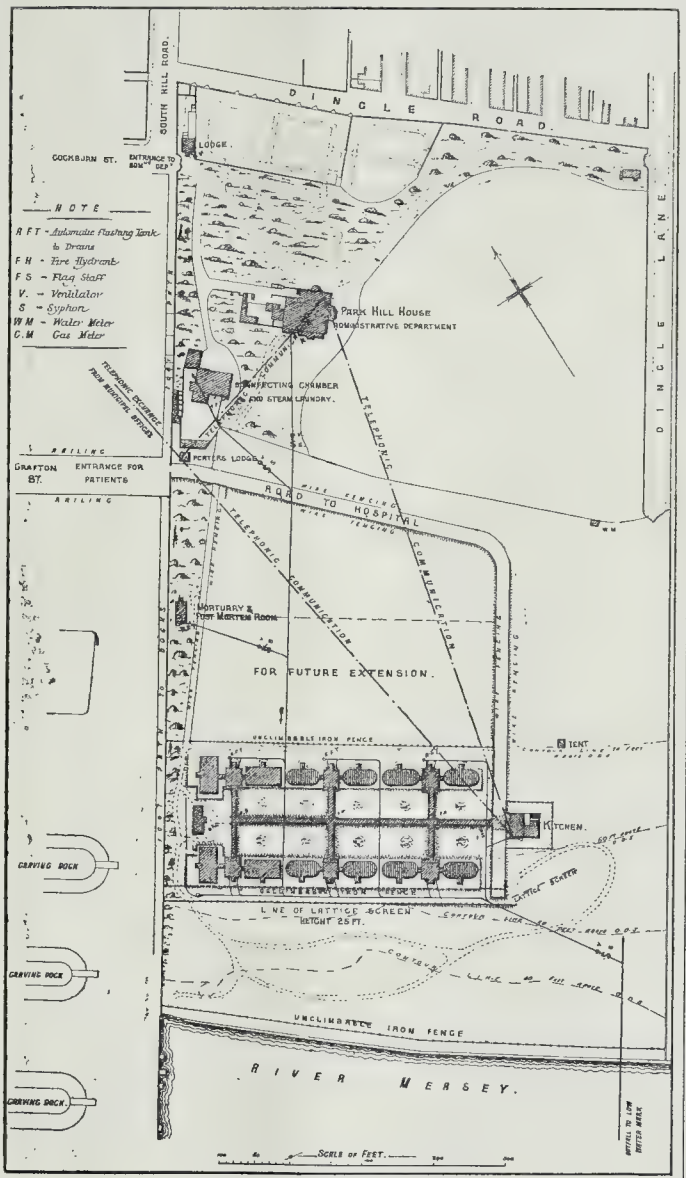
The drainage has been most carefully attended to, and forms as complete a system as could be devised. A reference to the block plan shows the arrangement. The whole of the drainage is external to the buildings; the sink wastes, &c., emptying over external traps. The drains are adequately ventilated, suitable inlets and outlets being provided. Disconnecting chambers are constructed to sever any connexion with the drainage from the hospital, mortuary, &c., and the administrative block. The drains, which consist of glazed earthenware pipes, caulked and jointed in Portland cement, finally discharge through a 9-in. pipe into the River Mersey at low-water mark. There is, therefore, no connexion with the drains from the hospital and the sewers of the city; the hospital, so to speak, having an independent outfall. At the head of the drains from each block an automatic flush-tank of simple construction is provided, which is filled by a tap in a given time. Six hours has been fixed in this case.

A small tank containing carbolic acid is fixed near each flush-tank, and communicating therewith. This tank discharges a given quantity of carbolic acid automatically into the flush-tank, and when this is full the siphon comes into operation, and the contents of the flush-tank, about 40 gallons, consisting of a powerful disinfecting solution, is discharged from the head of each drain. The same arrangements are provided at the mortuary, post-mortem room, kitchen, &c. In the case of the kitchens and mortuary, grease-interceptors are provided in the flush-tanks. It will be seen, therefore, that the whole of the drains are automatically flushed with a disinfecting solution four times in every twenty-four hours. The value of so complete and perfect a system of drainage, acting automatically, cannot be over-estimated in a hospital designed for infectious diseases.

*Heating Arrangements.*—It is intended to heat the tents and iron buildings by means of a specially-designed circular open fire-grate in the centre of each ward or tent, the firebars forming portion of a coil placed centrally at the back of the fireplace, with a steam-pipe from same running round the ward or tent, special provision being made for this to act as a ventilator. By this means it is believed that an equable ward temperature will be secured.

Gas is laid on throughout the buildings, tents, and covered ways. The brackets are in every case fixed and supplied with enamelled steel cowls, acting as reflectors.

Telephonic communication is established from the Telephone Exchange in the City Engineer's office, municipal offices, the medical officer of health's office, and Park Hill House (administrative department), the porter's lodge, and the encampment. Triangular communication as shown on the plan is established, which provides telephonic communication between the medical officer of health's office, or the City Engineer's office, and Park Hill House, the porter's lodge, or the encampment proper. There is a telephone office on the west side of the verandah attached to the kitchen, by which,




*Block Plan.*

in case of emergency, communication can be made to the resident medical officer at Park Hill House, or with the municipal offices. The porter from his lodge can likewise communicate with the medical staff at the Park Hill House, or with the encampment, on the arrival of a patient. By this means no time is lost in either dealing with a patient on arrival, or answering any questions from the municipal offices relative to patients.

*Wind Screen.*—Owing to this site being exposed to the prevailing winds, which vary from south to north-west, and it being also exposed to the river Mersey on the south-west side, it was considered advisable to protect the encampment from these winds. The construction designed for the purpose is both a novel and most effective arrangement. It is 600 ft. in length and 30 ft. in height, and consists of Norway poles, placed 6 ft. apart, to which are fixed battens at intervals of 1 ft. 3 in., laths being interlaced between the same, forming a screen which most effectually breaks the force of the heaviest gale. The screen is carefully braced and stayed with steel wire ropes, and it and the tents and buildings are well secured by steel wire ropes to ground anchors. Behind the screen there is formed a footpath, 5 ft. wide, for the use of convalescents.

The encampment is inclosed with wrought-iron unclimbable fencing, and wire fencing on each side of the road leading thereto, and also along the river frontage.

The lower grounds have walks laid out through them for the use of convalescents; the quadrangles formed by the covered ways are laid down in grass relieved by flower-beds and shrubs.

The hospital is generally supplied with all the furniture, fittings, and appliances of the most perfect and complete description, necessary for the requirements of the best appointed hospital.

The furniture, which is in polished pine throughout, has been specially designed, and also the fittings,—all plain, easily cleaned, and specially adapted for the purposes for which they are applied.

No unnecessary outlay has been incurred. The aim, however, has been to provide a temporary hospital second to none as regards its completeness in every detail, and one which will be readily available for those unable to provide proper isolation or medical care for patients in their own houses.

The endeavour has been to make the encampment and its surroundings as attractive-looking as possible, in contrast to what is too frequently designated as a "Temporary Infectious Hospital," and which in many cases consists of a repulsive-looking aggregation of wooden sheds.

As an evidence of the care taken in the designing of the buildings, and also in providing an adequate constant-service water-supply and all requisite fire appliances, it may be mentioned that the fire risk over the encampment is covered by a responsible fire office at the low rate of 3s. 6d. per cent.

The total cost of the hospital complete in every respect will be under 12,000*l.* This is exclusive of the value of the site or Park Hill House, which has been utilised for the administrative staff, but is inclusive of all furniture, fittings, and other appliances of every description.

It has been erected ready for use within two months, although the preparation of the grounds, water-supply, drainage, concreting the site, has entailed considerable labour, 300 men having been constantly employed for that period upon the works.

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**The New Hall and Library of Sion College.**—The works in connexion with the erection of the new hall and library of Sion College, on the Thames Embankment, has just been commenced. The site fixed upon for the new building is at the angle of the Embankment and the new street on the west side of the City of London School. The building will cover an area of about 10,150 superficial feet, having a frontage to the Embankment of 75 ft., with a return frontage of 135 ft. The work of getting in the foundations is now in progress. The contractors for this preliminary portion of the work are Messrs. Foster & Dicksee, of Rugby. In consequence of the Metropolitan District Railway passing underground in front of the site, the main elevation of the building will be set back a few feet. The architect of the building is Mr. A. W. Blomfield, M.A.

## THE DISPOSAL OF TOWN SEWAGE AND OTHER REFUSE.

In the Health department of the Social Science Congress at Birmingham, the first question was:—"What is the best method of dealing with (*a*) Town sewage? (*b*) The products of home and street scavenging? and (*c*) The products of combustion?" papers being read on these three subjects respectively by Mr. E. Pritchard, Mr. Lawson Tait, and Captain Douglas Galton. The latter we may be able to print separately on another occasion. As the discussion appears to have turned chiefly on the sewage question we give extracts from two papers which dealt with the sections *a* and *b*.

Mr. Pritchard, in regard to the first part of the question, said:—

Had this question been asked me some fifteen or twenty years ago I, like many others, would have suggested irrigation; but experience of the last few years has caused a modification of my views, and the answer now would be to the effect that local circumstances must of necessity govern the particular method of treatment; and what might possibly be considered the best system for one place would prove to be an undesirable one for adoption in another.

The methods generally adopted in this country for the disposal of town sewage, and to which I propose to briefly refer, I have classified as follows:—

1. Land purification.
2. Chemical precipitation.
3. Discharge of sewage into the sea.

Under the first head may be considered two methods for the purification of sewage:—(*a*) Sewage irrigation; (*b*) Intermittent filtration.

(*a*) *Sewage Irrigation.*—Broad irrigation is the application of the minimum quantity of sewage to the maximum area of land, whereby the sewage is allowed to flow over the land, the greatest return being obtained from this process of sewage utilisation. With suitable land and proper management good results are obtainable without the creation of nuisances; but as the true value appears now to be more generally known, sewage treated by broad irrigation, unless under exceptional circumstances, does not at the present time find much favour. It is estimated that one acre of land will purify the sewage from 50 to 100 persons; this is on the assumption that such land is not continuously treated. Heavy crops are obtainable from land so treated; large quantities of rye grass, mangold wurtzel, and various green crops being readily grown. On the Earl of Warwick's farm at Leamington, a few years since, over 80 tons of mangolds per acre were grown. It will, however, be perceived that in broad irrigation the first consideration would generally appear to be "how to make it pay," leaving the purification of the sewage as the lesser factor.

(*b*) *Intermittent Filtration.* — In 1868 Dr. Frankland, one of the Rivers Pollution Commissioners, determined, by experiments, that by deep drainage of land of a suitable description, sewage could be purified in large quantities upon a small area. This system was termed "intermittent downward filtration," and requires that the land shall be laid out in level beds, and properly drained at a sufficient depth, the surface of the land being prepared in a ridge and furrow, and upon the ridges green crops can be successfully grown. As the name implies, the sewage is applied in an intermittent manner. This process of sewage treatment is a costly one in the first instance for the preparation of the ground, the outlay in some instances reaching a sum in excess of 200*l.* per acre, whilst the cost of preparation of ground for broad irrigation might not exceed, under favourable circumstances, 10*l.* to 15*l.* per acre. The cost of works, however, whether for irrigation or filtration, must be governed by local conditions, my own experience proving that sums from 7*l.* 10s. to nearly 700*l.* per acre have been expended in the preparation of land for sewage treatment.

The treatment of town sewage by chemicals has now occupied the attention of engineers and others for many years. I do not propose in this paper to refer to the numerous processes that have been brought before the public during the past twenty years; and although not prepared to support a scheme of chemical precipitation *per se* for the purification of sewage, assuming the effluent has to be discharged into a stream of ordinary purity, still I am strongly of opinion that great improvements have been made, and it is somewhat satisfactory to find that lime, the first precipitant used, still holds its own as being able to produce fair results in sewage purification. The great difficulty for many years was how to dispose of the considerable volume of sludge, which is the natural result of precipitation. This difficulty has, however, been successfully overcome by means of the improved system of sludge presses in operation at various works. The sewage effluent from any scheme of chemical precipitation should pass through a properly-constructed artificial filter, or through land deeply drained on the principle of intermittent filtration.

The sewage from towns situate upon the sea coast is generally cast into the sea, at a point below low-water mark. In some instances this is done without in any way separating the heavier matters held in suspension; in other instances,—notably Brighton, Torquay, and other places,—intercepting sewers have been constructed at considerable cost, by which means the sewage has been diverted to a point some distance from the town, where the influence of the tides has not exerted any disagreeable effect upon the towns so sewered, by causing any return to the beach of the sewage discharged. In other instances sewage from large cities and towns, such as London, Liverpool, Glasgow, Newcastle, and Bristol, is discharged into tidal rivers. This emptying of sewage into rivers is, however, in some instance, productive of great nuisance to the public and injury to the river. At the present time a Royal Commission is sitting to consider remedial measures for the metropolitan sewage. I had the honour of appearing before such Commission as a witness, and advised what, in my opinion, was the most desirable course to adopt, viz., the extension of the existing outfall sewers of the metropolis, so that the sewage may be discharged into the sea beyond the range of tidal influence, even assuming that such works would entail great outlay.

Mr. Lawson Tait, in treating of "The Utilisation of Town Refuse," gave some account of his practical experience in dealing with the sewage of Birmingham. He said that Birmingham, from its situation on the highest part of the Midland district, was obliged to adopt in its early history the system of surface household wells, and until recently these had an almost universal prevalence throughout the town; indeed, they exist now in very large numbers. Closely associated, the midden privy was constructed, and in 1871 there were nearly 20,000 of these centres of disease existing in the borough, their aggregate area exceeding thirteen acres. As by far the greater part of the town is built upon hills of loose sand and gravel, it is perfectly needless for me to say that soakage from the privies into the wells was of constant occurrence, and is still far too frequent. Of these privies about 14,000 drained at that time into the sewers. There were about 7,000 water-closets, the contents of which, together with all the road-sweepings, manufacturers' refuse, and countless other impurities, were turned, and had been ever since the town existed, into the small river traversing its area. Up to 1871 the government of the town was conducted upon lines which it is no part of my business here to discuss or condemn, but no one who knows the town at all but will be able to substantiate my statement that, the new *régime* inaugurated by the distinguished statesman who at the present moment presides over the Board of Trade has, as it were, reconstructed every aspect of our municipal life. The town has improved in every possible way; its death-rate has fallen nearly five in the thousand, and the average age at death has been raised six years, and the whole of these beneficial changes are due to the inauguration of Mr. Chamberlain's sanitary policy.

The problems we had to solve were two,—How we could treat the fluid impurities which ran into the river, and how we could dispose of the solid household refuse; but they were extremely complicated, from the enormous bulk of the material to which they had to be applied, and it is from this chiefly that our progress in their solution was so slow. We found, in fact, that theoretical chemistry was of but little help, and that laboratory experiments were absolutely futile. We sent out inquiries, and we visited by deputation all the large towns in Great Britain which were in any way comparable to our own, and these inquiries and investigations, concurrently with our experiments,

occupied a period of nearly seven years. As they advanced, and as the results of our experiments became more accurate and more extended, the more certain did we become that the original conclusions established by the report of the Birmingham Sewage Inquiry Committee were those alone which were applicable to our town. The recommendations were as follow:—"The exclusion of animal excreta from the sewers is, in the opinion of the Committee, essential both to the effectual treatment of sewage and to the health and comfort of the population, and they have arrived at the conclusion that this object may be attained by a reform of the system of exposed privies and open middens now prevailing in the town, and which defile the air, poison the water, and, by means of connecting drains, pollute the sewage."

The first principle we established, and we arrived at it chiefly from the disastrous experience of other towns, where it had not been adopted, was that it was absolutely essential to keep the two elements with which we had to deal,—the household refuse and the excreta,—entirely separate, and for this purpose we established a system of dual and joint collection which has proved perfectly satisfactory. In the reconstruction of closet accommodation, we filled up the old middens and replaced them by simple closets, under the seats of which we placed large galvanised pans. These pans are coated inside from time to time with boiling tar, an operation which very much diminishes the smell and enables them to be easily cleaned. Somewhere near the closets ash-tubs, either of wood or iron, are placed, into which the tenants are requested to place their household refuse, and they are strictly forbidden to empty slops into the pans. It took a long time to educate the population to the fulfilment of even these simple directions, and much trouble was encountered for several years in establishing the fresh arrangement. We found that many people objected to it, and clung with a mistaken but most affectionate pertinacity to the foul middens to which they had been accustomed. The arrangements for the collection of the pans and ashes were at first defective, and a good deal of outcry was raised from time to time against the objectionable smells which they emitted as they passed through the streets; but as the details became perfected one after another these objections ceased, and we were not troubled with any complaints. Indeed, the complaints now are all against the old system, for when the remaining middens are to be emptied the overwhelming stench which prevails all over the neighbourhood for some hours after the process is a never-failing theme of complaint for exactly the same people who, when they were accustomed to its nightly recurrence, thought it hardly worth mention.

The collecting-vans are arranged to carry eighteen pans and about one ton of ashes, and the collection is made from each house on the average once a week. When the pan is removed it is covered by a lid, made to fit perfectly tight by means of a strong spring and a band of indiarubber, so that any smelling is avoided. The ash-tubs are emptied into a special receptacle at the hinder part of the van. These vans are taken to our central depôt, and there are subjected to processes of which I shall shortly speak.

The continually increasing cost of collection and the continuously-diminishing value of the material gave indications that the continuation of that policy would have been ruinous. At this point it may probably be convenient to anticipate a criticism which is sure to be raised upon the general system of our policy for the disposal of refuse which has been adopted in Birmingham. Towns will be pointed to, of great importance and large size, in which no such costs as these are incurred, and instances of towns where the water-carriage system is in use will doubtless be specially indicated. We may, and probably will, be asked the question, Why has not the water-carriage system been adopted in Birmingham? And there are some amongst us still, I am sorry to say, who are disposed to take such a retrograde step. I need not answer the objection in detail, because the answer to it will be found in the volume I have already quoted, the report of the Birmingham Sewage Inquiry Committee. Suffice it to say generally that as Birmingham has a very elevated position we cannot obtain a water supply by gravitation. Every ounce of water used in the town, unless obtained from a soft-water cistern placed on the roof of a house, has to be pumped, and the public supply has to be raised from 200 ft. to 600 ft., and I need not say that not only is this an extremely costly process, but that the quantity we can obtain, and from reservoirs, is such as is calculated only for the maximum requirements of a constantly growing population for all purposes exclusive of a water-carriage system of sewage. It is extremely doubtful if we could obtain in any way the additional quantity of water required for this purpose, and even if we could obtain it our difficulties would be increased instead of diminished by every gallon of water-closet liquid which was added to our already enormous bulk of sewage. The conclusion is, therefore, that the true economy is to preserve from waste these materials which having been taken from the land should be restored to it, and that it is a mistake to waste them by such dilution as renders them practically valueless.

Acting upon these principles, the plan we adopted was to act upon the one kind of refuse by means of the other. Immensely to our surprise, and to our no small satisfaction, we found that the solid ash-tub refuse, which amounts to 72,000 tons per annum, would burn in properly-constructed furnaces without the addition of any other kind of fuel, and in this burning it is reduced to one-fourth of its original bulk, and the result is a peculiarly useful silicious clinker, which we turn to all kinds of useful purposes. It has been used to erect buildings with, to make roads and paving blocks, staircases, horse-troughs, tables, and ornamental fire-places, samples of all of which may be seen at our works. Of this kind of household rubbish there has been about eleven boats per week sent out into the country, the mere cost of transit being 500*l*. If we burned the same amount, the cost would be 270*l*.; and if we used all the clinkers, as we hope to do, we should save 230*l*. The burning of this amount would occupy three furnaces of the kind we have erected for the purpose, and of the total bulk of the rubbish thus burned, 75 per cent. would be dissipated in the form of heat.

In order to utilise this waste heat, the plan adopted by the Health Committee was to apply it for the removal of moisture from the contents of the pans. The means by which this is done is extremely simple. Boilers are placed in the furnaces, and the heat is transferred by means of steam to large machines, of which a working model is here exhibited, into which about sixteen tons of pail stuff are put as a charge with sufficient sulphuric acid to fix the ammonia. A hot-air blast from the furnace flue is drawn through the machines by means of a blower. The steam is applied by means of a steam-jacket and hollow rotating spindles, and in from sixteen to twenty hours the sixteen tons are reduced to one ton of solid poudrette containing from 7 to 9 per cent. of ammonia, according to the time of the year, and from 2 to 3 per cent. of phosphates. Without any further treatment or addition this forms an admirable manure for top dressings, and for all kinds of rapidly-growing roots, particularly the beet-root, and in the growth of those vegetables for the purpose of sugar manufacture this kind of manure has been found extremely valuable, and doubtless it will also have a ready sale for sugar-cane and cotton.

Concerning its commercial value no absolutely certain statements can be made. So long as we were making ten or fifteen tons per week, and until we were satisfied we could make a much larger amount, we did not very energetically enter into the question of the price we could obtain for it. We were quite satisfied to hand it over to a large firm of artificial manure manufacturers, who took all we made at 5*l*. per ton without any reduction for carriage. When our output rose to twenty and twenty-five tons per week, this firm found the quantity larger than they could deal with, and we accepted a temporary reduction of price to 4*l*. a ton. During the last two months, however, we have been making efforts to obtain other markets and a better price, and we found no difficulty in getting 5*l*. a ton; in fact, we have been able to get as much as 7*l*. 10s. We also find that the Corporation of Warrington can command a steady price of 6*l*. 10s. per ton for exactly the same material.

In the course of the discussion which followed,

Mr. Baldwin Latham, C.E., said he had always been a great advocate of the application of sewage to land, although he did not deny that there were conditions and occasions when it was necessary to use other agents. He did not approve of the use of lime, as the French people had shown that it did not destroy the small microbes which caused the unpleasantness of the sewage, while filtration through land did so. With respect to the pan system, he might say that at Saltley the amount of solid in the sewage was about ¼ lb. per head, and by that system they asked the people of Birmingham to live over pans which altogether gave the same area as the land used at Saltley. He certainly would not live in a town where such a system was in vogue. Besides, they were told that ashes by themselves were a valuable commodity; but if they were mixed with sewage, the cost of separating them would not be covered by the sum realised by the sale of the ashes afterwards. Speaking of London, he said he believed the only way of dealing with its sewage was to carry it all near the sea, where they would get large quantities of land for filtration. The land on the north of the Thames was of such a character that the sewage could be applied to it without detriment to the water supply, but on the south side the system of irrigation would be inimical.

Mr. Vivian Sillar said there were now really only two systems of treatment,—that in use at Aylesbury, and the precipitation by lime process. He found that the lime displaced ammonia, so from an agricultural point of view that treatment was mischievous. At Aylesbury, instead of lime they used charcoal, clay, and alumina; when treated with that the water was purified to such a degree that it could be allowed to go into any river. The manure was sold for 3*l*. 10s. per ton, and that paid.

Dr. A. H. Drysdale (London) was also of opinion that land was the only purifier for sewage, and 6 ft. depth would purify the water so that they could drink it. In France that system was used, and the consequence was that the land produced from three to five times the amount of crops. He would be terribly ashamed if the suggestion to throw away the sewage of London were carried out; it would be frightful waste, whereas if they could only get a piece of land sixteen miles long and one mile broad they could treat the sewage in a way to add to the wealth of the country.

Major Fosbery (Warwick) said one of the great difficulties was the treatment of the storm-water: it rushed into the sewers, and carried everything to the outfall without its going into the tank at all. No doubt later that matter would be dealt with. The A B C scheme had to be put a stop to at Leamington, because it did not fulfil the necessary conditions. That and other schemes might have their value, but it seemed to him that precipitation alone was not sufficient to purify the water, and that land filtration was necessary to accomplish it.

Mr. Edwin Cheshire (Birmingham) was of opinion that they were all wrong, and that the only way to properly treat sewage was to intercept it at the very first point, and not at the outfall, as they could never thoroughly stop it all there. In ordinary weather there was a large amount of solid, and when a storm came this floated at the top, and was carried to the outfall, making the river worse than before. He felt inclined to say, "Sewage, sewage, everywhere. Oh, what a nasty stink!"

Mr. Ald. Avory (Birmingham) detailed at length what was being done at Saltley, and said that the effect was all that could be desired. There they used lime, and found it a very powerful auxiliary; the results of their working were constantly increasing crops, and diminution of the nuisance. They had intercepted 580 tons per day, and could treat that satisfactorily; but if they got the sewage from 70,000 more houses, he was afraid that there would be considerable inconvenience caused before it could be dug into the ground, so that if the pan system were abolished, they would be worse off than now.

Lord Norton said he must disagree with the last speaker as to the purity of the water turned into the river, and would send a sample of it for members to see, from Forge Mills.

Mr. Avory said the proper place to take a sample was at the outlet and not at Forge Mills.

Mr. Geo. Hurst (Bedford) said earth was the most effectual disinfectant they had, and sewage matter thrown upon it lost its smell. The question of storm-water was one that would have to be dealt with, and he believed that would only be by duplicate sewers. At

Bedford the sewage system was self-supporting, except the pumping, and had given every satisfaction.

Mr. Pritchard, in reply, said he was of opinion that at first the pan system presented great legal difficulties in Birmingham, but now the circumstances were altered. He did not say that lime was a complete agent; but thought it was a re-agent to be used in the process. With respect to storm-water, he maintained that it was impossible to prevent the storm-water carrying the sewage to the outfall unless they had duplicate sewers. In conclusion, he would say that no system would do for every town; each place must be governed by its own peculiar circumstances.

## ILLUSTRATIONS OF RECENT PATENTS.

1,164, Improved means for Fastening Door-handles in their Spindles, &c. W. A. Gill, London.

Here the object is to avoid the frequent failure of the fastening as at present used, and to secure an efficient, simple, and cheap fastening for door-handles to their spindles. Fig. 1 shows a part

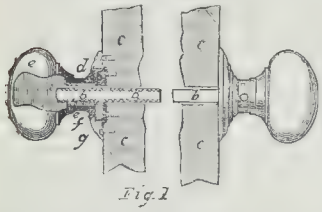
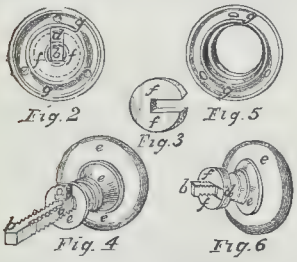


Fig. 1

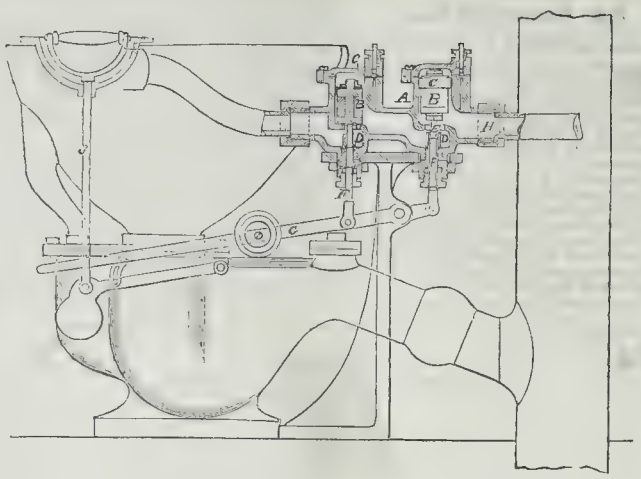
longitudinal section of the improved appliance. Fig. 2 is a back view of the rose, showing the slotted disc. This same slotted disc is also shown at fig. 3. Figs. 4, 5, and 6 give perspective views of handle




and rose with the square-slotted disc, which is one of the main features of the patent. One end of the spindle, *b*, is threaded and the other end left plain. To secure the knob *e* to this spindle *b* the spindle is passed through the door which is marked by *c* on the drawings (see fig. 1). At the other end of the spindle *b* it is made with a thread to correspond with the thread at its first end, and the face of the knob *e* is provided with a lump of metal, shown on fig. 4; when this is in position it abuts against the door when the knob *e* is screwed on the spindle. Before the knob is screwed on, a rose, *g*, is slipped over the neck of the knob handle, *e*, and when the lump, *d*, is screwed up against the door a square-slotted disc or key, *f*, is slipped down between the face of the knob and the door; the slotted portion covering the spindle, *b*, which is square, and also the lump, *d*. The rose, *g*, is then screwed on to the door, and the fastening is complete. One knob may be attached permanently to the spindle, and the key, *f*, for cheapness may be stamped out of sheet iron.

3,878, Improved Water Waste-preventing Apparatus for Closets, &c. John Smeaton, London.

This invention is to control and prevent the waste of water as under the present system. To a water-closet a double valve is fixed on a supply-pipe with spindle and cup-leathers to the said valves. When one of the valves is lifted, it allows the flush to the closet, and when released, the other valve regulates the after-flush, so that only a given quantity of water can pass at each operation. Between twin valves is a lever fixed on a centre between the two valves, free to move, and on the lever being actuated, it pushes up one valve by coming in contact with the spindle of it, and releases the other valve, which gradually shuts off. When the lever drops again, it pushes up the other valve, and the first-mentioned valve gradually drops. In our woodcut, A is the body of the valve; B, the valve; C, cup leather; D D, guide for the spindles; E and F are the




spindles on the lever, G, to actuate the valve; H is the inlet; J is the pull acting on the lever in the manner described. In adapting his invention, the inventor particularises the closet he prefers, but with an "Eclipse" trap, as shown above the floor-line, the trap and valve box may be formed in one.

9,308, Improvement in Stove Grates. G. W. Chambers, York.

In an ordinary stove grate or range the air passes up through the bottom grate into the fire, and supports the free combustion of the coal, while that which is called a slow combustion has a solid bottom of brick, stone, or iron. The ordinary stove grate or range may be converted into a slow-combustion by taking out the bottom grate and substituting a brick, which involves the removal of the whole of the fire; or by covering the bottom grate over with a loose iron plate, which is inconvenient, troublesome, and even dangerous; or by means of a tightly-fitting ash-pan, which is expensive and seldom satisfactory. This invention has for its object the immediate stoppage of the draught of air through the ordinary bottom grate, thus converting the stove grate or range into a slow-combustion, which may at any moment be turned again at will into a free-combustion without any difficulty or inconvenience. This is effected by raising an iron plate from below the ordinary bottom grate, so that it shall come into contact with it, and thus at once check or stop the draught of air through it. It is not necessary that it should be in immediate contact with the whole of the bottom grate; but only the rim or raised margin of the plate should be in contact with the outer portion of the bottom grate. The novelty claimed for this invention is the method of converting an ordinary stove-grate or kitchen-range into a slow-combustion one by raising an iron plate from below the ordinary bottom grate, so that it shall so cover the under-surface of the bottom grate as to stop or check the draught of air through it, while retaining the power of restoring the fire to free combustion at will by again lowering the said plate.

## THE DOME OF ST. PAUL'S.

SIR,—It is to me a new experience, in questions of art, to find myself at variance with my old and valued friend Mr. W. Cave Thomas. Nevertheless, I must demur to his plea, urged in your issue of the 13th inst. [p. 374], viz., that Thornhill's rococo monochromes on the cupola of St. Paul's should be accepted as the best art now available for its decoration. This, as a proposition, is startling enough; but it fairly takes one's breath to be told, further, that Thornhill's compositions should, for due decorative effect, be translated into colour on fields of gold. It is just possible to imagine a person, more or less colour-blind, and imperfectly acquainted with art, pleading for the conservation, in their integrity, of Thornhill's floundering groups and distorted architecture in drab,—this in the interests of history. It is easier to comprehend an urgent desire for their total effacement in the interests of art.

To advocate the retention of such works, and, at the same time, the application to them of after-thought effects in colour and gold, for which they are intrinsically and hopelessly unfit, is only to offer a serious suggestion for their destruction under a humorous plea for their preservation.

JOHN R. CLAYTON.

## PARTY WALLS.

SIR,—In reply to "Subscriber" [p. 408, *ante*], I think the Metropolitan Building Act contains what information is sought. If "Subscriber" owns the half of the party-wall, he has the right, so far as appears, to build on the party-wall, but subject to every liability in the Building Act detailed, if in London. HENRY AMBROSE.

SIR,—The law allows a party-wall to be raised; the addition to it does not prevent the lower part from retaining its original character. A. B.

*** Our correspondent of last week will find two articles on "Party-walls" in the *Builder* of May 8th and 15th, 1880, which contain a general summary of the law.

## UTILISATION OF TIDAL POWER.

SIR, In your issue of September 6th [p. 317] you were good enough to refer to the model which is now being exhibited by Messrs. Henry Greene & Son, of 155, Cannon-street, City, at the Health Exhibition, illustrating my proposed method of utilising the rise and fall of the tide to the particular purpose of the discharge of town sewage,—in which reference a doubt is implied as to the economical practical application of the invention. As the subject is admittedly one of great national importance, a word or two from the inventor explanatory of this part of the question may not be unwelcome to your readers. Your proposition is that the necessary works cannot be erected except at so large a capital outlay as to make the interest amount to a very heavy item in comparison with that chargeable on the first cost of steam pumping machinery, but I venture to think that your conclusion,—that the working expenses of steam power would probably fall short of that interest,—is somewhat premature. I frankly admit that I am unable to give an exact estimate of the cost of the works for places of such importance as London, Glasgow, or Liverpool, as we have not entered into such calculations, but there is no reason why the system should not be economically applied even to the largest of our cities. The cost of large installations is generally less in proportion than smaller works, but assuming a town with a population of 10,000, let us see what will be required. We will suppose the town in question to be situated on the coast, where a 20 ft. neap tide obtains, and that the sewage will run by gravitation to low-water mark, being thus tide-locked; the sewage must therefore be lifted so as to run out to sea. By my plan the cost for the necessary works would be under 5,000*l.*, which, at four per cent. interest, would be an annual charge of 200*l.* This estimate, being from a *bonâ-fide* quotation from a firm ready to undertake the work, is indisputable. Moreover, as far as the mechanism is concerned, there would practically be no cost whatever. Now, as to steam-power. To erect and maintain in efficiency a steam-engine to raise the daily outfall of sewage (250,000 gallons) would incur an annual charge of not less than 300*l.* These facts speak for themselves.

C. MAYNARD WALKER.

155, *Cannon-street, E.C.*

**Metropolitan Drawing-Classes.**—Lord Carlingford, K.P., has acceded to the invitation of Mr. W. Busbridge to deliver the Queen's prizes to the students of these classes. The meeting will take place in the Guildhall, on Monday, November 3rd, under the presidency of the Lord Mayor.

## The Student's Column.

### A SIMPLE LESSON IN PERSPECTIVE.

MOST students have been taught the ordinary rules of perspective, and many have drawn on a sheet of glass the perspective appearance of an object seen through it. The following process may perhaps assist them in connecting the rules with the appearance.

Place a sheet of paper on a level table. Fix up a ring, at the level of the eye, at the near edge of the paper, to look through. Hold up a sheet of glass vertically and facing the ring, half way across the paper. Place a match-box on the far end of the paper, opposite the ring, and nearly square with the glass, so that the right side of the box is just seen.

Draw a pencil line on the paper round the bottom edge of the box, draw another line along the bottom edge of the glass, and mark a dot on the paper under the centre of the ring.

Look through the ring, and holding the glass quite vertically, draw upon it with a pen and Indian ink the appearance of the box (in other words, the intersection of the visual rays by the picture plane); this is best done by first marking dots at the corners, and then connecting them by lines in *Indian* ink.

Now shift the box nearer to, and farther from the glass, and observe that it appears respectively larger, and smaller than when it was in its original position.

Replace the box and shift the glass backwards and forwards, and observe that again the box appears, respectively larger and smaller than when the glass was in its original position.

Replace the glass and shift the ring backwards and forwards, and observe that again the box appears respectively larger and smaller (to speak correctly, that the box occupies more and less of the surface of the glass), than it did when the ring was in its original position.

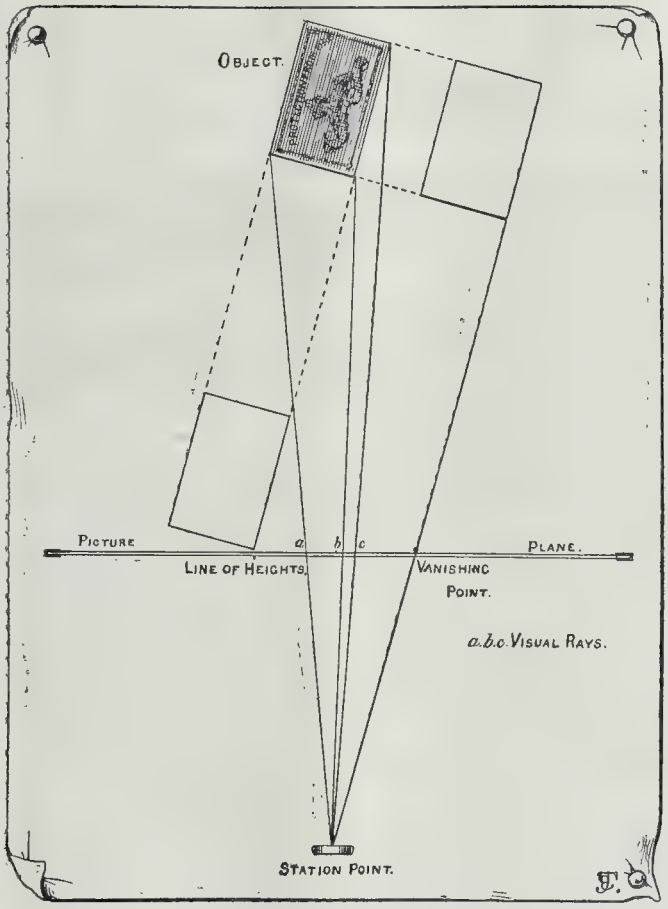
From these experiments it will be evident that a perspective view is regulated by the relative positions of the box (the object), the glass (the picture plane), and the ring (the station point).

Next draw a line right across the glass, still held in position, at the level of the ring. This is called the horizontal line.

Next continue the lines on the glass representing the right side of the box, and observe that they meet together; observe further that they meet on the horizontal line.

Make a dot at the point where they meet, this is called their vanishing point.

Now look through the ring and shift the box gently to the right, keeping it at the same angle to the picture plane, until its right side comes immediately under this vanishing point,




and observe that the right side, as well as the continuation of it up to the vanishing point, now appear to be vertical.

While the box is in this position, mark its plan on the paper, and observe that if its right side be continued backwards through the picture plane it will touch the station point.

Conversely, a line parallel to the right side drawn from the station point to the picture plane gives the vanishing point for it; *which is the rule.*

What is true of the right side of the box is equally true of the front and back of the box, though their angle to the picture plane renders this more difficult to be proved by shifting the box about.

Now replace the box in its original position, and then draw it backwards, in a line parallel to its right side, until it touches the glass.

Mark its height on the glass, and observe that this is the actual height of the box.

While the box is in this position draw its appearance on the glass, and observe that the right side still tends to the same vanishing point as before.

Therefore to find in perspective the height of any part of an object, bring the plan of it back to the picture plane, there set up a line called its line of heights, mark the height thereon, and then carry it back towards its vanishing point until it intersects its visual ray; *which is the rule.*

## Books.

*Quantities: a Text-book for Surveyors, in Tabulated Form.* By BANISTER FLETCHER, F.R.I.B.A. Fourth edition, revised, with supplementary chapters. London: Batsford. 1884.

ABOUT four years have passed by since the publication of the third edition of Mr. Fletcher's book on "Quantities." In the interval he has sought for suggestions as to improvements, and having been requested to show a complete specimen of "taking off" has added Chapter V. This gives examples,—founded on five plates of a neat detached villa being erected under the author's superintendence. The brickwork of the front is taken off completely, and then the whole of the interior work of the drawing-room. The book contains now over 250 pages between cover and cover, and will be found to answer the author's modest wishes. It has proved, and will prove, useful in teaching the young practitioner, and the more mature may refer to it with satisfaction. It is perhaps not strictly necessary to repeat the statement we have frequently made, but it makes things safer to be precise, and to observe once more in this connexion that there is no royal road to the possession of the knowledge, required for the satisfactory practice of the responsible and arduous profession of a quantity surveyor. He must be trained by long and persistent practice. Still, many people, who have no intention of regularly practising, want to know generally how things are done; and for them text-books, in some form or other, are indispensable.

As suggestions are invited, a few points of detail may be touched upon, mainly, of course, for the sake of the principles involved, in which we find ourselves generally at one with Mr. Fletcher. Instead of the saying, "If you want to be cured of the conceit of infallibility, make an index," standing as aforetime, for the last three words should be substituted, "make a text-book." This author has evidently stood in no need of curing for a good length of time;—the form of the book, with five supplementary chapters, bears witness to this. One method in taking dimensions should uniformly be followed,—length, breadth, and then depth or height. On pages 15 and 31, for instance, there are slips, and the heights are misplaced. Under "Bricklayer," on page 18, and in Table II., Damp-courses generally are dealt with; but "Slate Damp-course" appears in Table IV., where Slate of all sorts is being treated of. The best rule would seem to be to follow Table II., and keep all damp-courses with the brickwork. On page 99 a figure is referred to as showing how to measure the girths of mouldings; the figure (No. 21, p. 55) in question shows, in fact, the shaping of the feet of rafters,—a diagram of the kind suggested might be useful. There is a slip on page 143 in telling "the student how to ascertain the number of slates required to cover a given area of roof"; the method happens, however, to be stated rightly on page 26, so that an active-minded person would be on his guard. In mentioning skirtings on page 65, the paragraph reads, "also state if the backings, or grounds, are intended to be included in the one item." This, as it stands, might easily be misread. The backings are usually included with the skirtings, and the grounds as usually taken separately, as indeed Mr. Fletcher recommends in Table VIII. All manufacturers do not fall in with the measurement of revolving-shutters (page 78) by the foot super. merely. They call for an allowance in the height, sometimes measuring from the cill to the top of the roller, and sometimes asking for a height of 1 ft. more than the opening. If in measuring paperhanging, as recommended on page 121, the number of superficial feet of wall space is divided by 60, there will not be sufficient allowance for waste in matching patterns in a good-sized room. Some surveyors divide by fifty-four instead of by sixty, that is, they make an allowance of one

piece in ten; others are more liberal, and add one piece to the amount for every seven. Fixing smith's work in connexion with carpenter's work is best included in the Carpenter's Bill as suggested in Table VII.; but the ironwork must be in the Smith's Bill with a special note to the effect that the fixing has been put in the carpenter's bill. In Table IX. (Smith's Bill) we have "wrought iron in straps and ties; bolts and ties; bolts, &c. (including fixing),"—which would result in the fixing coming twice into the estimate. With reference to patterns for casting there is some doubt whether the recommendation on p. 93 should be followed. It is stated there that, when the patterns are taken separately, they should be billed with the carpenter. Good custom can be quoted against this, and practical convenience may be alleged also as a reason for making each pattern follow directly after the castings for which it is made. Estimates from founders are frequently wanted, and the founder's people will probably arrange also as to the patterns. "French polishing, where described in the specification, must also be included in the description in the bill of the joiner's work" (p. 85). There is no objection to this; indeed, the course is that frequently,—perhaps that most frequently,—pursued. But at pp. 116, 117, and again in the specimen of a fair bill, at p. 176, the polishing is grouped under "Painter." In Chapter V., in the example of taking off, "Bay *a b*," and ⓓ appear out of a clear sky; the abbreviations in "Painter," p. 133, would, indeed, supply a clue to the latter sign, if "the student" had the good luck to look in the right place; but he might be guided there, or the abbreviations might have been scattered about more plentifully in the specimen.

Too much importance may, however, be easily attached to minutiæ; they may, at any rate, serve to show that a diligent examination of the book has been made. One or two *obiter dicta*, not especially connected with "quantities," may be referred to. The clause in the preamble of Smith and Founder (page 173),—"All girders to be tested to half their breaking-weight at the contractor's expense,"—would not meet with universal approval, a test of more than one-third of the breaking-weight for cast-iron meets with strong objection. "Number the D-traps" on page 110, and their innocent intrusion into Table XIII., might be resented by earnest sanitarians,—who do not willingly see those objectionable articles mentioned as among the possibilities of ordinary life. The instruction on page 111 to state the number of the gauge of the zinc would also meet with objectors, as would the provision (on page 112), of No. 13 for flats, and No. 12 for gutters. The weights of zinc have been put in such confusion, owing to the changes in the gauges, that no one ought now to specify the gauge, but the weight per foot only. Mr. Fletcher gives, at p. 151, a list of weights according to the old Belgian gauge; the present No. 13 gauge of the Vieille Montagne Company is 17 oz. to the foot against 19·56 oz. as aforetime and in that table. In the summary of the fair bills (page 178) the surveyor's charges are given as 2½ per cent.,—which may be correct for that case. The general understanding, however, is that 2½ per cent. is to be charged for very small or very difficult works, and 1½ per cent. for ordinary works. If we pursued this, however, we might possibly be led a good way from our original purpose,—which was merely to call attention to the publication of a new edition of Mr. Fletcher's very useful Text-book.

## Miscellanea.

**An Alleged New Motive-Power.**—A discovery of particular value in the engineering world is just announced in the form of a new motive power. The discovery is due to Mr. Edwin Sturge, who has patented its mode of application. It is claimed that for all purposes of light locomotion, or for driving light machinery, it will eventually displace steam Private experiments of the new motive power are stated to have proved very satisfactory, and arrangements are being made to give it a public trial.

**A New Font** has been placed in the Earl of Zetland's private chapel at Aske Hall, from designs by Messrs. Clark & Moscrop, architects, of Darlington. The work was executed by Mr. Ralph Hedley, of Newcastle-upon-Tyne.

**Birkbeck Literary and Scientific Institute, Bream's-Buildings, Chancery-lane.**—The prospectus for the sixty-second session of this, the parent and largest, Institution has just been issued. The inaugural address will be delivered by Professor Tyndall. The new building, the foundation-stone of which was laid by the late Duke of Albany, is now completed, and provides superior accommodation for 6,000 students. The new institution has been erected for the special purpose of enabling the extensive educational work to be carried on with comfort and efficiency, and we are glad to hear that great attention has been paid to lighting and ventilation. The long list of classes includes languages, mathematics, natural, applied, and mental science, technology, art, music, law, literature, &c. Special attention has been paid to the establishment of practical classes in many of the subjects, and the chemical and biological laboratories have been thoroughly fitted up. The spacious art room will afford unusual facilities to the students of the School of Art, which will open at the commencement of the session. The classes will not, as heretofore, be restricted to the evening. In many of the subjects morning and afternoon classes will be held. The large lecture-hall seats 1,200 persons. We regret to observe that the sum of 6,500*l.* is still required to complete the payment for the building. This amount should be at once cleared off by the contributions of those who support the great cause of education, to which this Institution has rendered unique service. Amongst the recent donors is her Majesty the Queen, who has sent 50*l.* to the fund. The bankers are Messrs. Smith, Payne, & Smith, Lombard-street.

**Conference of Plumbers.**—The conference of plumbers held at the Health Exhibition on Friday divided its labours into the following sections:—1. The technical instruction of plumbers. 2. Apprenticeship, the duration and condition of indentures suited to the present state of the plumbing trade and to the modern system of technical instruction. 3. The establishment of metropolitan and provincial boards of examiners of plumbing work. 4. The registration of journeymen plumbers. 5. The suitability of materials used in plumbing, and particularly of those materials recently introduced as substitutes for lead. 6. The desirability of fixing upon a system by which uniformity in the quality of material used in plumbing may be insured. 7. The formation of district associations of plumbers to investigate and secure, as far as practicable, correction of evils and abuses arising in connexion with the trade. 8. A general and executive committee to be formed for the purpose of receiving reports from district associations of plumbers and others, with a view to the preparation of a general report by the Plumbers' Company, to form the basis for an appeal to Parliament for necessary amendments and extensions of the law relating to plumbers' work under the Building and Health Acts, and otherwise.

**Evening Classes in Metallurgy and Fuel at King's College, London.**—We understand that, in addition to the usual course of evening lectures in connexion with Prof. Huntington's Department, which will be given this session on Mondays from eight to nine, upon the "Properties of Metals and Alloys, and their Uses in the Arts," Mr. W. G. McMillan, the Demonstrator in Metallurgy, will give a new course treating of "Fuel and its Applications," from seven to eight on the same evening. These lectures are designed to be of assistance to intending candidates for the examination of the City and Guilds of London Institute in Metal-plate Work, Plumbing, and Iron and Steel, and in Fuel respectively. The first meeting of the classes will be on the 6th of October. The laboratory for practical work is open to evening students on Friday from seven to nine, and will remain open as usual every day during College hours, alike for occasional students and for members of the Engineering Department, &c., of the College.

**International Health Exhibition.**—We have received the third edition of the Official Catalogue, which is much bulkier than the previous editions. It contains an elaborate Subject-Index to the exhibits of the United Kingdom, and considerable additions to the Foreign Section of the Catalogue; the most important of these being the extensive contributions made at a somewhat late period by the Japanese Government.

**The New Offices for the "Daily News."** The extensive premises which for some months past have been in course of erection in Bouverie-street for the proprietors of the *Daily News* are making good progress towards completion. The new buildings cover a ground area of about 10,000 superficial feet, some buildings adjoining the old premises having been acquired to enlarge the site. The Bouverie-street elevation is about 100 ft. in length, and upwards of 70 ft. in height, presenting a bold and massive façade. The ground-floor portion of the frontage, which is very lofty, is faced with Portland stone, having a commanding central entrance about 20 ft. in height, surmounted by an elliptical arch and pediment resting on massive corbels. On each side of the entrance, and architecturally uniform with it, there are three arched windows, each window being divided by circular columns and capitals. The upper portion of the frontage, containing two lofty floors, is faced with red brick and Mansfield stone, relieved by carvings. The building extends back for upwards of 100 ft., that portion of the structure in the rear of the frontage showing three and four floors above the ground line. In the centre there is an area or well admitting of an abundance of light to the numerous rooms and apartments on the several floors of the building. This is inclosed by a lantern light, in which are placed a number of ventilating shafts. The principal entrance leads into a spacious hall or vestibule, on each side of which are the advertisement and general business offices. A wide stone staircase leads to the upper floors, containing the editors', reporters', and other offices. The composing-rooms are amongst the largest apartments in the building. The works have been carried out without disturbing the greater part of the machinery in the basement of the old building. Mr. T. Chatfeild Clarke is the architect, and Messrs. Brown, Son, & Blomfield are the contractors, Mr. Crossley acting as clerk of the works.

**New Post-Office Buildings at Tooting.**—The Government are erecting new district post-office buildings on a vacant plot of ground in Lower Tooting, a short distance from the High-street. The building has a frontage to the main high road 33 ft. in length, with a return frontage 60 ft. in depth, thus covering a ground area of about 2,000 superficial feet. The building is faced with red Bracknell brick, with Portland stone cornice, &c. The façade is upwards of 30 ft. in height, terminating with a gable, and is covered in with a high-pitched roof. The principal room in the building is a spacious sorting-room, 40 ft. long and 30 ft. broad, which is lighted by three lofty windows in the principal frontage, and four similar windows in the return elevation, in addition to a lantern-light in the ceiling. Adjoining is a receiving-office and other offices for the transaction of general post-office business. At the rear of the building is a kitchen and other domestic offices, together with sheds for post-office vehicles. The building is being erected from the designs of Mr. Williams, of her Majesty's Office of Works. Mr. Joseph Dowey, of High-street, Brentford, is the contractor, and Mr. S. Nowel is foreman of the works.

**Architecture at University College.**—The opening lecture of the courses at University College, London, on Architecture, Construction, and Professional Practice, will be given by Professor T. Roger Smith on Friday, the 3rd of October, at six p.m. Admission free. The subject of the lecture is "The Wall as an Architectural Feature, including the Gable and the Tower."

**Architectural Association.**—The opening *conversazione* of Session 1884-85 will be held in the galleries of the Royal Institute of Painters in Water Colours, Piccadilly, on Friday, Oct. 10.

## TENDERS.

For Willesden main drainage. Mr. Claud Robson, engineer:—

| | | | |
|---|---|---|---|
| Beadle Bros. | £25,614 | 0 | 0 |
| Rogers & Dickens | 25,600 | 0 | 0 |
| Mowlem & Co. | 25,200 | 0 | 0 |
| A. Oliver | 25,000 | 0 | 0 |
| Bottoms Bros. | 24,200 | 0 | 0 |
| Jas. Dickson | 24,168 | 0 | 0 |
| J. Mears | 23,920 | 0 | 0 |
| J. W. & T. Neave | 23,840 | 0 | 0 |
| Nowell & Robson | 23,470 | 0 | 0 |
| G. Felton | 23,100 | 0 | 0 |
| B. Cook & Co. | 22,930 | 0 | 0 |
| Killingback | 22,800 | 0 | 0 |
| Neave & Son* | 22,690 | 0 | 0 |
| Sanders | 22,200 | 0 | 0 |

* Accepted, the schedule of the lowest tender being too high.

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| College at Norwich | Rev. Hinds Howell | Not stated | Not stated | i. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| New Offices, Bewick-street, Newcastle | Tyne Improvment Com. | R. J. Johnson | Sept. 30th | ii. |
| Concrete Invert | Tottenham Local Board | — de Pape | do. | ii. |
| Battery Drill Shed and Offices, Maryport | Admiralty | *Official* | October 3rd | i. |
| Tramways | Birmingham Twn. Cncl. | W. S. Till | October 4th | ii. |
| Broken Granite | Aldershot Local Board | W. L. Coulson | October 6th | ii. |
| Effluent Sewers | Warwick Town Council | E. M. Richards, C.E. | do. | xviii. |
| Filter Bed | do. | do. | do. | xviii. |
| Boundary-Walls, &c., Sunderland Cemetery | Burial Board | D. Balfour, C.E. | do. | ii. |
| Making-up Road | Hornsey Local Board | T. de Courcy Meade, C.E. | do. | ii. |
| Kerbing, Tar-Paving, &c. | Lewisham Brd. of Wks. | | October 7th | xviii. |
| Erection of Houses, Shops, &c. | | Geo. Fuller | October 9th | i. |
| Supplying and Laying Cast-Iron Pipes | Hartley Wintney Rural Sanitary Aut. | J. R. Sisterson | October 11th | xviii. |
| Brick Sewers | Birmingham Twn. Cncl. | W. S. Till | October 13th | ii. |
| Kerbing | Southampton Corprtn. | W. B. G. Bennett | October 14th | ii. |
| New Post-office, Watford | Commissnrs. of Works | *Official* | do. | ii. |
| Construction of Dock | Barry Dock & Railway Company | J. W. Barry & H. M. Brunel | do. | ii. |
| Alterations, &c., to Mortuary Buildings | Paddington Vestry | Higgs & Rudkin | October 15th | xviii. |
| Wet Dock, Bombay | Trustees | J. A. McConnochie, C.E. | Nov. 14th | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Surveyor | Chelsea Vestry | October 14th | 400*l.* per annum | xvi. |

For the erection of three houses and shops at Upton Park, Essex, for Messrs. Hopwood & Son. Mr. John Hudson, architect, 80, Leman-street, E. Quantities by Mr. C. Stanger:—

| | | | |
|---|---|---|---|
| Gladding, New-road, E. | £2,780 | 0 | 0 |
| Eaton & Co., Whitechapel | 2,749 | 0 | 0 |
| Coulsell Bros., Bethnal Green | 2,684 | 2 | 1 |
| Outhwaite & Son, East Smithfield | 2,635 | 0 | 0 |
| T. Little, Whitechapel | 2,568 | 0 | 0 |
| Hearle & Son, Cable-street, E. | 2,393 | 0 | 0 |
| J. A. Taylor, Haggerston | 2,359 | 0 | 0 |
| J. & H. Cocks, Mile End, E. | 2,348 | 0 | 0 |
| J. Brickell,* Manor Park, Essex | 2,115 | 0 | 0 |

* Accepted.

For the construction of pipe sewers, receiving tank and engine houses, engines and pumps, formation of irrigation area, &c., at Claines (Worcester):—

| | | | |
|---|---|---|---|
| Thomas Adams, London | £7,982 | 0 | 0 |
| T. Small & Sons, West Bromwich | 7,800 | 0 | 0 |
| Bottoms Bros., Battersea, S.W. | 7,434 | 0 | 0 |
| H. Hilton & Sons, Birmingham | 6,895 | 0 | 0 |
| Henry Welsh, Hereford | 6,384 | 0 | 0 |
| Thomas Vale, Hartlebury | 5,980 | 0 | 0 |
| Currall & Lewis, Birmingham | 5,900 | 0 | 0 |
| Cowdery & Sons, Newent | 5,434 | 0 | 0 |
| B. Cooke & Co., Battersea, S.W. | 5,293 | 0 | 0 |
| George Law,* Kidderminster | 4,977 | 0 | 0 |

* Accepted.

New residence at Glifaes, near Crickhowel, Brecknockshire, for the Rev. Wm. Henry West. Messrs. Browne & Gill, architects, Bath. Quantities by Mr. B. W. Pope, Bristol:—

| | | | |
|---|---|---|---|
| Bowers & Co., Hereford | £6,144 | 10 | 0 |
| A. King, Gloucester | 5,748 | 0 | 0 |
| J. G. Thomas, Abergavenny | 5,508 | 0 | 0 |
| Williams & Sons, Brecon | 5,400 | 0 | 0 |
| H. A. Forse, Bristol | 4,900 | 0 | 0 |
| Jones & Co., Gloucester | 4,690 | 0 | 0 |
| H. Welsh, Hereford | 4,294 | 0 | 0 |

For building offices and warehouses, Mill-street, Kidderminster, for Messrs. R. Smith & Sons:—

| | | | |
|---|---|---|---|
| C. Claridge | £3,849 | 0 | 0 |
| Hilton & Sons | 3,220 | 0 | 0 |
| J. H. Bate | 3,200 | 0 | 0 |
| Dorse & Son | 3,187 | 0 | 0 |
| John Guest | 2,940 | 0 | 0 |
| Howard & Sons | 2,900 | 0 | 0 |
| W. T. Bennett | 2,847 | 0 | 0 |
| Binnian & Son (accepted) | 2,800 | 0 | 0 |
| H. Smith | 2,769 | 0 | 0 |
| C. A. Horton | 2,685 | 0 | 0 |
| Bradney & Co. | 2,670 | 0 | 0 |

For building a billiard-room, and for alterations, at the Conservative Club, Llanelly. Mr. J. Buckley Wilson, 15, Castle-street, Swansea, architect:—

| | | | |
|---|---|---|---|
| Brown, Thomas, & Johns | £339 | 0 | 0 |
| G. Davies | 325 | 0 | 0 |
| J. Evans | 324 | 19 | 0 |
| Basset, Davies, & Hopkins | 275 | 0 | 0 |
| G. Mercer, New-road (accepted) | 270 | 0 | 0 |

[All of Llanelly.]

For stabling, &c., at the Railway Tavern, Herne Hill. Mr. S. C. McMurdie, architect:—

| | | | |
|---|---|---|---|
| W. D. Palmer | £348 | 12 | 0 |
| C. Riddich & Sons | 275 | 0 | 0 |
| Ben. Cook | 247 | 0 | 0 |
| F. Higgs | 240 | 0 | 0 |

For works at Fullow Corner, Finchley, for Mr. Barnes Wimbush:—

| | | | |
|---|---|---|---|
| Simpson & Sons | £4,021 | 0 | 0 |
| Dove Bros. | 3,995 | 0 | 0 |
| Plowman | 3,593 | 0 | 0 |
| W. Oldrey | 3,400 | 0 | 0 |

For repairs and decorations to Pontypool Wesleyan Chapel, Mr. E. A. Lansdowne, architect:—

| | | | |
|---|---|---|---|
| Dando & Son, Newport | £284 | 15 | 0 |
| W. Jones & E. Jones, Abersychan | 258 | 10 | 0 |
| F. W. Taylor, Newport | 234 | 0 | 0 |
| D. Vaughan, Tredegar (accepted) | 220 | 0 | 0 |

For completion of two houses in Dixon-street, Gilberts Hill, New Swindon, for Messrs. Baily & Gilbert, the foundations and a portion of the walls being already built. Mr. Wm Drew, Swindon, architect:—

| | | | |
|---|---|---|---|
| Phillips | £485 | 0 | 0 |
| Barrett | 470 | 10 | 0 |
| Wiltshire | 462 | 0 | 0 |
| T. Kent,* Union-street, Swindon | 435 | 0 | 0 |

* Accepted.

For additional stabling, High-street, Bromley, for the London General Omnibus Company, under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton:—

| | | | |
|---|---|---|---|
| Gibbons | £1,050 | 0 | 0 |
| Deacon | 995 | 0 | 0 |
| Houghton | 992 | 0 | 0 |
| Dickenson | 959 | 0 | 0 |
| Robson | 947 | 0 | 0 |
| Haynes | 920 | 0 | 0 |
| Manning | 895 | 0 | 0 |
| Beale | 875 | 0 | 0 |
| Thomerson & Son | 869 | 0 | 0 |
| Bolding | 847 | 0 | 0 |
| Richens & Mount | 838 | 0 | 0 |
| Garrud | 831 | 15 | 0 |
| Parker | 829 | 0 | 0 |
| Rider Hunt | 763 | 0 | 0 |
| Aldridge & Jenvey | 757 | 0 | 0 |
| Scharien & Williams | 729 | 0 | 0 |

For alterations, &c., to premises at rear of No. 157, King-street West, Hammersmith, for Mr. W. Foss. Mr. T. Woodbridge, Biggs, surveyor:—

| | | | |
|---|---|---|---|
| Rodgers, Turnham Green | £285 | 0 | 0 |
| Bryant, Turnham Green | 247 | 0 | 0 |
| Johnson, St. Peter's-square | 239 | 0 | 0 |
| Webb & Rosser, Hammersmith | 205 | 0 | 0 |
| Manning, Barnes (accepted) | 178 | 0 | 0 |

For alterations, repairs, &c., to the Seven Sisters Public House, Tottenham. Mr. E. Clark, architect:—

| | | | |
|---|---|---|---|
| W. Oran & Son | £873 | 0 | 0 |
| T. L. Green | 838 | 0 | 0 |
| P. Hart | 798 | 0 | 0 |
| J. Lindrell | 797 | 0 | 0 |
| Mower | 738 | 0 | 0 |
| A. Bolding | 697 | 0 | 0 |

For rebuilding premises after fire at 64, Mare-street, Hackney, for Mr. Chopping. Mr. H. E. Allen, architect, 50, Finsbury-square:—

| | | | |
|---|---|---|---|
| Mower | £1,112 | 0 | 0 |
| Warr | 1,095 | 0 | 0 |
| Groome & Rowland | 980 | 0 | 0 |
| Robinson & Miller | 795 | 0 | 0 |
| Thompson & Tweed | 771 | 0 | 0 |
| Beach | 768 | 0 | 0 |
| Burgen | 765 | 0 | 0 |
| Burrell & Norten | 744 | 0 | 0 |
| Wood | 725 | 0 | 0 |
| Houghton | 687 | 0 | 0 |
| Dunkley | 668 | 10 | 0 |
| Russell | 650 | 0 | 0 |
| Wooding | 623 | 10 | 0 |
| List | 620 | 0 | 0 |
| Baxter | 595 | 0 | 0 |
| Deacon | 595 | 0 | 0 |
| Beale | 586 | 0 | 0 |
| Bartram | 584 | 0 | 0 |
| Balsam Bros. | 560 | 0 | 0 |
| Cousins & Simmons | 550 | 0 | 0 |
| Saunders (accepted) | 450 | 0 | 0 |
| Aldridge & Jenvey | 445 | 15 | 0 |

For works at Llansaintffraid Church, Breconshire. Mr. S. W. Williams, architect, Rhayader:—

| | | | |
|---|---|---|---|
| Williams & Son, Brecon | £3,066 | 0 | 0 |
| D. C. Jones, Gloucester | 2,949 | 0 | 0 |
| Thomas, Abergavenny | 2,868 | 0 | 0 |
| Treasure & Son, Shrewsbury | 2,541 | 0 | 0 |
| Inwood, Malvern | 2,455 | 0 | 0 |
| Bowers & Co., Hereford | 2,395 | 0 | 0 |
| Williams, Knighton | 2,371 | 0 | 0 |
| Welsh, Hereford | 2,288 | 0 | 0 |
| Davies & Son, Newtown (accepted) | 2,125 | 0 | 0 |

For the erection of school buildings at Charlotteville, Guildford. Mr. W. G. Lower, architect:—

| | | | |
|---|---|---|---|
| Colls & Sons, Dorking | £5,876 | 0 | 0 |
| Woodbridge, Maidenhead | 5,784 | 0 | 0 |
| Mitchell Bros., Stratford | 5,697 | 0 | 0 |
| Redford & Potter, Horsham | 5,600 | 0 | 0 |
| Ingram, Woking | 5,578 | 0 | 0 |
| Bottrill, Reading | 5,475 | 0 | 0 |
| Rowland, Horsham | 5,400 | 0 | 0 |
| Longley, Crawley | 5,394 | 0 | 0 |
| Woolgar & Sons, Horsham | 5,380 | 0 | 0 |
| Woods, Weybridge | 5,251 | 0 | 0 |
| Stafford, Peckham | 5,249 | 0 | 0 |
| Aldridge & Jenvey, Camberwell | 5,114 | 18 | 0 |
| Stevens, Bartard, & Co., Bristol | 5,000 | 0 | 0 |
| Kingerlee, Oxford | 4,950 | 0 | 0 |
| Peter Peters, Horsham | 4,947 | 0 | 0 |
| Mower, Hackney, E. | 4,890 | 0 | 0 |

For additions to the Scottish Club, Dover-street, Piccadilly, W., for Lieut.-Col. Gordon Alexander. Mr. E. P. Loftus Brock, F.S.A., architect:—

| | | | |
|---|---|---|---|
| Hall, Beddall, & Co. | £2,620 | 0 | 0 |
| Mattock Bros. | 2,419 | 0 | 0 |
| Perry & Co. | 2,349 | 0 | 0 |
| Boyce Bros. | 2,293 | 0 | 0 |
| Robert Weston | 2,263 | 0 | 0 |
| Henry Haynes | 2,050 | 0 | 0 |
| Wm. Cole | 1,991 | 10 | 0 |

For alterations to buildings, Nos. 1 to 5, Cedars-terrace, Lavender Hill, for converting same into shops. Mr. Zeph. King, architect:—

| | | | |
|---|---|---|---|
| Garrett & Son | £915 | 0 | 0 |
| Holloway Bros. (accepted) | 905 | 0 | 0 |

Accepted for the making up of private roads within the district of the Hornsey Local Board. Mr. T. de Courcy Meade, engineer and surveyor:—

| | | | |
|---|---|---|---|
| *Oakfield-Road.* | | | |
| A. Walker, Upper Holloway | £690 | 14 | 3 |
| *Beatrice-Road.* | | | |
| Brown, Upper Holloway | 250 | 10 | 6 |
| *Dogmar-Road.* | | | |
| Brown, Upper Holloway | 210 | 5 | 6 |
| *Burghley-Road.* | | | |
| Brown, Upper Holloway | 118 | 10 | 0 |
| *Vernon-Road.* | | | |
| McKenzie & Co., City | 145 | 0 | 0 |
| *Waldegrave-Road.* | | | |
| McKenzie & Co., City | 139 | 0 | 0 |

For the erection of new infants' schools at Norbiton, Kingston-on-Thames. Mr. C. L. Luck, architect:—

| | | | |
|---|---|---|---|
| Jarvis | £1,315 | 0 | 0 |
| Lane | 1,258 | 0 | 0 |
| Henley | 1,250 | 0 | 0 |
| Collings | 1,198 | 0 | 0 |
| Aldridge & Sons (accepted) | 1,135 | 0 | 0 |
| Snelling (withdrawn) | 890 | 0 | 0 |

Accepted for new farm buildings at Over Dinsdale, Darlington, for the executors of the late Mr. Charles Pease. Messrs. Clark & Moscrop, architects, Darlington. Quantities supplied:—

| | | | |
|---|---|---|---|
| T. Boyd, Cleasby (bricklayer and tiler) | £372 | 7 | 7 |
| W. Miller, Fighting Cocks (carpenter and joiner) | 207 | 2 | 1 |
| T. Wandless, Darlington (slater) | 41 | 10 | 0 |
| T. Lishman, Darlington (plumber and glazier) | 27 | 4 | 0 |
| Teasdale Bros., Darlington (smith and ironfounder) | 120 | 15 | 0 |
| T. Metcalfe, Darlington (painter) | 19 | 18 | 0 |
| | 788 | 16 | 8 |

For new counter and pewtering at the White Hart, King's-road, Chelsea, for Mr. J. J. Pope. Mr. J. Miller, architect:—

| | | | |
|---|---|---|---|
| J. Warne | £119 | 17 | 0 |
| Heath | 100 | 0 | 0 |
| W. Helling | 98 | 0 | 0 |

For photographic studio, High-street, Dorking, for Mr. W. G. Fenn. Mr. Frederic W. Ledger, architect, London:—

| | | | |
|---|---|---|---|
| F. G. Hammond, Dorking | £471 | 4 | 2 |
| Nightingale Bros., Reigate | 432 | 0 | 0 |
| W. Edser, Dorking | 410 | 0 | 0 |
| F. R. Docking, Croydon | 401 | 0 | 0 |
| Burdett & Son, Guildford (accepted) | 379 | 16 | 9 |

For additions to two cottages, East Marden, near Exmouth, for Admiral Sir G. P. Hornby, K.C.B. Mr. J. Newman, architect:—

| | | | |
|---|---|---|---|
| George Blackmore (accepted) | £185 | 0 | 0 |

For the erection and completion of a new Girls' and Infants' School at Bushey village, for the Bushey School Board. W. H. Syme, architect, Watford:—

| | | | |
|---|---|---|---|
| Kirby, Great Stanmore | £2,335 | 0 | 0 |
| Scrivener & Co., London | 2,268 | 0 | 0 |
| Dove Bros., London | 2,250 | 0 | 0 |
| Andrews, Watford | 1,976 | 0 | 0 |
| Waterman, Watford | 1,777 | 0 | 0 |
| Chadwick, Watford | 1,778 | 0 | 0 |
| Turner, Watford | 1,766 | 0 | 0 |
| Clifford & Gough, Watford (accepted) | 1,724 | 0 | 0 |

For re-building and re-instatement in Jerusalem-court, St. John's-square, Clerkenwell, for Mr. Thomas Capps. Mr. Henry John Hansom, architect:—

| | | | |
|---|---|---|---|
| Turtle & Appleton | £395 | 0 | 0 |
| Byford | 836 | 0 | 0 |
| Hammond | 820 | 0 | 0 |
| Russell* | 669 | 0 | 0 |

* Subsequently stated had made an error of 100*l.* in estimate.

For taking down and re-erecting portions of the parapet walls, &c., at the St. Marylebone Workhouse, for the Guardians of the Poor of the Parish of St. Marylebone. Messrs. Marsou Snell & Son, architects, 22, Southampton Buildings, W.C.:—

| | |
|---|---|
| L. J. Webb | £185 0 0 |
| W. Bamford | 170 0 0 |
| Wall Brothers | 154 0 0 |
| C. French | 146 10 0 |
| Burridge & Cullen | 145 0 0 |
| W. Martin | 130 0 0 |
| Sheerman & Sons (accepted) | 98 9 0 |

For the erection of a Bible Christian Chapel, Whitwell, Isle of Wight. Mr. James Newman, architect. Quantities supplied:—

| | |
|---|---|
| A. Newnham | £613 0 0 |
| Creeth & Jacobs | 507 0 0 |
| Colenutt & Moses | 493 0 0 |
| James Ball | 491 0 0 |
| A. Daish | 490 0 0 |
| Hayles & Moses | 480 12 0 |
| G. Hayles | 480 0 0 |
| Russell & Taylor (accepted) | 460 0 0 |
| E. W. Daish | 468 0 0 |

For sanitary works and alterations at the Poplar and Stepney Sick Asylum, Devon-road, Bromley, Middlesex. Messrs. A. & C. Harston, architects:—

*Second Sanitary Contract.*

| | |
|---|---|
| Gardner | £1,450 0 0 |
| Holland | 1,385 0 0 |
| Derby | 1,312 0 0 |
| Gibbons | 1,283 0 0 |
| Stidder | 1,256 0 0 |
| Hawkins | 1,059 0 0 |
| John Knight, Westminster (accepted) | 979 0 0 |

For repairs and alterations to Nos. 315 and 317, Oxford-street, W., for Mr. Patrick Ness. Messrs. Hards, Vaughan, & Jenkinson. Mr. R. T. H. Stoneham, architect, 6, Moorgate-street, E.C. Quantities by Mr. C. Jackson, West Brighton:—

| | |
|---|---|
| E. Conder | £3,995 0 0 |
| Ashby Bros. | 3,861 0 0 |
| Perry & Co. | 3,700 0 0 |
| J. Chapple | 3,620 0 0 |
| Bangs & Co. (accepted) | 3,574 0 0 |
| Colls & Sons | 3,515 0 0 |
| Macey & Sons | 3,496 0 0 |
| J. & J. Greenwood | 3,449 0 0 |

*Ironwork.*

| | |
|---|---|
| Measures Brothers & Co., London | 466 0 0 |

*Granite.*

| | |
|---|---|
| A. Macdonald & Co., Aberdeen [Four tendered.] | 505 10 0 |

*Residence and Stables, Monkton Coombe.*—Messrs. Pack Bros. write to say that the amount of their tender was £4,478, not £4,378 as stated last week.

*Lists not couched for by Senders.*—We have received, in an envelope bearing the Reading post-mark, a list of tenders which is not accompanied by the name and address of the sender, and which is therefore excluded. The attention of correspondents is respectfully requested to our standing notice that all lists of tenders and other communications must be accompanied by the name and address of the senders,—not for publication, but as an earnest of good faith. Non-observance of this rule on the part of correspondents frequently compels us to omit communications of importance.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

## TO CORRESPONDENTS.

C. E. D.—W. G. S.—W. G.—H. & C. D. & Co.—H. B.—A. B.—J. J. R.—S. J. N.—R. P. C.—W. B. (had better lay his complaint before the Vestry.—W. H. H.—E. G.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read a public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR: all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

## PUBLISHER'S NOTICES.

### CHARGES FOR ADVERTISEMENTS.

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# The Builder.

Vol. XLVII. No. 2174. Saturday, October 4, 1884.


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### *Sanitary and Realistic Dublin.**

WITH the exception of a few leading thoroughfares and squares, decay and dilapidation are making marked progress, not only in the very heart of Dublin, but in once fashionable districts north and south of the Liffey, on the borders of the old municipal boundary. Trade has completely deserted many of the streets where it flourished a quarter of a century ago; wealthy merchants and prosperous traders have disappeared in scores from their old haunts, and their extensive premises have undergone strange transformations, to suit the exigencies of a smaller class of traders, who, in many instances, are engaged in a life-and-death struggle throughout the year to keep their heads above the water. The seat of the Vice-Regal Government even is getting hemmed in by decayed streets of houses which threaten at no distant date to form a complete cordon round Dublin Castle, if no industrial revival takes place in the meantime to check the downward ruin that appears to be steadily making headway. The only redeeming feature to the dismal picture is in the growth of the townships and suburbs north and south of the city,—but particularly on the south side,—to which places many hundreds of the well-to-do families, who formerly resided in private streets in the city, have removed. Many of the city traders and shopkeepers who have lost their best customers still struggle on, while many more have followed in the wake of those who patronised them, and commenced business in the fashionable suburbs. The taxation in the city is very high, and the Corporation, partly conscious at least of the tide of decay that is setting in, or has already set in, have been contemplating for some time past the obtaining of powers to absorb some of the more immediate townships in a new city boundary, and of rendering the well-to-do inhabitants of these localities amenable to city taxation. It is argued that a large number of the township residents derive their income through business and appointments in the city, and that they should be made to contribute to the cost of the administration and improvements necessary to its well-being. The spectacle of a rapidly decaying capital is anything but a cheering sight, particularly when the decay is real and manifest. Several plagues from the thirteenth to the nineteenth century made their appearance in Dublin, including the two serious cholera visitations of 1832 and 1849. We are told of one which occurred in the sixteenth century which was so severe that the majority of the inhabitants and their rulers took flight into the suburban districts, some of the people even removing to small islands in the bay. Grass, says the historian, grew in the streets of the city, they became so desolated; but we fear there is a likelihood of grass again growing in the streets of Dublin without the intervention of any epidemic, but through causes we have indicated. It is a thousand pities that a city still reflecting in the architecture and art of her old public buildings the grandeur and prosperity of a happier era, should be so stricken with the paralysis of decay. Dublin, unlike what she was of old, has now little trade, her greatest industries being the manufacture of whisky and porter, and unfortunately her own sons are among the greatest consumers.

In some former notes we alluded to the wretched condition of the tenement houses of Dublin, and to the need of a class of dwellings suited to the wants of the very poor, comprising a large and very miscellaneous class of workers of both sexes, many of whom eke out life by uncertain employment. It is but justice to the Superintendent Medical and Executive Officer of Health, who is also City Analyist, to say that he has more than once urged upon the Corporation the necessity of providing dwellings for the poorer classes, mainly because the Public Health Committee, by its action, led to the clearing of many hundreds of houses within the last few years which had been totally unfit for human habitation.

The leases of some Corporation property in a locality in the north-west part of the City having recently fallen in, a clearance of an area of houses of a very bad kind was determined upon, in view of carrying out a street improvement. On a portion of this cleared area in Barrack-street the Corporation have agreed to erect a block of dwellings for workmen of the poorer kind. A loan of 50,000*l.*, for the purpose of providing dwellings has been sanctioned by the Civic Council, and it was proposed to expend a sum of 25,000*l.* this year. Municipal intentions are sometimes very good, but Corporate projects take a long time before they are realised in Dublin. New street openings and improvements promoted several years ago are not practically begun yet; still, we shall be pleased to hear of the commencement and completion of the proposed block of workmen's dwellings in the Oxmantown district, with a repetition of the same work for other poor quarters of the city north and south.

Forbidding-looking and barrack-like blocks of houses have been erected for workmen by artisans' dwellings companies some time back in Buckingham, Echlen, and other streets in the northern and southern parts of the city, but from an examination of them we can say little in their favour, either on the score of room-space, comfort, or amount of rent. The houses, however, erected on the area cleared in the Coombe district, and leased to an artisans' dwellings company, form an exception to the usual class of industrial dwellings. On this area are built four classes of houses,—one-story cottages, containing one living-room and one bedroom; cottages containing one living-room and two bedrooms; two-story cottages, containing two living rooms and two bedrooms; and again some containing one large sitting-room and two bedrooms. The first two classes are built of Portland cement concrete, the front walls being 8 in. thick. The third kind have front walls of red brick, and partitions and yard walls of concrete; and the fourth class have front and end walls of brick, and the remainder in concrete. Sanitary accommodation and other requirements have been fairly provided for in the houses erected on the Coombe area. For the two classes of one-story cottages, the rents charged are respectively 3s. 6d. and 4s. per week; 6s. 6d. and 7s. for the four-roomed two-story houses; and 5s. 6d. for the three-roomed houses. Six out of the 210 houses in this area are used as shops, and the remainder by tenants of various trades and callings. The rental received for these 202, excluding those used by caretakers, is 2,680*l.* per annum, and we were informed that bad debts are practically non-existent.

The Coombe district before the commencement of the present century was a prosperous locality, occupied to a great extent by silk and cloth merchants, and a thriving weaving trade flourished there for many years, founded by a Huguenot settlement. This south part of old Dublin has gradually decayed, and ruin and squalor are now widespread over a district once ripe with opulence and trade. The clearance made for the erection of the cottages we have described has led to the improvement of that particular portion of the district. Some years ago the Government valuation of the Coombe area was only 424*l.*, and average total rates paid yearly, taking the three years ending in 1878, amounted to only 63*l.* At present the valuation is 1,429*l.* 15s., and the total rates paid in 1883 am unted to 611*l.*

The clearances of areas for improvements are costly not only in London, but, allowing for the altered condition of matters, in Dublin they are also costly. Preposterous claims are put forward by landlords and tenants in respect to a class of house property which, if the Sanitary Acts were rigidly enforced, would have been

* See p. 371, *ante*.

declared unfit for habitation. A nominal sum would be amply sufficient compensation for a large number of landlords who own wretched tenement property, and who systematically neglect for years to expend a shilling in repairs or in the abatement of the nuisance their neglect occasions. Another unhealthy area, known as the Plunket-street area has recently been cleared by the Corporation, and is ready for building operations. A portion of this area could also be utilised for the erection of workmen's dwellings or houses for the very poor. Over-crowding exists still to a considerable extent in tenement houses, and particularly in the houses in back streets, lanes, courts, and alleys north and south of the Liffey. The large back offices, coach-houses, lofts, and stable buildings attached to houses that were once and not many years ago occupied by wealthy private families have in various quarters been converted into dwellings, and are tenanted by the poor. The passers-by in the front streets are, for the most part, unconscious of colonies of such a class of poor dwellers in their midst, yet in whilom stable buildings many hundreds of these vegetate and die, starving on one meal a day, and hiding their rags on Sunday. Indeed, the old proverb is still true to the letter, that "One-half of the world does not know how the other half lives"; and in many cases we fear we might add, does not care to know.

The Artisans' Dwellings Company, we may observe, are erecting a large number of cottages, having procured sites at Portobello, Harold's Cross, and Rutland-street. We examined a number of these short streets of cottages situated on the banks of the Grand Canal at Portobello. Some of these two-storied cottages have only three rooms, one on the ground-floor, and two above. The four-roomed cottages are 8s. per week, and the three-roomed 6s. The walls are chiefly of concrete, the fronts alone being of red brick. Though an improvement on the ordinary class of tenement dwellings, we consider these cottages are deficient in necessary domestic accommodation in respect to wash-houses, scullery, &c., provided in industrial dwellings in London and suburbs. The rents are also two high for the accommodation provided, and this is particularly the case in respect to the three-roomed cottages. We do not admire the planning of these cottages. When the door is opened (we will not say hall-door, for there is no hall), the fireplace, and nearly the whole room, is exposed to the sight of each passer-by without. It is somewhat remarkable that Irish cottage dwellers, whether living in the streets of a town or in a straggling country village, are fond of keeping their front-doors open even after nightfall.

Considering the very large number of tenement houses that exist all over the city, once in the occupation of private families, the question may be asked, is it not possible to make structural alterations in hundreds of these houses, and fit them for the needs of the industrial and working classes? Without any expensive structural alteration, save by the provision of necessary sanitary accommodation, a large number of these tenement houses could be made suitable for the healthy and comfortable habitation of the industrial poor. Of course there are hundreds of these tenement houses so dilapidated, and so fouled and impregnated with the seeds of disease, that no system of reparation could effect their cure. As they are a standing menace to the public health, their demolition is called for. The number of houses unfit for decent habitation in Dublin probably falls little short of 10,000; and in respect to these a very moderate estimate of the number of persons contained in them would run the figures up to 100,000. If even this number of persons have to be housed in a healthy manner, what machinery exists for doing it? Is the Corporation of Dublin willing to do its share in the work of properly re-housing the poor? When, we would ask, will the Artisans' Dwellings Company meet the urgent want? This company tells the public that when they have completed their present arrangements they shall have covered with buildings nineteen acres of ground, and accommodated nearly 6,000 persons. It would take a dozen of artisans' dwellings companies working for several years to provide for the admitted want; but, at the same time, it is not desirable that Dublin should be converted into a city of artisans' dwellings, and that the Corporation and citizens should close their eyes to the fact that miles upon miles of streets of well-built private houses and mansions have drifted and are still drifting into use as tenement dwellings. It behoves the Corporation of Dublin, as a body, to grapple with the difficulty in respect to this decaying class of house property, and to see that it is utilised in a sanitary way by the new and jobbing class of landlords who have and are obtaining possession of it. There are a number of respectable citizens and traders who say it is madness to encourage the operations of artisans' dwellings companies while such a mass of house property as we have indicated is not utilised to some extent for the healthy habitation of the people. For ourselves, we would not discourage, but rather favour, the erection of well-planned artisans' and labourers' dwellings here and there in the city and on its borders, but we are decidedly of opinion that persistent efforts should be made on the part of the municipal authorities to keep the city respectable. If streets of houses must drift into tenement dwellings, surely, under their new conditions, the Corporation can make their landlords keep them in a habitable state and provide the necessary sanitary requirements of civilisation for their occupants? It was more than once, during our visits to the homes of the poor, pointed out to us that certain members of the Corporation or the Public Health Committee were also shareholders in the Artisans' Dwellings Company, while others were large owners of low tenement house property, and that it was incompatible with the proper exercise of the public duties of those members that their private interests should enter into the question of housing the poor.

According to a sanitary survey of the city made in 1882, at the instance of the Executive Officer of Health, it is stated there are in Dublin 7,284 houses occupied by two or more families coming under the denomination of tenement dwellings. In addition there are 6,000 small houses, houses in the yards of larger houses, and cottages occupied by the poorer classes, said to be subject to periodical sanitary inspection. There are 88,116 rooms in the tenement houses, and they are occupied by 32,202 families, or more than three-fifths of the total number of families in the city. According to this enumeration, the greater number of families in Dublin occupy each one room and a half on the average. These figures are suggestive indeed, and their bearings and results are obvious. There is, however, good reason for believing that the above figures are a good deal under the mark, and that the evils they point to are more widespread. It may be well to add here that the municipal districts, or city of Dublin proper, comprise an area of 3,754 acres, and at the date of the census in 1881 contained a population of 249,602, or, estimated up to the middle of last year, about 250,557, being at the rate of 65·8 persons per acre. In 1881 the city was returned with 24,211 inhabited houses, 3,060 uninhabited houses, and only 316 in course of erection, making a total of 27,587 houses.

Within the last few years a considerable improvement has taken place in the general drainage of the city, long lengths of new sewers being constructed to replace the old and most defective ones that existed, but the house drainage in sundry places north and south of the Liffey is very bad, and in spots non-existent. In the northern and southern suburbs a low-class speculative house property has been run up, and operations are still proceeding. We fear that the erection of these buildings obtains very little inspection on the part of the local authority. We found bad materials and workmanship, and also scamped drainage in abundance. The Building Act appears to be violated in several instances, even within the municipal boundary. These houses are made to assume a "neat and genteel" appearance in their fronts to catch the eye, but a skeleton lurks beneath. An improvement has taken place in the matter of the domestic scavenging of Dublin, and a large number of the yards or courts of the tenement houses of the city are cleansed daily, but there is much to be done still in this direction and in the general cleansing and scavenging of the town. During the late year scarlet fever and whooping-cough assumed serious proportions; indeed, the former disease has often ravaged Dublin, where it periodically presents an epidemic form. It has proved a formidable malady in London and other great cities, we must admit, as well as Dublin, but the causes of "filth diseases" are not occult, and they were heretofore, to a great extent, traceable, to sanitary neglect in the Irish capital. Besides the carrying out of a well-devised system of main drainage, including the purification of the Liffey, much sanitary and improving work remains to be accomplished by the Corporation, if decay is to be arrested, disease stamped out, and the capital once more made worthy of the country.

## ANTIQUITIES FROM SAN.

MR. FLINDERS PETRIE has brought safely home the first and more portable section of his remarkable find at San, — the site of which is some twenty miles south-west of the modern Port Said,—and the Egyptian Exploration Committee may congratulate themselves on the result of his labours. Some hundreds of small articles are on view at the rooms of the Archæological Institute, in the Oxford Mansion (near Regent-circus, on the site of what was Oxford Market), and are open to inspection on the presentation of an address-card. The visitor may be so fortunate as to find Mr. Petrie at the Institute, and will have the benefit of his stores of knowledge on this most interesting subject. The articles are not arranged in chronological order, but in groups as they were discovered. They consist of charms, domestic utensils, and personal adornments,—many of them very minute in scale, most of them of rare beauty, and all of the greatest interest. They were found at depths varying from 20 ft. to 30 ft. from the surface, and their separation from the *débris* in which they have lain for centuries must have been a work of great care and nicety. By far the most beautiful amongst the objects displayed are the glass mosaics, exquisite alike in design and colouring, and so microscopic in their dimensions as to be only properly seen by the aid of a magnifying-glass. Next to these in attractiveness are the small silver figures, worn as charms, modelled with extreme delicacy. After these the terra-cotta fragments, adorned with ornament in relief, of which the vine-leaf is the most prominent feature, must be classed. Some terra-cotta pateræ of several colours, arranged in geometrical designs, are extremely interesting as art, and interest deepens into wonder when we learn that they date from about the year 1200 B.C. The treasures found in one house comprise a statuette of its owner, Bak-akhu-in, who was evidently an art patron and æsthete of the period. In particular, a bronze lamp, with a long curved neck, for suspension from the ceiling of his house, may be noted as an evidence of his taste.

Of greater interest to the architect than trinkets, however rare or beautiful, is a bronze window lattice, which is believed to date from the fifteenth century B.C., and to be the only one of the kind hitherto met with of so early a date. The fragments are arranged to show the general design, and measure, as so disposed about 18 in. by 9 in.; but there are portions of the same lattice laid loosely about, which, if pieced together, would form a much larger panel. The sides and one end only have been discovered, and it is evident that this identical panel was a very long one. Hence the suggestion that it was placed along the upper portion of the enclosing wall of a hall or other apartment as an internal screen to the "clearstory" by which such apartments in Egyptian structures were lighted. The pattern is a mere reticulation of thin flat bars placed at an angle of 45 deg. with the enclosing frame. The bronze

nails by which it was attached to a wooden frame are laid beside it. Indeed, nails of all sorts and sizes, and bearing a strange resemblance to their modern counterparts, form a considerable portion of the exhibition, and divide the attention with keys, hasps, and staples,—one of the latter specimens having a knob to receive the blows of the hammer, and protect the eye from being bent out of shape.

Amongst the exhibits are some small bronze capitals, probably connected with a shrine or similar structure. They are quite destitute of ornament, and resemble the iron capitals at the Oxford Museum to which the wrought-iron ornament is affixed. The mouldings are not in the least suggestive of Egyptian work, and are, in fact, without any character at all. Other fragments of architecture are adorned with incised ornament of delicate design and workmanship, or with applied decoration in the form of glass mosaic.

A glass lense, some 2 in. or more in diameter, is held to be a great rarity, and the glass and porcelain objects generally, both in respect of the shape and colour, are of exquisite beauty.

A quantity of cloth ornamented in simple colours (in which red predominates), and which clearly shows the aptitude of this remarkable people for art in all its forms, is disposed about the rooms, and the gentlemen who are distressed at the failure of the Chinese hair-crop (*vide* the *Times*) may be curious to see a specimen of human hair 2,000 years old, which belonged to the lady whose cerements were furnished by the cloth in question. The hair is long and wavy, of a rich auburn colour, and apparently as perfect as when its owner proudly wore it. There is no end to the themes for wonder which this collection provides. Mr. Petrie is about to return to Egypt for the terra-cotta, granite, and other specimens which form the bulkier part of his collection, and which will probably find its way before long to the Egyptian section of the British Museum.

If we might venture upon a suggestion in the re-arrangement of these curiosities, it would be that the dates of the several objects should be stated in figures, and not by references to dynasties. Outside the charmed circle there are not many wondering spectators who can attach any meaning to dates concealed under such dynastic hints ; and it is the extreme antiquity of many of these objects which constitutes their claim upon general attention. By all means let the learned keep to their own occult system ; but let their weaker brethren have the benefit of a translation of the otherwise insoluble chronological enigmas.

## NOTES.

AN exhibition of Women's Industries is to be held at Bristol early in January. The idea of the promoters, we are told, is to bring together specimens of work requiring skilled training, so as to illustrate the part taken by women in various arts and manufactures demanding special technical and artistic training, professional and not amateur work being desired. Among the class of exhibits which it is desired to exemplify are painting, sculpture, wood-engraving, wood-carving, modelling, designs for articles of household furniture, designs for decorative work generally, and for textile fabrics, lace, needlework, &c. The loan of ancient needlework and of other articles "representing the occupation of women in past times" is also invited ; and it is hoped to form a loan collection of portraits of eminent women, and relics of interest connected with them.* The special motive for all this appears in the footnote to the prospectus of the exhibition, stating that the proceeds derived from the exhibition will be handed to "The National Society for Women's Suffrage,"—for the promotion of women's suffrage, we presume, is what was intended to be said. That the exhibition will excite a great deal of interest, and contain much that is worth looking at, we have no doubt. As far as the more distinctly artistic side of the programme is concerned, however, the subjects of painting, sculpture, engraving, &c., we can only repeat what we have said before in reference to the female art-exhibitions in London, that no good is done either to women or to art by any endeavour to set up art-exhibitions for women alone. The few women who have really achieved a high place in the higher arts have contended with, and prefer to be ranked with, other artists, without distinction of sex ; and all the women's art-exhibitions we have hitherto seen have resulted in a display of artistic mediocrity. If women have attained sufficient power in art to take a high stand in it, let them do so as artists, not as women. If they have not attained such power, they have no right to expect compliments for their efforts merely because they are women.

* Communications in regard to the Exhibition are to be addressed to the Hon. Secretaries of the Exhibition of Women's Industries, 20, Park-street, Bristol.

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AT a meeting of plumbers in reference to the proposed plumbers' conference, reported in another column, it was remarked that an ordinance of Edward III. had provided that no one should meddle with such a trade unless he had the testimony of the best and most skilled men in the city that "he could well and completely do his work." The feeling of the meeting was that such an ordinance, now practically obsolete, was exactly what was wanted in the present day. Many persons will no doubt entirely approve, as we do, of the attitude taken by the plumbers' meeting in that respect. But it is, as Pepys would have said, "mighty curious" to see how plumbers may take such a line with the support of outsiders, while architects, if they attempt, through their representative corporate body, to protest against incompetent persons being employed on architectural work, are only regarded with indifference or twitted with self-interested motives. The inference is that the public care about plumbing, but do not care about architecture.

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A PAPER has been recently read before the French Engineering Society on "Ancient Metallic Architecture," by M. Normand, the architect who restored the Vendome Column, the subject of which was the employment of metallic architecture before the Christian era. He shows that there are evidences of its use, not only in the details of public and private edifices, but also in the erection of buildings in which almost the whole structure was of metal. Columns of iron and bronze were used in many of the Assyrian and Jewish monuments, and some metallic beams of the Roman Pantheon were remaining in the sixteenth century. Metallic joists and terra-cotta panels were also used in ceilings, much as they are in modern buildings.

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WE have received a revised edition of the "Practical Suggestions" made by Sir Robert Rawlinson, C.B., and issued by the Commissioners in Lunacy, in reference to the sewerage, drainage, water-supply, &c., of lunatic asylums. These suggestions have been carefully rewritten by the author, and, as may be inferred, they contain a great many useful and necessary rules applicable to town-houses and public buildings other than asylums. It may be noted that an outlet-sewer for the largest asylum need not exceed 12 in. if of earthenware, and 9 in. if of cast-iron. The Commissioners, from their experiences, stipulated "No brick sewers. No sewer larger than 12 in. diameter." Sewers larger than necessary are not only more costly, but they are in a degree mischievous, as liable to accumulate silt. There are large houses in the country, —and in towns also,—built, say fifty or a hundred years since, under which there are brick sewers 5 ft. high by 3 ft. 6 in. wide, flat-bottomed, and branch barrel drains of brick, rude in construction and porous as to material, from 3 ft. to 12 in. Rats swarm in all such sewers and drains. In small well-formed sewers of earthenware or cast-iron pipes, rats cannot exist. The presence of rats about dwelling-houses, either in town or country, is generally a sign of defective sewering and draining, and means bad health to the occupants.

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THE old moss which is found in beds of more than 1 ft. thick in various places in Norway and Sweden has been found to be an excellent material for the manufacture of paper, even in its half-decomposed state, and cardboard has been made from it, some leaves of which are ·787 in. in thickness. It is as hard as wood, and can be very easily dyed and polished. There is no reason indeed why this product should not in some cases be substituted for wood with advantage, for it possesses all its good qualities and none of its defects, and can be used in the manufacture of doors and windows, cornices, and many ornamental portions of a house, while under the hydraulic press it receives a consistency and power of resistance far superior to those of straw-board.

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M. CHAMBERLAND, the director of M. Pasteur's laboratories, has been endeavouring to find, for the very delicate experiments carried out by M. Pasteur, a filter which will absolutely purify water of all, even the most infinitesimal, germs or "microbes." He claims to have found it,—and we may place every reliance on testimony coming from such a source,—in the shape of a biscuit porcelain tube through which the water is slowly forced under pressure. The following further details are extracted from M. Chamberland's account of the filter :—"All previous forms of apparatus called filters, invented up to the present time, have been confined to clarifying the water ; that is to say, they retain matters in suspension, but do not in any way arrest the morbid germs contained in all liquids. Water, filtered by M. Chamberland's process, is the same as when taken fresh from the spring ; spring water being, as is well known, absolutely free from microbes. This filter may thus be said to constitute a spring at home. The apparatus consists of a tube of biscuit-baked porcelain, closed at one end, and having at the other an enamelled porcelain ring in it, with an aperture for the discharge of the water. The tube is placed in another metallic tube, which screws on to the top, soldered to the water-pipe. A nut placed at the bottom of the apparatus, and screwed up by hand, allows of the space between the metallic and porcelain tube being hermetically closed by the aid of an indiarubber washer attached to the enamelled ring. When the tap is turned on the water fills the vacant space between the metallic and the porous tube, or filtering-rod. It filters slowly under pressure from the outside to the inside, by these means being relieved of all solid matter, including any microbes or germs it might contain. With a pressure of about two atmospheres one obtains, through one single porous tube or filtering-rod (8 in. long by 1 in. diameter), about five gallons of water per day, which seems to be sufficient for the ordinary purposes of a household. The greater the pressure the more filtered water can be obtained. By multiplying the number of rods and coupling them together in batteries it will be easy to obtain the water-supply necessary for schools, hospitals, barracks, hotels, &c."

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LAST week we witnessed a trial, at the Health Exhibition, of Fyfe's patent "columnar valve" hydraulic ram, which claims, by the arrangement of the valves and their adjuncts, to obtain the greatest possible result with a minimum of head. Upon the occasion of our visit, two of these rams,—one a double-action and the other single,—were arranged with falls of 5 ft. and 1 ft. respectively, and the delivery-pipes were carried to the top of one of the highest buildings in the grounds. With the greater fall a lift of 92 times the head was attained, whilst 157 times the fall was recorded with the minimum head. Again, with a fall of 5 ft., and an expenditure of twelve gallons of water, 1,592 gallons per minute were raised to a height of 42 ft. We are not prepared to endorse the confident statement of the inventor that these machines "are able to raise water to almost any height, and from any place where a few inches of water can be obtained," because there are many conflicting circumstances in

connexion with placing these motors that would not prove so favourable as those under which we saw them. Nevertheless, we fully believe that an average lift of 60 to 70 times the head may safely be depended upon, and in some cases even greater. The action of the ram is exceedingly regular, and the valves are guaranteed to last four years, with which exception the machines will work automatically for a considerable length of time.

A GERMAN mechanic has discovered that damp parchment paper, when strongly compressed, forms a homogeneous and unctuous material, which has great rigidity and toughness. Observing that when exposed by its cut edges to the friction of a smooth metallic surface it undergoes but an insignificant amount of wear, he took out a patent for the manufacture of journal boxes from compressed parchment paper, one great advantage of this being that lubrification can be produced by water alone. A slight greasing with oil is sufficient to prevent rust.

THE report of the Medical Officer of Health for Clerkenwell for the past year, which has been forwarded to us, contains very bitter words against the Home Secretary and Sir Charles Dilke, the latter of whom has called Clerkenwell a retrograde parish, while the former has expressed a general want of faith in vestry government and (apparently) in that of Clerkenwell more particularly. The report includes a handbill which the vestry drew up when cholera was considered imminent, earnestly advising the inhabitants to take certain precautions specified, all of which appear to be proper and needful cautions; 10,000 of these were distributed, arrangements were made with the Local Government and the Hospital Boards for hospital accommodation and ambulances, and a map was prepared showing where cases would be received in the event of an outbreak. "Fortunately, we have so far been spared; yet the arrangements are still in order. How, in spite of what was then done, and what has always been done, under similar circumstances, Sir William Harcourt could assert, in the House of Commons, that in the event of an epidemic occurring in the metropolis, there was no uniformity of action and no central guiding power over the vestries and local Boards, seems to me only intelligible on the plea that he is a special pleader in a cause." The vestry have, perhaps, some right to feel ill-used; but their statement does not prove that there was a central guiding power, but only that, in their opinion, they did not require one.

IN regard to the taunt about the "retrograde parish, the medical officer of Clerkenwell makes some statements as to the real foundation for the charge, which may be worth the attention of those who legislate for the poorest class of house property and tenants. He says, —"For some years past many of the well-to-do residents of the parish have been gradually leaving their houses, which become occupied by a poorer class of people, many of the houses which were formerly held by one family being now let to several. When these poorer and rough people, especially the labourers, enter a house, at once begins a course of dirt and destruction. The locks and handles of the doors become toys for the children, and are soon demolished. The drain-traps are sold at the bone and bottle shops, those left are never kept on, the closets are stopped up and the pans are broken. The chimneys are never swept, so that the rooms become black and disfigured. The paper is torn off the walls, the floors and passages are never washed, and there are no door-mats, so that the whole place becomes a mass of dirt and destruction. The water-butt lids and the dust-bin lids are used for firewood, the ball-cocks are broken off, so that there is great water waste, which floods the yards and washes away the cement from the paving. The very handrails of the staircases are broken away, and even the walls are picked out with nails, or something of the kind, so as to leave large holes. The windows are constantly broken and stopped up with brown paper; in fact, there exists in every parish a juvenile window-breaking club, the members of which demolish every pane of glass they can, especially in empty houses." With such a class of tenants (and we suspect the account is not exaggerated) the prospect of being otherwise than a retrograde parish is certainly, as the Report observes, "not favourable."

A RECENT number of the "Transactions of the American Society of Engineers" contains some notes by Mr. E. B. Dorsey on "the comparative liability to, and danger from, conflagrations, in London and in American cities." The fire average of London, it appears, is very low as compared with that of New York (taken as a representative American city), and Mr. Dorsey was at first under the impression that the difference must be due to the superior efficiency of the London Fire Brigade. Further investigation, he says, led him to the conclusion that the American Fire Preventive Service was not inferior to the English, but that the circumstances were very different. The damp climate and consequent saturation of wood in London is an element in reducing the liability to fire; and, in addition, the author gives the following list of favourable circumstances in London :—

"1st. The small size of most of the houses, which confines the fire to a very limited space between brick walls.

2nd. The low, strong and well-braced walls, which enable the firemen to approach them without danger.

3rd. The high and effectual fire-walls between adjoining houses.

4th. The great benefit derived from the houses being low and small, enabling the firemen to throw water easily all over them, and with a very short ladder to reach the roof. And also avoiding the great draught drawing the fire up the stairways and wells of high buildings.

5th. The use of more brick and less wood in buildings.

6th. Absence of all frame buildings.

7th. Absence of all wooden additions, outbuildings or fences.

8th. Fire-proof roofing.

9th. Absence of ash barrels or boxes.

10th. The moist or wet climate, which prevents sparks or weak flame from igniting wood.

11th. The parks and Thames river, which divide the city into distinct fire divisions.

12th. The numerous parks, squares, private grounds, wide streets, railroads, &c., all of which are effectual barriers to the extension of fire.

13th. The mildness of the winter climate.

14th. The great care of the authorities in prohibiting the manufacture or storage of combustible materials, &c., in the populous portion of the city.

15th. The very few telegraph wires in the streets above ground to interfere with the work of the firemen.

Contrast the preceding with New York, with its numerous wooden buildings, wooden or asphalt roofs, buildings from four to ten stories high, with long unbraced walls, weakened by many large windows, containing more than ten times the lumber the average London house does, and that very inflammable, owing to our dry and hot climate; the five and six-story tenement houses, with two or three families on each floor, each with their private ash barrel or box, kept handy in their rooms, all a-rivingto keep warm during our severe winters; the narrow streets and high buildings, with nothing to obstruct the spreading of a fire except a few small parks; the perfect freedom with which the city authorities allow in the most populous portions of the city large stables, lumber-yards, carpenters' shops, and the manufacture and storage of inflammable materials; the absence of high or effectual fire-walls between buildings."

## NOTES AT THE IRON AND STEEL INSTITUTE MEETING.

At the autumn meeting of the Iron and Steel Institute held this year in Chester, the "visits and excursions" were really the principal features of interest. Of these probably the most interesting excursions were the visits to the salt-mines at Northwich and the Weaver navigation. They were taken on the Thursday, and the Festiniog Railway and slate quarries, on the following day. A few years ago the Flint Alkali Works would also have afforded a point of great interest as a part of the programme, but the great changes that have been for some time taking place in this industry have shifted the centre of attraction to another spot. The proprietors of those chemical works that would afford information of the greatest interest and value to the chemist and engineer are keeping their doors resolutely shut, and indeed most carefully guarded, being fearful no doubt that prying eyes might discover a means of sharing in the enormous profits that are now being made in this branch of industry.

Amongst the establishments open to the inspection of members during the week were the well-known lead works of Messrs. Walker, Parker, & Co., and also the Hydraulic Engineering Company's shops.

At Saltney were to be seen Messrs. Wood's anchor works. At this establishment some of the largest anchors in the world have been produced in times past, those of the *Great Eastern*, the largest of which weighed 7 tons, each, having been forged here. Messrs. Wood have now in hand the anchors and chain cable of the last new Cunard liner, so they can claim to have made the holding tackle for the two largest ships that have ever been built.

The Dee Oil Works, which are also at Saltney, are well worth a visit. Here may be seen the process by which petroleum refuse is made into lubricating oil, by means of distillation and filtration. This company makes a special feature of manufacturing that particularly fine description of oil required for certain classes of textile machinery. In order to make a lubricant fit for cotton spindles every particle of paraffin wax must be extracted, and this can only be done effectually by subjecting the mixture whilst in the filter press to a very low temperature in order to solidify the softer wax. At the Dee Oil Company's Works there is an important installation of refrigerating machinery on the ammonia system, which is used for this process. The wax expressed is made into candles, the part of the works set apart for this purpose forming an important branch.

The Sandycroft Foundry and the Mostyn Ironworks were also open to inspection. The former is about five miles from Chester, and well worth going to, especially for those interested in mining affairs, as the Sandycroft firm devote their attention principally to mining machinery. The Mostyn Ironworks are twenty-one miles away, and are small and unimportant compared to the vast establishments of South Wales that were recently visited by the Mechanical Engineers during their summer meeting. The Mostyn works are, we believe, engaged solely in the production of Spiegeleisen.

From our own special point of view the lead works and hydraulic engineering works were of the most interest.

The firm of Joseph Walker, Parker, & Co., has works at Chester, Newcastle, Liverpool, Glasgow, Bagillt, and London, most of which are establishments sufficient in themselves to constitute a fairly important business. The Bagillt works are situated in North Wales, on the estuary of the Dee, and about seventeen miles from Chester, on the Chester and Holyhead Railway. Here the first processes of procuring lead from the ore are carried on by means of smelting in ordinary reverberatory furnaces after the manner usually followed in North Wales. There is at these works a flue of rather larger size than is usually met with. It is somewhat under two miles in length, and is arranged in a continuous spiral on a conveniently elevated plateau at the back of the works. It is built of brick in the ordinary way, and is of oval section, 7 ft. high, and 6 ft. across in a horizontal direction. Into this flue are led all waste furnace gases which have been brought in contact with metal in process of reduction. The flue-dust which is carried over with the smoke and products of combustion is deposited during its passage through the long winding flue. The latter, at stated intervals, is flushed by water when the flue dust is carried through and is collected by allowing it to settle in large ponds made for the purpose. The sediment so obtained contains 55 to 60 per cent. of lead. This, under the old system, would have been impartially distributed over the adjoining land to the complete destruction of any crops that might have been attempted to have been grown in the immediate neighbourhood. At the present time such vegetation as is to be seen is as green and pleasant as it can be expected to be within a short distance of a manufacturing centre. The large flue naturally occupies a great deal of land which is, perhaps, not an object of great importance at Bagillt. The principal difficulty in an arrangement of this nature is to get the dust to settle without at the same time sacri-

ficing the draught required for the furnaces. At these works there is a chimney over 250 ft. high and 12 ft. in diameter, and the additional height required to compensate for so long a flue must be considerable. We do not know whether there is any special reason why the necessary space required for the settlement of the flue-dust should not take the form of large chambers. These would occupy far less ground, whilst the rapidity with which the fumes would travel would be far less. Naturally in a flue which has the same sectional area throughout the gases will travel at approximately the same speed, and it is this speed which delays the deposition of the suspended particles of dust. Possibly, too, if chambers were used a better means of abstracting the flue-dust than the somewhat primitive one of flushing by water might be devised.

The furnaces used for smelting lead are generally about 20 ft. long and about 10 ft. wide. There are doors on each side, and the hearth is made up of slag. About a ton of ore with 2 cwt. of flue-dust is the usual charge at Bagillt. The reduction is by air, the furnaces in which ordinary coal slack is burned being placed at the sides and delivering the flames above the charge on the hearth. As the metal forms during the process, at which time the charge is well worked by hand, it flows towards the tap-hole and ultimately runs out and is cast into pigs. About ten per cent. of the metal remains in the slags left after the first working. In order to recover as much of this as possible the slag is worked up again, and in this way a hard inferior description of lead is obtained. There is an exceedingly well-arranged desilverising plant for the zinc process at Bagillt, which has recently been erected under the superintendence of Mr. W. M. Hutchings, the manager. The melting-pots are 3 ft. 5 in. in diameter. This plant is capable of producing over 600 tons of lead per week, whilst the annual output of silver at these works is about 13 tons a year. Litharge and red lead are also made in large quantities at these works. Red lead is, as is well known, an oxide of lead. The first process of manufacture is carried on in "drossing-ovens," of which there is a large number at Bagillt. These are of the ordinary bee-hive form, with a rather high dome in which the smoke and gases from the furnace collect until they pass out at the working door and are carried off by an uptake conveniently placed. The pigs of lead are melted on the floor of these ovens, the molten metal being kept from running out by a dam composed of the refuse from the last working. Antimony is introduced into the bath, and the whole is kept agitated by hand-rakes. In process of time,—about six hours,—the greater part of the lead has become oxidised, and the remainder is allowed to run away to be recast and used again. The "dross" is left in the oven and kept at a high temperature, and is then ground and levigated, after which it is subjected to further oxidation in other ovens in order to improve the colour. After a further process of levigation and grinding the material only requires drying in stoves in order to become the red lead of commerce.

Sheet lead is rolled at these works, there being a rolling-mill capable of producing sheets up to 100 in. wide. A pair of cast-iron rollers, 33 in. in diameter, are mounted in cast-iron standards, and have a long bench with loose rollers on each side for working the sheets upon. There are also a couple of live rollers worked by spur gearing, close to the mill on each side, for the purpose of feeding-up the sheets. The rolls are driven by a separate engine, and the reversing is effected by a clutch gearing on to the bottom roller, which is the driven one, the top roller running loose in its bearings. When a sheet has to be rolled a slab of metal is cast, and a piece of the necessary weight, according to the gauge and area of the sheet required, is cut off. This is passed through the rolls whilst quite hot, and is gradually reduced in thickness and extended in area as the operation proceeds, until finally it becomes the familiar sheet-lead which is used for such a large variety of purposes. At each pass the top roll is brought closer to the other, its journals and their bearings being lowered in the framing by suitable hand gearing.

At the Chester Works of this firm white-lead making, pipe-drawing, and shot-making are the principal occupations. The shot are dropped from a tower in the ordinary way. The globule of molten lead assumes its spherical form as soon as it leaves the perforated tray, known technically as a card, through which it is allowed to percolate, and hardens during its descent, when it is finally caught in vats containing water, in order to prevent injury through falling from so great a height on to any hard substance. Larger shot are cast in moulds. At the Chester Works there is a large plant for drawing lead-pipe, consisting of several hydraulic presses and the necessary gear for working them.

A press for making solid drawn lead pipe consists firstly of a hydraulic ram and cylinder, the former pressing upwards in a vertical line. On the upper part of the press there is a cylindrical vessel with which molten lead is poured and a die of the same diameter as the pipe to be drawn is then firmly wedged into the upper part of this cylinder. An iron core of smaller diameter than the hole in the die is placed concentrically to the latter, and an annular space is thus obtained, through which the lead is forced by means of the head of a ram which fits the bottom of the cylinder containing the lead. It will be manifest that the outer diameter of the pipe is regulated by the diameter of the die, whilst the thickness of metal is dependent on the size of the core. In order that the lead which comes in contact with the walls of the cylinder may not be chilled when it is first poured in, small fires are made up in receptacles provided for the purpose, or, in the case of larger presses, the cylinder is bodily heated by being placed in a gas-heated chamber. Considerable judgment is required on the part of the operator in determining when the lead is at the right temperature for the purpose. Should it be too soft it will run out in a shapeless mass, whilst if allowed to set too hard it will not work at all. A pressure of about 2,200 lb. is obtained in the hydraulic cylinder for the smaller presses, whilst those used for producing heavier pipe work up to 6,000 lb. to the square inch. Pure tin pipes are made in the same way, whilst tinned pipe of lead is produced by pouring a small quantity of molten tin into a hollow formed on the upper part of the die, and also by pouring a small quantity into the first few inches of pipe made as it emerges upwards from the die. This tin remains molten for a considerable time, and deposits a thin layer on both the outside and inside of the leaden pipe as it is formed.

Solid round lead is formed in the same way as the leaden pipe, the only alteration in the process being the omission of the core.

Lengths of lead of any required section, such as calm lead for glazing, can be drawn in these presses, dies of various descriptions being provided for the purpose.

Water-pipes of all standard sizes are here made as stock articles, ranging between ⅜ in. pipe, from 3¼ lb. to 5½ lb. per yard up to 6 in. barrelling up to 84 lb. per yard. Lead and composition gas-pipe is drawn from ¼ in. diameter up to 1½ in. diameter. A special gas-pipe, of $\frac{3}{32}$ in. diameter, is drawn for using in glass chandeliers.

White-lead is made at Chester by the ordinary stack process, in which thin castings or "crates" are subject for several weeks to the corroding influence of the fumes of ascetic acid, damp bark being used to generate the required heat. The product is carbonate of lead, which, having been washed and dried in a stove, becomes the dry white-lead of commerce. Messrs. Walker, Parker, & Co. also grind large quantities of white-lead in oil, having several mills of the ordinary description, and a roller-mill of ingenious construction for the purpose. The ascetic acid used for the production of lead is made on the premises, and there are also appliances for boiling and refining the oil used in grinding the lead into paint.

The Hydraulic Engineering Company, of Chester and Palace-chambers, Westminster, are well known as manufacturers of hydraulic machinery in general; Ellington's patent hydraulic balance-lifts for hotels, warehouses, and private dwellings, being amongst their special productions. These lifts are direct-acting, the ram, which is of the same length as the height of the lift, working in a cylinder placed in a well immediately under the cage, which in every position rests on the column of water beneath it. Lifts of this description have been up till recently mostly worked at low pressure, obtained from the mains of the ordinary water supply, or from a head of water in a tank on the roof. In such cases a large ram is a necessity, and the cage and ram have to be counterbalanced by weights and chains. The dangers that may arise through the failure of such appliances are well known and have received too many lamentable proofs in practical working. It is in order to obviate these risks that Mr. Ellington has introduced his hydraulic balance, and works only at higher pressures. There are several modifications of this hydraulic balance, but they are all arranged on the same fundamental principle. At the side of the lifting cylinder a second cylinder is placed, the ram of which works in an opposite direction to the lifting-ram, so that the balance-ram ascends when the lift is coming down, or descends when the lift is rising. The stroke of the balance-ram is necessarily less than that of the lifting-ram, but the area of the former is greater. In this way the balance governs the action of the lifting-cylinder, and prevents it rising too high or descending too rapidly. It would be impossible, without illustrations, to give a clear idea of the various means by which the principle is fitted to the different conditions of working that may be required, but we hope to be able to refer to the subject again at a future date.

At the present time several lifts on this principle are in course of construction at the works. One order for thirty is being executed for dwelling-houses on the Kensington Court Estate. The power to work these will be supplied by the London Hydraulic Power Company, which is erecting a hydraulic pumping-station in the district. Two more lifts are also being made for the Hôtel Métropole, whilst two others have lately been fitted to the First Avenue Hotel. Possibly, however, the best known of Ellington's lifts is that at the Bedford-street Branch of the Civil Service Stores, which has for several years been carrying on an average 2,000 persons a day without accident or delay.

One of the principal features in the erecting shop at these works is a set of vertical hydraulic pumping-engines that have been made for the General Hydraulic Power Company, and which are about to be erected at this company's principal station at Blackfriars. The engines are of the three-cylinder compound type, having one high-pressure cylinder, 19 in. in diameter, which exhausts into two low-pressure cylinders, each 25 in. in diameter. The stroke is 24 in. Cowey's automatic expansion gear is fitted. This is worked by a governor and a chain attached to the accumulators actuating cams, which in turn operate on a trigger-gear. There are three pumps 5 in. diameter, and of the same stroke as the steam pistons, being, in fact, placed below the steam cylinders, and driven directly from the piston-rods. These pumps will work to the standard hydraulic pressure of 700. Another object of interest in these shops is a hydraulic intensifier, by means of which a water-pressure of 2,500 lb. can be obtained from the ordinary hydraulic main pressure of 700 lb. This is got by the differential action of two rams; one of larger area and lower pressure forcing a second of smaller area to a considerably higher pressure. The apparatus would be of great service for testing purposes in cases where it would not be desirable to work the pumps at the full test pressure.

## THE PLACE OF ART IN THE POLITICAL ECONOMY OF A NATION.

This was the title of a paper read by Mr. P. H. Rathbone at the Social Science Congress, Birmingham, last week, and which we now give in full:—

Some years ago I ventured upon a few remarks upon the political value of art to a great nation, but art is many-sided, and has its ethical and even scientific value if properly understood. At the present moment, however, it is perhaps even more important to insist upon its economical value. It is one of the most serious functions of a statesman to strive that the great body of the nation be well clothed, fed, and housed. It is not unnatural that he should ask himself whether it is wise to divert energies which ought to be mainly directed to these important ends, to what has been too much considered as a mere ornament of life. I propose to ask your attention for a few minutes while we try to solve this problem. Art is the logic of beauty and of efficiency. Art, in form and in colour, is the knowledge of how to select and arrange lines, colour, and shades, so as to rest

the eye, stimulate the intellect, awaken the imagination, and last, not least, satisfy the reason. In short, the main object of art is to do whatever we have to do so as to be of most use and give most pleasure. We have been too much in the habit of unconsciously confining the term art to the initiative arts of painting and sculpture, &c., with perhaps a partial exception in favour of architecture, so far as it is considered as an object of beauty rather than of use. Hence many of our errors of taste in regard to architecture. We have taken buildings, eminently adapted for the purposes to which they were applied, and copied them for purposes to which they were not adapted. Then we wonder that these copies do not produce in us the same sense of beauty as their prototypes. In the last century attempts were made to adapt Greek temples as mansions, and the owners felt much surprised that a style of architecture suited for large halls lighted from the roof should look heavy and unsuitable when applied to two-story dwelling-houses with a multiplicity of rooms. We forget the original use of sculpture as the enrichment and complement of architecture, and send hapless statues shivering about our squares, without buildings to which they have any relation whatever, and without apparent reason why they should be there, or we stick them up on the top of poles, like bears in a zoological garden, waiting to be fed with buns by the angels. Look, on the other hand, at the Column of Trajan at Rome; there it stands in the middle of a square, completing the square and marking its centre. The record of a series of campaigns is sculptured round the column, which was originally crowned by a portrait figure of the chief actor in those campaigns. Every portion of the column has its *raison d'être*,—its definite relations to its surroundings; but what sense is there in Charles James Fox presiding over a cabstand in Hanover-square, or Victory dispensing her wreaths among the bus-drivers at the bottom of Waterloo-place?

But, it may fairly be asked, what has this to do with the economical value of Art? Much, I venture to think, if we look closely into the matter. For many years we have devoted ourselves, with considerable success, to being the cheap-jacks of the world. We have been able to effect this by the aid of our coal mines, and by the practical possession of the cheapest labour in the world; I do not, of course, mean the lowest priced,—for low wages beyond a certain limit do not mean cheap labour. We must look forward, and that in no remote period, to losing this supremacy. Coal and steam are rapidly supplanting bone and sinew; and the invention of a furnace adapted to anthracite coal might entirely and most rapidly enable America to supplant us in the matter of coal. Let her repeal her insane protection laws, and our manufacturing supremacy, so far as cheapness is concerned, would probably become a thing of the past. If, therefore, we are to maintain our manufacturing position in the world, we must in future learn to manufacture the best and most tasteful fabrics rather than the cheapest. Low-priced articles will, in future, be more and more manufactured on the spot where the raw material is produced,—witness the growth of cotton-mills at Bombay. We shall have to turn our attention to manufactures which increase the value of raw material so much that the freight and carriage become unimportant items; and it goes without saying, that such manufactures must have a large artistic element in them. A few years ago, Mr. Morris devoted himself to introducing sound art into wall-papers, and the general world gently smiled at the æsthetic craze. But what is the practical result? Why, that as a direct effect of his action a large export trade (so I am told) in wall-papers is growing up which did not before exist. It is good wall-papers, not cheap wall-papers, that we are exporting. Look at Nottingham,—its lace manufacture and consequent prosperity,—and then inquire into the enlightened amount of thought and energy expended in impregnating the population with artistic feeling.

The history of the potteries is an equally instructive one. Go where you will,—Russia, Italy, &c.,—you will find the remains of old Josiah Wedgwood's pottery in old pawnshops,—pieces of a character which show it must have been exported in large quantities. The common articles in daily use were produced in their most artistic form, because a true study of the principles had taught him, and, through him, other potters, one of the most important lessons of Art,—the adaptation of means to the proposed end, and economy in raw material. Unfortunately, Wedgwood died just at the dawn of that dreary period when the country was dominated by that crass stupidity which was dignified by the name of *plain common sense*; the time when Pitt refused 100,000*l.* to buy the Pitti Gallery, because England did not require pictures. The pottery trade of England declined and languished till the Exhibition of 1851 stimulated the potters to the study of art; and the effect upon the export trade of Great Britain is too well known to be insisted upon. I am told that the firm which has most conspicuously devoted itself to the best forms of art in its manufacture, is also the firm which has suffered least in the present period of extensive depression. I need not insist upon the example of Birmingham, and the work Messrs. Elkington and many others have done here. I ask those who doubt to inquire for themselves, and to ask those manufacturers who have devoted themselves to producing good artistic work what have been the pecuniary results of their endeavours. The artistic education which would have prevented our defacing our towns with absurd and incongruous statues and buildings at outrageous expense would have enabled us to supply Europe with those tasteful manufactures which, until lately, we have chiefly derived from France, where the necessity of artistic education for her workmen has been so long realised.

What more striking instance of the material value of art education could you have than Paris? Here is a city without coal, with an insignificant river, with no natural manufacturing advantages whatever, which supports an enormous population by the taste of her artisans. Her position as capital,—geographically an unfortunate one,—is not sufficient to explain this.

For want of it much highly-paid artisan's work falls into the hands of foreigners, and till the establishment of art schools this was still more the case. Sculptors reside in Italy because they can get marble-cutters there, and it was but the other day that a young artist confided to me his great joy over finding a skilful Italian marble-cutter in London at 5*l.* per week. It is but a few years ago that the best decoration of pottery was chiefly in the hands of foreigners, and we owe much to Messrs. Doulton for their efforts to create an artistic school of British pottery, and put the higher wages paid for artistic work in the hands of our artisans. It was not pleasant some time ago in Liverpool, where we have some of the best bricklayers in England, to find that, when it came to the ornamental and more highly-paid brickwork, artisans from a distance had to be imported. I cannot altogether absolve trade societies from blame in this matter. The objection to having wages regulated in proportion to the skill and industry displayed which they have occasionally evinced is most immoral and demoralising. No language can be too strong to denounce, no laws can be too strong to pitilessly crush any attempt at interference with a free workman's full use of all the skill and industry of which he is capable, or to deprive him of his right to the increase of wages which those qualities deserve. Any action which cramps the growth or energies of the nation is high treason to the country, and should be relentlessly suppressed as such by public opinion and by public laws.

It is not, however, only necessary that our workmen should be artistically trained; they must live in an artistic atmosphere, among a public ready and able to appreciate and criticise their works. I have been told that one of the largest firms of calico-printers finds it desirable that their designers (Englishmen) should live in Paris, because they find by experience that life in artistic and unsympathetic surroundings chills and blunts their designing powers. A poet may shut himself up in his interior consciousness, and develope out of it the sweetest powers of song. An artist, for the most part, requires stimulation from the surrounding sympathy; for he has to express to those around him his sense of beauty and fitness, or else it ceases to be beauty and fitness to him. Nor is it necessary that it should be in the same forms of art as he himself practises.

Nothing is more remarkable than the many-sidedness of the very greatest artists. Michelangelo and Raffaelle were painters, sculptors, and architects; Leonardo da Vinci added music to his other artistic acquirements, and his master, Verrochio, turned from painting to sculpture late in life, and succeeded. Many others tell the same story, and we have among ourselves artists of whom it would be difficult to predicate whether they were more at home with the chisel or the brush, and who would, no doubt, shine as architects were they required to turn their energies in that direction. In the Ober Amergau we find a population of peasants, supporting themselves by wood-carving, who have attracted crowds from all parts of Europe and America to witness their skill in dramatic representation. Through a more thorough artistic education, we should enable our handicraftsmen to turn from an overstocked occupation to one understocked, and render their intelligence and labour more mobile and fluid. Art thoroughly acquired in theory and practice trains the powers of observation, of discrimination, and of selection; trains the eye to accuracy, the hand to prompt efficiency, and gives command over materials. A man thoroughly trained in drawing finds little difficulty in modelling in clay. Only those who have given attention to the subject would guess what varied powers of united knowledge and observation are required to produce any work of art which has any real claim to be so called. This question is deserving of very serious consideration.

At the present moment we are face to face with a very perplexing paradox. The average price of wheat this year has been the *lowest* on record, as we are informed by the *Spectator*. Meat supplies are opening all over the world, and good South American mutton cannot secure more than 6d. per lb. in London, wholesale. Wool and cotton have been, and remain, extremely low. Many, if not most, of our cities are over-built. And yet, with the main necessities of life,—food, clothing, and shelter,—over-plentiful and cheap, the best informed employers are looking forward to a period of more than ordinary distress among industrious workmen during the coming winter. There must be something wrong about this state of affairs. It seems mockery to talk of over-production of food, shelter, and clothing, when so large a proportion of our population are half-fed and clothed, and worse lodged than cattle. It is not so much that more necessaries are produced than are wanted, as that more are produced than can be paid for. Now, what is the reason of this? Doubtless, there are temporary causes which will pass, but I venture to think that there is a permanent cause. Facilities of transport, the development of machinery, have enabled the population of the world to feed, clothe, and house themselves by working much fewer hours a day than formerly. Now, this would be all very well if they did work fewer hours a day, but they do not, and, what is more they will not, at least not to sufficient extent. Let us suppose that the civilised population could formerly furnish themselves with necessaries by working ten hours a day and we can do it now by working seven hours a day. Of course the number of hours is a mere hypothesis, but, I believe, a moderate one. If they all did work seven hours, well and good,—they would have three extra hours to spend for rest, amusement, and enjoyments; but what is the real case? Why, that seven-tenths work ten hours a day, and three-tenths look on with idle hands. What is the remedy? Not working shorter hours: competition will prevent that; and you may as well attempt to sweep back the ocean with Mrs. Partington's broom as to arrest the action of competition. If we were a single nation, thoroughly organised, something might be done, though even then I doubt it; as it is, we are a family of nations, speaking different languages, and with very imperfect means of organisation. What is the consequence? Why, that at the end of the year the seven-tenths have produced sufficient necessaries for the whole community, and that the three-tenths have earned nothing to pay for their share, a large proportion of which, therefore, is thrown back upon the hands of the producers, and we have the curse of over-production amid a semi-starving population. What is the remedy? Surely that the three-tenths should be employed in producing means of making the lives of the seven-tenths brighter, happier, more varied than at present. It is producing superfluities if you will, but superfluities that will do much to raise our workmen from the rank of machines and animals into that of thinking, reasoning, life-enjoying men. They have as much right to the enjoyment of life as we. Much, no doubt, has

been done, but much remains to be done. At present the means of enjoyment most freely offered them is drink. Can you blame them altogether if they avail themselves of it too freely? But it is said that you cannot force these things upon our working population; certainly not, but let them be offered the option. If it be refused,—and I believe it would not,—then, and not till then, you may accuse our fellow-countrymen of innate sensual instincts. Of course, it will take time. A taste for art requires time to cultivate; but that it can be done we have had satisfactory proofs in Liverpool, and, I have no doubt, you will have even greater in Birmingham, for many forms of manufacture require a nicety of eye and delicacy of hand, which are in themselves the first and by no means least important steps towards the cultivation of a love of art.

In a small town near Liverpool, devoted to chemical manufactures, a theatre has been recently erected, and the publicans complain that when it is open their takings are reduced by a third. Thus a large proportion of the population are kept out of mischief, and remunerative employment is provided for a deserving and hard-working class of men and women; for an actor's life is not the mere play-work outsiders are apt to imagine. Cultivate the taste of our population by art galleries and museums, by concerts and theatres, and they will not only patronise the latter, but they will crave to possess as their own such forms of art to decorate their houses as may be within their means. They will frame the coloured prints provided by the *Graphic* and *Illustrated News*, after our best artists, and photographs of the pictures in our galleries; they will cover their chimney-pieces with pretty and inexpensive specimens in the potter's art; they will fill their rooms with elegant, if plain and simple, furniture; and the very tea-cups and plates in daily use will be, not dearer, but in better and purer taste than has hitherto been the case. Lastly, they will dress their wives and daughters and themselves so as to do justice to one of the most beautiful populations that has ever existed, if we may trust the records of art. Day by day will elevate and purify their taste, till it creates a demand for artistic work that will overflow the limits of the country, and create an export trade which may do much to counteract the loss of that supremacy in mere cheapness, hitherto our mainstay, and a discrimination and judgment in our working population will be developed which we are not yet prepared to consider them capable of possessing.

If you think these ideas Utopian, I ask you to look back some five-and-twenty years, and compare the style of music which was provided for the working men's concerts with that to which they listen now with earnest and intelligent attention; I ask you to note the gradual disappearance of the flaring and ill-assorted colours which used to disfigure the dresses of the working women and those of much wealthier classes; to compare the woodcuts of the cheap illustrated papers with those of former days, and then deny, if you can, that there has been an improvement in the taste of the nation, which gives every hope for its future progress, and I maintain is a new source of material wealth. If I am right, here is a prospect of supplying the supposed three-tenths (or whatever the proportion may be) of our nation, and of making the lives of the remaining seven-tenths happier, better, and more beautiful than they now are; and so I believe that, looking at the question in a purely material light, and as a source of wealth, putting aside all other considerations, the cultivation of the artistic taste is well worth the statesman's serious attention. It would be worth while to have a committee to inquire what effect schools of art have already had upon the export trade of the country. I believe much has already been done, is doing, and in a right direction, only do not let us relax our efforts. There is, however, one direction to which I do not think sufficient attention has been paid. I think every large town should have a good typical collection of casts of the best sculptures of all schools; not confining it, as has been too much the case, to the Greek and Græco-Roman schools, but including the early Florentine, French, German, and other Mediæval schools. Casts are the cheapest forms in which the best specimens of the highest art can be produced, and so little altered, except as to material, as to be, for practical purposes, almost as educational as the originals.

I wish the subject had fallen into stronger hands, but trust I may have said enough to prove that art has no unimportant place in the political economy of a nation.

## SANITARY CONGRESS AND EXHIBITION IN DUBLIN.

The seventh congress of the Sanitary Institute of Great Britain was opened on Tuesday last with an address by Sir Robert Rawlinson, C.B., the President of the Congress. Having referred to the Royal Commission of which he was president, and which sat in 1879 to inquire into the sewerage, drainage, and general sanitary condition of Dublin, he observed that since 1879 the Corporation had carried out various sanitary improvements, but the purification of the Liffey still remained to be accomplished. Sanitary science, he said, was as old as literature. The Book of Leviticus contained laws and regulations for preserving health, and the reasons for some of the ceremonial regulations might be easily understood, such as avoidance of unclean meats, and isolation of contagious diseases,—leprosy for instance. There were at this day what might be termed leprous sites, produced through ages of continued pollution. In the great towns, such as London, hospital surgeons recognised types of disease the most malignant and deadly as coming from special streets, and even houses, and when those streets and houses had been removed, cases of those types of disease ceased. One of the greatest objects of sanitarians was to stem the torrent of sanitary ignorance now working so much mischief and causing incalculable human misery. Quarantine, as now practised, was worked at enormous money cost as well as inconvenience, and produced much misery without having the effect intended. He referred to the antiquity of cholera, which was said to have been known in China as well as India, and to the peculiar conditions and characteristics of the disease in the East. He reminded the meeting that the disease was not so destructive as the ever-present fever under its various forms. Typhoid was answerable for far more deaths than cholera. Unsound meat and impure water might be factors in causing cholera, but were not the sole cause, as these were ever present, and many who died of cholera were not water-drinkers. In some outbreaks the most destitute portion of the population had not suffered, while the artisan class had. The very poor in summer lived mostly in the open air, and drank water.

Referring to the question of sewage disposal, Sir Robert Rawlinson said: — "The work of entirely freeing the River Thames of sewage from Teddington to the North Sea is merely a question of time, and there will be no further tampering with the question in London; and out to sea also must go the whole of the crude sewage of Dublin, because the river Liffey must be purified, and intercepting sewers, having a sea outlet, will be the cheapest remedy. Every large town in Great Britain which is situate on the seashore or on the margin of a salt-water estuary, sends the crude sewage direct to the estuaries or to the sea, and I know no valid reason against it. There are, undoubtedly, manurial elements of value in crude sewage; but if it must cost thirty or more shillings to utilise it by deposition with chemicals, or in land-irrigation, to earn 20s., I fail to see that to dispose of it into the sea at a less cost in rates is waste."

The business of the Congress was continued on Wednesday, when the Registrar-General for Ireland delivered an address on "Statistical Measures of the Health of Communities." Dr. Flinn read a paper unfavourably contrasting the administration of the Public Health Act in Ireland with that in Great Britain. Mr. E. Spencer, M.A., read a paper giving a deplorable account of the condition of the houses of the working-classes in Dublin. He recommended the demolition of old houses; but stated that the improvement of the homes of the working classes did not altogether depend on the provision of suitable abodes, but to a great extent on the education of the people themselves.

In connexion with the Congress an exhibition of sanitary appliances was opened in the buildings of the Royal Dublin Society, Ball's Bridge. This exhibition will remain open until the 18th inst. Many firms well known to our readers are amongst the exhibitors. The judges* have made the following among other awards, viz.:—

*Medals and Starred Certificates.*

Bradford & Co., London; for washing machines.†
British Sanitary Company, Glasgow; for self-acting earth-closets †
J. & M. Craig, Kilmarnock; for white enamelled fire-clay ware for sinks.
Doulton & Co., London; for art pottery; ditto, for ventilating tile stoves; ditto, for anti-percussion high-pressure valves.
J. E. Ellison, Leeds, for conical ventilators.†
R. R. Heap, Manchester, for dry earth and ashes closet.†
Maguire & Son, Dublin; for sanitary and domestic appliances.
P. H. Maignen, London; for filtre rapide.†
Musgrave & Co., Belfast; for slow combustion stoves.
J. L. Smallman, Dublin; for Stott's mercury gas governor.†
Shanks & Co., Glasgow; for siphon-action water-waste preventers.
Wilson Engineering Company, London; for their Wilson cooking range.†
J. Wright & Co. Birmingham; for Eureka gas cooking stove, and Silver Medal of the Exeter Gas Company.

*Certificates.*

Robert Adams, London; for the Norton door-spring, and for adjustable pivot for fanlights.
W. Baird, Dublin; for butler's sink, bath, and lavatory.
David Thompson & Co, Glasgow; for Watt's asphyxiator, for testing drains with smoke.
Bourtreebill Coal Company, Dreghorn, Ayrshire, for stoneware drain pipes; and for white enamelled fireclay sinks.
W. Carson & Sons, Dublin; for Willesden waterproof paper and canvas.
T. Cardingley & Sons, Bradford; for granite concrete pavement.
J. M. Craig, Kilmarnock; for Buchan's disconnecting trap.
Doulton & Co., Lambeth, London; for cheap glazed stoneware sinks; for bath-fitting locking apparatus; for Lambeth combination water-closet; for enamelled-ware open channels for manholes; for manholes for drains with connexions complete; for London-made stoneware pipes; for silicon treads for steps; and for glazed-ware mantelpiece with slow combustion grate.
J. E. Ellison, Leeds; for radiator ventilator.
W. R. Leggott, Bradford; for opener for fanlights and skylights.
Maguire & Son, Dublin; for white enamelled fire-clay sinks; for cast-iron drain pipes coated with Angus Smith's preparation; for Marsden tiling for wall decoration; for new laundry stove and copper boiler; for Scott's self-regulating disinfecting chamber.
Pennycook Company, Glasgow; for their system of glazing without putty.
T. R. Scott & Co., Dublin; for solid oak parquet flooring.
Shanks & Co., Glasgow; for cast-iron baths and porcelain lavatories.
Smith, Elder, & Co., London; for sanitary publications.
T. Twyford, Hanley; for lavatory basins and slop sinks.
T. & M. Craig, Kilmarnock; for white enamelled bricks.
Bourtreebill Coal Company; for white enamelled bricks.
J. Wright & Co., Birmingham; for ventilating open gas fire.
W. Carson & Sons, Dublin; for slow combustion stoves.
T. Twyford, Dublin; indiarubber connexion for joining lead and earthenware pipes.
Arden, Hill, & Co., Birmingham; for gas cooking stove lined with white tiles.

The awards as to a number of other exhibits are deferred.

## SURVEYORSHIP ITEMS.

*Belfast.*—At a special meeting of the Belfast Town Council held recently, Mr. J. C. Bretland was appointed successor to the late Mr. J. J. Montgomery as Borough Surveyor of Belfast. Mr. Bretland has been in the service of the Corporation for the past sixteen years, during which period he has become familar with the duties of the office. The present salary is 500*l.* a year.

*Edmonton.*—Mr. F. J. Bancroft, who has during the past three years held the post of assistant surveyor to the Finchley Local Board, and who has been engaged assisting Mr. Bramell, the Board's engineer, in preparing plans for the main drainage schemes, has accepted a similar appointment under Mr. Eachus, engineer to the Edmonton Local Board.

**Gas v. Coal for Cooking.**—At a recent meeting of the Guardians of the St. George's (Hanover-square) Union, it was reported from the Infirmary that cooking by gas apparatus had been tried for three months, the result being a saving of 20*l.* as compared with the cost of coal. The Infirmary Committee recommended that a gas roaster and hot-plate be purchased of Messrs. H. & C. Davis & Co., Camberwell, which was carried.

* Professor W. H. Corfield, M.D., chairman; Professor F. De Chaumont, F.R.S.; Mr. Saxon Snell, F.R.I.B.A.; Mr. Rogers Field, M.I.C.E.; Dr. H. C. Bartlett, Ph.D.; Mr. Ernest Turner, F.R.I.B.A.; Mr. W. Eassie, C.E.; Mr. J. W. Peggs, M.I.C.E.; and Dr. Louis Parkes, sec.

† These recipients would have received a medal each but for the fact that one had been awarded to them on a previous occasion.

## ECCLESIASTICAL ART EXHIBITION AT CARLISLE.

In connexion with the Church Congress, at Carlisle, an interesting exhibition of ecclesiastical art has been opened. The loan collection includes 300 exhibits, embracing specimens of ancient and modern embroidery, wood carving, metal work, carved ivories, and other *instrumenta ecclesiastica*. Pictorial art is represented by various photographs and chromolithographs of ancient pictures, illuminations, drawings of churches and ecclesiastical furniture, engravings of chalices, and a large collection of rubbings of monumental brasses and incised slabs, from what is believed to be the oldest known specimen, representing Sir John D'Abernon (A.D. 1277), down to that erected to the memory of the late George Edmund Street in Westminster Abbey. Amongst the books may be mentioned a York Missal of about 1500; an early edition, dated 1596, of Marot & Beza's French Psalter; together with several service books, prayer-books, books of homilies, &c. A striking feature of the collection was an assemblage of disused plate, obtained from various churches in the diocese. It included about seventy pieces, mostly belonging to the sixteenth and seventeenth centuries, many of which were of great interest. The various guilds of the city of Carlisle have also contributed their plate, amounting to twenty-five pieces, or thereabouts: including tankards, porringers, cups, and salvers.

Messrs. Cox Sons, Buckley, & Co.: Messrs. Jones & Willis; Messrs. G. M Hammer & Co.; Messrs. Heaton, Butler, & Bayne; Messrs. Keith & Co.; Milner's Safe Company; Messrs. John Smith & Sons; Messrs. Ward & Hughes; Messrs. John Warner & Sons; and other well-known firms, were amongst the exhibitors of church furniture, decorations, plate, &c.

While speaking of the Church Congress, we may make mention of the pastoral staff presented to the Bishop of Carlisle. It is the work of Messrs. Barkentin & Krall, of Regent-street, London, the well-known goldsmiths and art-workers in metal. The design was furnished by Messrs. Bodley & Garner. The work appears to be one of much merit, but we have no space for a detailed description of it.

# Illustrations.

## DETAIL ELEVATIONS OF WAR AND ADMIRALTY OFFICE DESIGNS.

We give, as we promised last week, the detail elevation studies of the three designs which were placed first in the second competition, those by Messrs. Leeming & Leeming, Webb & Bell, and Verity & Hunt, devoting a page to each. These will enable a better comparison to be made between the treatment of the three than could be made from a general view only. We fear such a comparison cannot possibly be favourable to the selected design, which consists of more or less pretty bits with no coherence whatever, and the columnar order is, as used here, as complete a piece of architectural sham as could be seen; a ponderous base, and a great column and cornice carrying nothing but a single statue. The elevation from Messrs. Webb & Bell's design is by far the most refined in detail of the three, but whether any one who saw it executed would take it for a War Office may be a question to be asked. Messrs. Verity & Hunt's elevation, like their general view, suggests "War Office" more than either of the other two; there is a massive stability about it which is expressive of its purpose; but it must be admitted that it does not present anything which is of much architectural interest in itself; it is the old material suitably worked up by a practised hand, that is all. Even so, however, the coherence and balance of the design brings out the more by contrast the singularly piecemeal character of Messrs. Leeming's elevation, which also consists entirely of well-worn details, with the difference that they are not combined or worked up into a whole at all. Consideration of this detail elevation certainly leads to the conclusion that the amateur element in the Committee of Selection must have been in the ascendant when this design was chosen. In fact, the other two elevations have style; this has no style. To remodel it to the extent that would be desirable would be nearly equivalent to making an entirely new study of the design in detail. If this were done, as surely it must be, may we suggest among other improvements the removal of the irrepressible flower-pot from the top of the balustrade? It is really melancholy to think that at this time of day it should be proposed to repeat such a piece of senseless and worn-out *rococo* as this, as part of the design of the most important national building of the day.

## GLAZED HALL AND STAIRCASE, ADMIRALTY.

BY MESSRS. ASTON WEBB AND E. INGRESS BELL.

In speaking of the design by Messrs. Webb & Bell generally the other day, we adverted to the fine points in the interior plan which would have been formed by the large glazed and arcaded courts which were to contain the principal staircases, and also to act as *salles des pas perdus* to the several departments, thus making a point of manifest convenience, in the laying out of an elaborate plan, subservient also to architectural effect, as the central features in the arrangement of a plan ought to be. The view of one of these halls, which formed the most noteworthy feature among the fine set of drawings sent in for the second competition by Messrs. Webb & Bell, is here reproduced by the ink-photo process, which gives a certain amount of surface tone and texture to what in its original form was a plain line-drawing, without losing the original lines. This hall was the one which would have formed the principal entrance to the Admiralty Department from the Spring-gardens end of the site. Its connexion with the past and present of the Admiralty Department is sufficiently typified in the drawing, by the statues of former distinguished admirals in chronological succession, and the figures of the departmental clerk or private secretary and the obviously maritime official with whom he is holding converse in the foreground; not to mention the seahorses at the foot of the balustrade, and the anchors worked into the pierced panelling above. These specialised details, however, are very minor considerations in an admirable piece of architectural design, which has the merit of being elegant and graceful without weakness. There is, indeed, a remarkable degree of solidity of effect in the piers of the two lower stories, in comparison with the actual mass of the material employed. It is perhaps rather to be regretted that the old conventionalism of breaking the cornice lines over the pilasters and columns has been so much employed; that may be considered the one weakness of the design, and has the disadvantage of producing too marked a vertical division in the upper stages. Of course, when one objects on strict theoretical principle to these conventionalisms of Classic architecture, one may be met by the question, "What would you do instead?"—a question not always easy to answer. Other forms of language besides that of architecture are full of convenient conventionalisms, and life is too short to allow us to do more sometimes than take them as we find them, as part of the current and accepted mode of expression.

Taken on the whole, however, it may be said that this hall, for the design and drawing of which we believe Mr. Aston Webb is specially responsible, is the best piece of architectural work which the competition has elicited.

## STATUE OF THE LATE LORD FREDERICK CAVENDISH.

The bronze statue which is about to be erected at Barrow-in-Furness in memory of the late Lord Frederick Cavendish, was, it will be remembered, exhibited (in plaster) in this year's show at the Royal Academy. Our view of the statue is from a photograph of the work as finished in bronze, without any deviation from the cast as exhibited. It was cast in bronze at the foundry of Mr. James Moore, of Thames Ditton. It is of colossal size, being 10 ft. 6 in. high, and is intended to stand on a pedestal of polished Aberdeen granite 14 ft. high, supplied by Messrs. Alexander Macdonald & Co., of Aberdeen. The site selected is in front of the Town-hall at Barrow, and it is expected that the work will be unveiled in about a month hence. In the opinion of those who were most intimate with the deceased, the sculptor has been very successful in his work. The figure is draped in a long Inverness cape, which Lord Frederick was in the habit of wearing.

## PARISH CHURCH OF ST. LEONARD, MIDDLETON, LANCASHIRE.

The church lies about seven miles out of Manchester. It was rebuilt in 1412 by Thomas Langley, Cardinal Bishop of Durham. He obtained permission from John (Bourghill), Bishop of Lichfield and Coventry, to visit and consecrate the church. The date of consecration is August 2nd, 1412. Before this time it had been allowed to fall into decay. Parts of the church are built out of fragments of the old church.

In 1524 the south aisle was reconstructed by the Assheton family. The inscription on this aisle (over the window next to the porch) runs thus:—"Richardus Assheton et Anna Uxor ejus Anno D'ne' MDXXIIII." The Assheton arms are carved in the panels of the chancel screen and other places.

There is a large public-house near the church, built half-timbered, called the Old Boar's Head. A boar's head is conspicuous in the arms. It is conjectured that there was a church here in Saxon times. There is a record of a valuation taken by order of Pope Nicholas IV., 1291.

There are fragments of diaper-work, &c., which seem to date much earlier,—1091. The arch in the baptistery seems to have been the chancel of a Norman church altered at the transition.

The drawing is by Mr. Leeson, of Werneth, near Oldham, who has also made an excellent set of measured drawings of interior details, which we will give in another number.

## NEW ENGLISH CHURCH, HYÈRES.

The Church of St. Paul, Hyères, France, was consecrated on Wednesday, February 6th, by the Lord Bishop of Gibraltar, Bishop Courteny taking part, and a large number of clergy being present, both from the Riviera and from England.

The church consists of nave and aisles, with organ-chamber and invalids' chapel, gabled as transepts. It is in the Decorated style of the thirteenth, or early part of the fourteenth, century, and is built of walling-stone obtained from a neighbouring quarry, and freestone of fine and durable quality from near Toulon. The roofs are boarded with moulded ribs, both longitudinally and transversely, having carved bosses at intersections, and all in pitch-pine. The chancel-stalls are wainscot-oak. There is no plastering, the walls being worked inside and outside as random rubble, and pointed in black mortar. The windows are in three-tint quarry cathedral glass, by Brewster, of London, and the east window of richly stained glass, manufactured by Messrs. Jones & Willis, of London, who also supplied the whole of the chairs, stalls, and fittings, and executed the rather elaborate carving. The floor encaustic tiles are by Mr. Collier, of London. There is a bell-cot, and (by especial and rather exclusive permission of the authorities) a bell by Messrs. Warner. The church will seat 450 persons, and a special characteristic is that the invalids' chapel is arranged for Bath chairs, an easy sloping way having been formed, and screens are to be fixed in each of the arches dividing the chapel from the chancel and church respectively. There are crypts for library and waiting-room and clergy vestry. The church is heated by Musgrave, of London, with hot air, and especial care has been exercised in ventilation.

The cost has been 4,500*l.*, two-thirds of which, with the site, was given by a munificent French gentleman, named Godilliot, residing at Hyères, to whom the thanks of the Prince of Wales were conveyed upon the opening day by the Rev. D. L. McAnally, the secretary of the Colonial and Continental Church Society, who have liberally supplied the remainder of the needful funds.

The contractors were Messrs. Bousquet & Son, of Marseilles, the very indefatigable clerk of works being Mr. Gilling, an Englishman, but thoroughly acquainted with foreign languages and works; and the architects are Messrs. G. Habershon & Fawckner, of London.

**Dangers of Staircase Wells in Artisans' Dwellings.**—Another child has been killed by falling down an imperfectly-protected staircase well in one of the large blocks of artisans' dwellings in flats in South London. Children abound in these blocks of buildings, and efficient means should be taken to render such "accidents" impossible.



CHURCH OF ST. LEONARD, MIDDLETON, LANCASHIRE.

*Drawn by Mr. E. W. Leeson.*



DESIGN FOR WAR AND ADMIRALTY OFFICES.

By Messrs. Verity & Hunt.

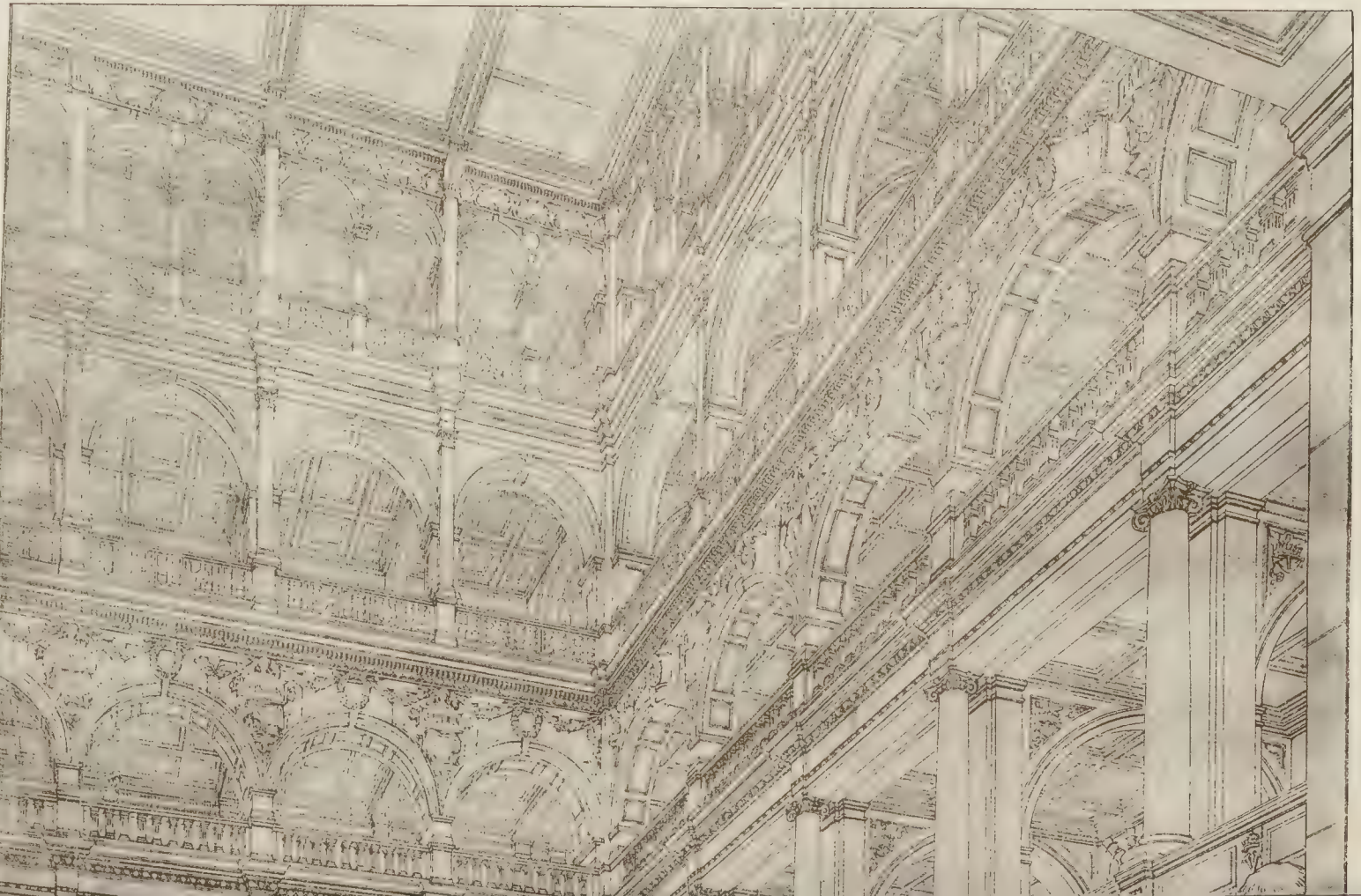
Detail Elevation.

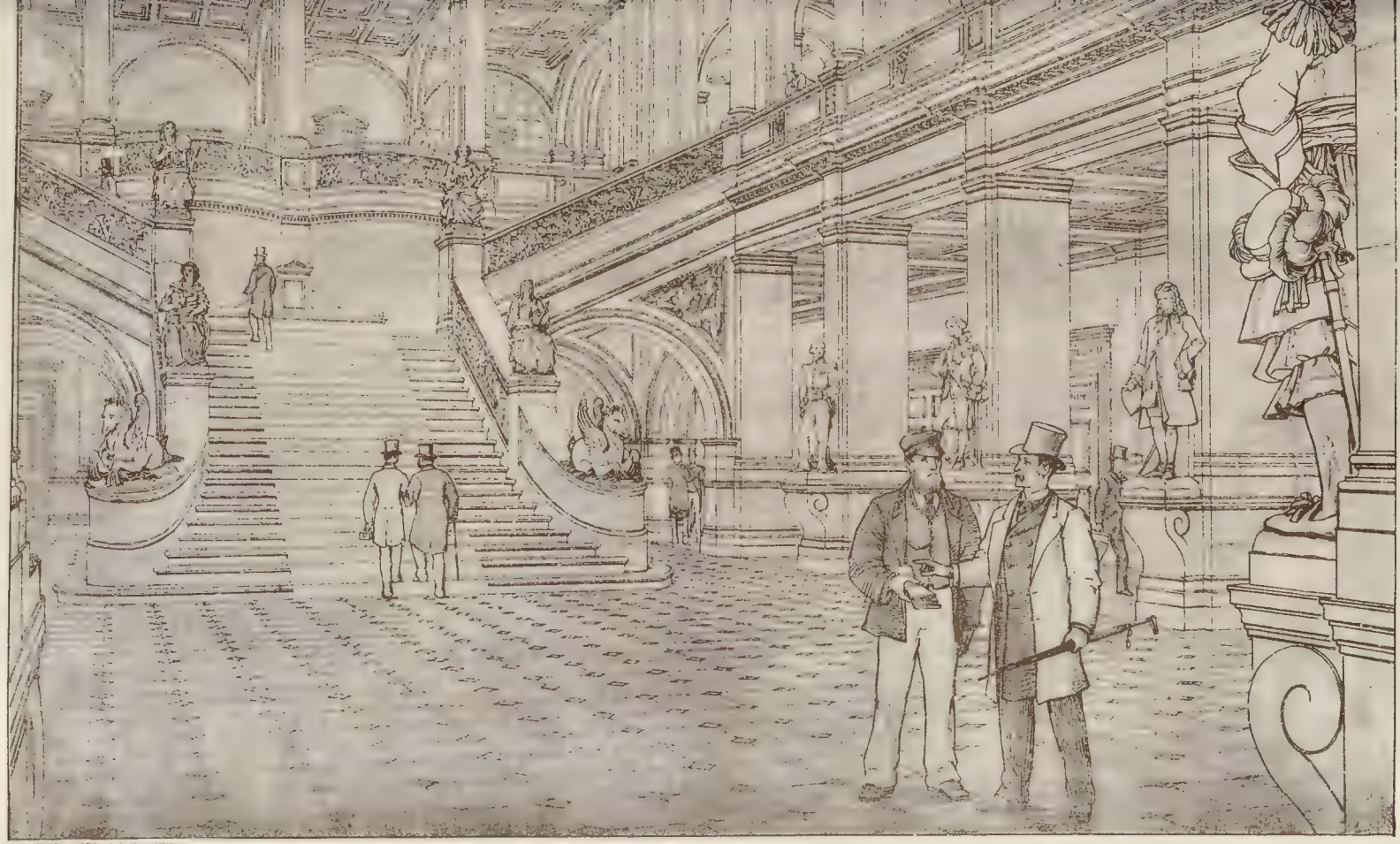



DESIGN FOR WAR AND ADMIRALTY OFFICES,

By Messrs. Leeming & Leeming.

Detail Elevation.

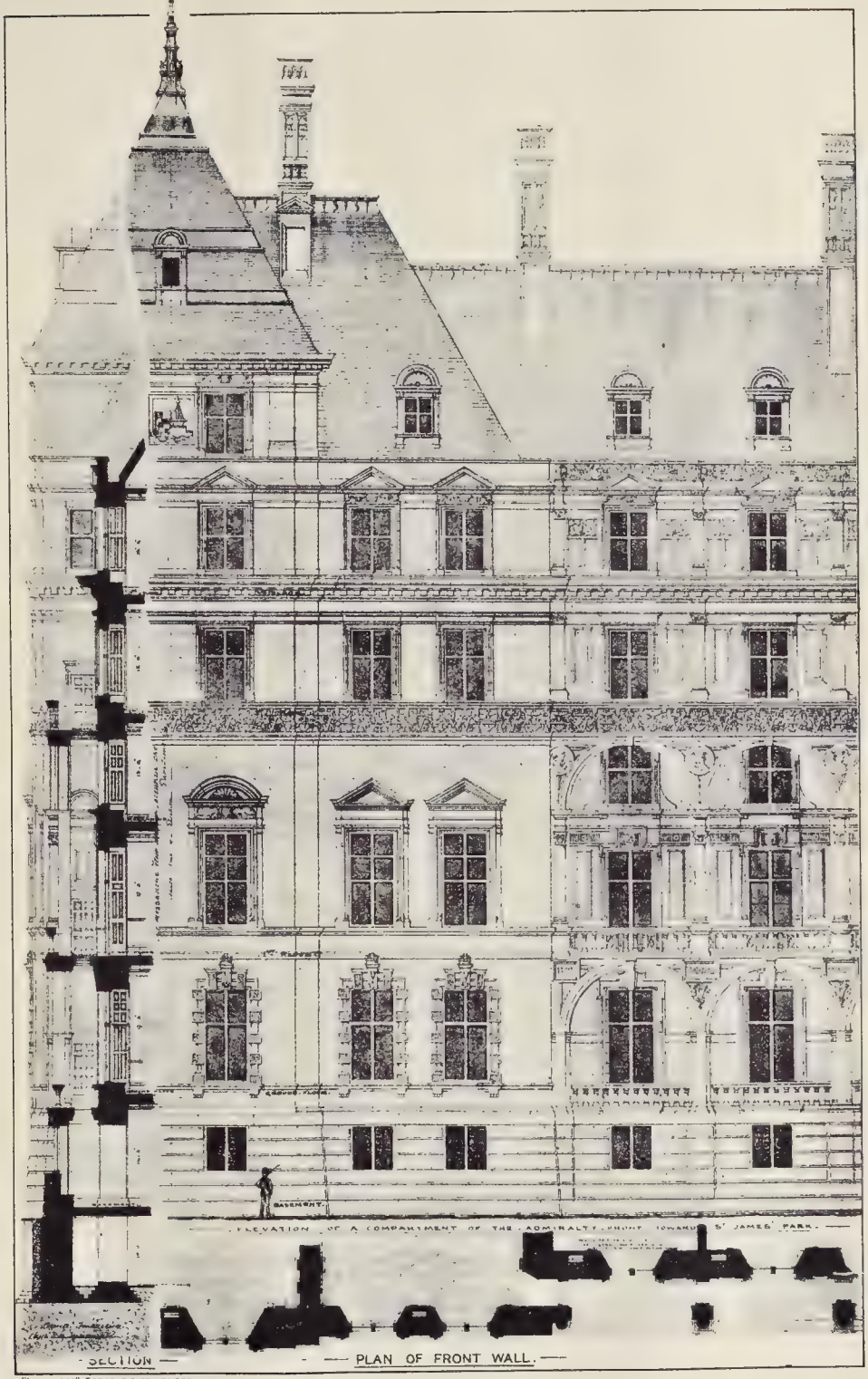




DESIGN FOR WAR AND ADMIRALTY OFFICES.

By Messrs. Aston Webb & E. Ingress Bell.

Glazed Court and Staircase, Admiralty Department.




"INK PHOTO" SPRAGUE & Cº LONDON

DESIGN FOR WAR AND ADMIRALTY OFFICES,

By Messrs. Aston Webb & E. Ingress Bell.

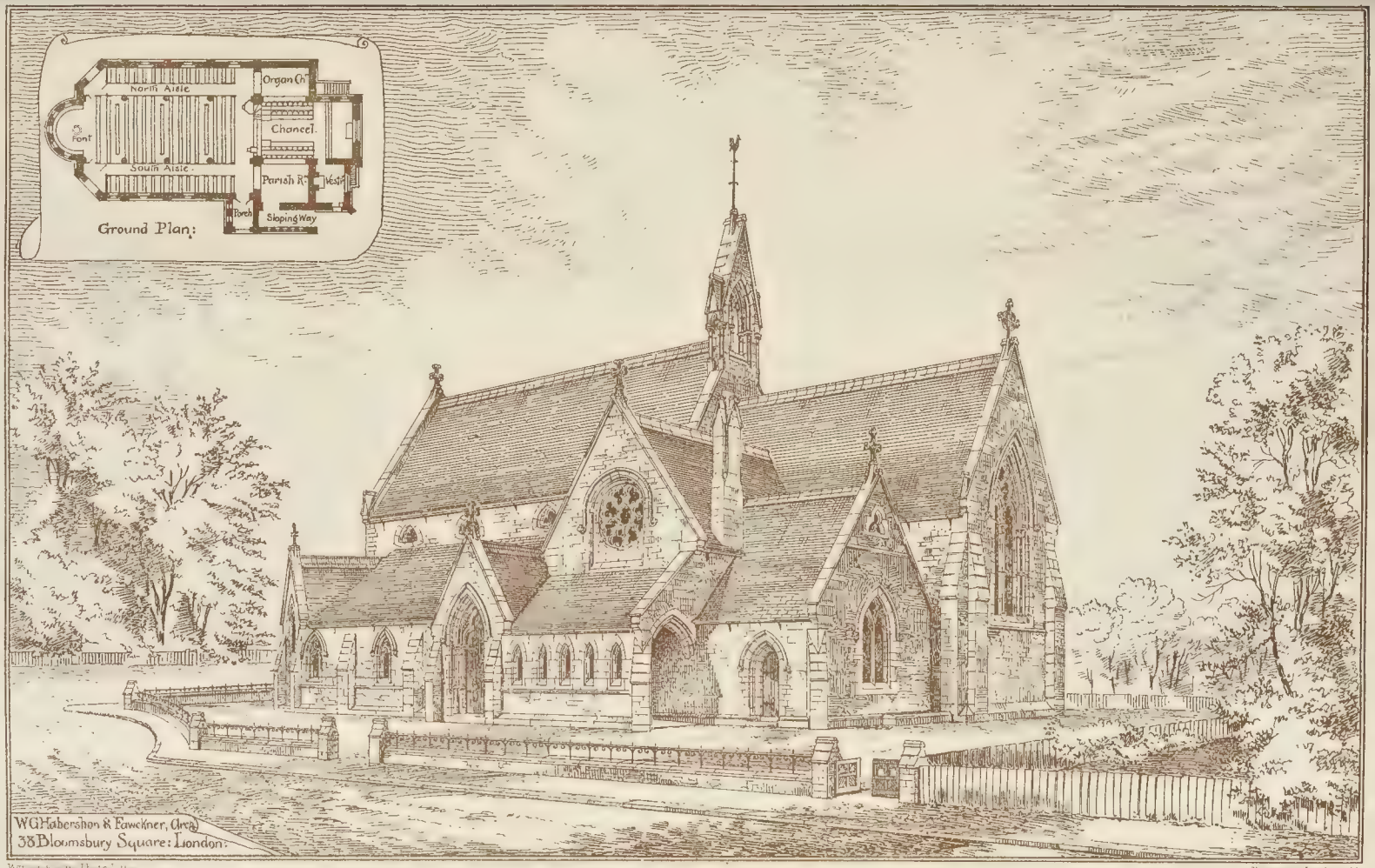
Detail Elevation.



"INK PHOTO. SPRAGUE & Co. LONDON

MEMORIAL STATUE OF THE LATE LORD FREDERICK CAVENDISH.

Mr. A. Bruce Joy, Sculptor.




PROTESTANT CHURCH AT HYÈRES.

## THE SOCIAL SCIENCE CONGRESS.

### ART DEPARTMENT.

In the course of the discussion which ensued upon the reading of the papers mentioned in our last (p. 419, *ante*),

Mr. T. C. Horsfall (Manchester) said he did not believe that the mere formation of the society suggested by Mr. Besant would be sufficient. Mr. Besant, he gathered, only contemplated the influencing of adults, but it would be necessary even more to get hold of the children. They must not rest contented till they had carried their system into every elementary school in the kingdom. It was necessary that they should keep in mind two principles, if any good or healthy knowledge of art was to be engendered, — in the first place they must teach the people to recognise the superiority of beauty, and in the next they must also have some means of calling their attention to it. They could not possibly attain these without introducing art into the schools. He believed the South Kensington authorities would do much more good if they lent to the local authorities specimens which appealed to the people's knowledge rather than the specimens which they now sent, and he moved a resolution to that effect.

Mr. P. H. Rathbone seconded the motion. They must appeal first of all to the scholars in the Board Schools, and they could only do that by receiving different specimens from South Kensington to those which were usually now sent. They must have specimens which appealed to the knowledge of the people to whom they were sent. He had been very much interested in what Mr. Tuckwell had said about the large number of new makes of artistic pottery, and he himself had been very much struck by the fact that, in pottery especially, they were witnessing efforts on the part of the manufacturers to excel each other in the artistic character of their work.

Mr. Osler (hon. local secretary) deprecated the passage of Mr. Horsfall's resolution, which, he said, was tantamount to asking the Department to go into competition with the shops, and would lead to a great deal of jobbery.

Mr. F. Willson insisted on the necessity of an education in colour for the young as a primary necessity for an appreciation of a love for art.

Mr. E. R. Taylor explained the principles on which the selections were made by the Science and Art Department for the loan collections in the provinces.

Mr. W. H. Wills, M.P., said he thought that Mr. Horsfall's proposition had been somewhat misunderstood by Mr. Osler, and was of opinion that South Kensington might be made to supply what he termed the missing link. Unless the artisan, or the child in the Board school, was taught to distinguish between what was radically wrong and what was intrinsically good, he did not see how they could make much progress. They must teach the A B C of any language before they could expect any one to progress with its literature. He was afraid, however, from his experience of South Kensington, that unless they found volunteers to explain the objects sent, they would not be of much use. He thought much more might be done by those who, like himself, were large employers of labour, if they provided in the buildings set apart for the refreshment of their workpeople some artistic decoration.

Dr. Heinemann spoke in terms of eulogy of the papers which had been read, and maintained that we must go to the elementary schools if we wished to change the artistic character of the people.

Mr. Mark H. Judge, hon. secretary of the Sunday Society, after an ineffectual attempt to move a resolution asking the Council to seek information from the towns where the museums and art galleries were opened on Sunday,—the Chairman having ruled it out of order,—urged that it was only by opening the museums on the only day of the week when they were available for the great bulk of the working classes that they could bring home to the masses a true appreciation of art.

Mr. Besant, in reply, pointed to what had been done in a single generation by South Kensington as evidence of what might yet be accomplished among the lower classes. He would have his proposed college as elastic as possible, both in regard to its curriculum and its management.

### ECONOMY AND TRADE DEPARTMENT.

At one of the meetings of this section, Viscount Lymington, M.P., presided over the discussion of the special question, "Would it be advantageous to give to leaseholders powers entitling them to the purchase of the fee simple of the lands and premises they occupy, or otherwise to interfere by law with the prevailing system of building and other long leases?"

Mr. John T. Emmett read a paper on the subject, and gave a description of the method of procedure in the manufacture of leaseholds. He observed that the legal costs are heavy, and are needful only because the system is cumbersome; that as a contrivance for inducing wretched building work and miserable houses for the population no more clever and efficient system could have been invented; that leasehold houses are inconvenient and the building is bad; and that this bad system is, in the metropolis and other districts, rapidly extending. The system was then shown to be enormously disadvantageous to the leasing freeholder, whose property is taken by the lessee at an abatement, owing to the nuisance of the tenure, of some 25 per cent. below the freehold value of the land. The reversion to the freeholder, at the end of the lease, of the lessee's property in buildings is only worth one-eighteenth part of the 25 per cent. and compound interest lost by the effect of the lease, which 25 per cent., moreover, had it been continuously employed in trade for ninety-nine years, would have amounted to about twelve hundred times as much as the reversion. Leasehold tenure is not the only cause of evil to house property, but it is a most malignant evil; and near London, and in many leasehold towns, the inferiority of leasehold houses to the corresponding work in freehold districts is remarkable. Enfranchisement would be gradual in its operation, and in due time universal, thus improving the condition and morals of the entire population.

Mr. J. S. Rubenstein submitted a second paper on the same subject, which was read by the hon. secretary. The writer started by asserting that there can be no dispute as to the evils of the present system of leasehold tenure. The opinion of the late Master of the Rolls, Sir George Jessel, was quoted to the effect that if lessors were to enforce their rights to the full extent allowed them by law, leases would not exist in this country for six months. The lessee, it was pointed out, is not a free agent in the matter of taking or refusing a lease, as in our large towns it is almost an impossibility to obtain a house fit for the lessee's purpose otherwise than on lease. The hardship to the lessee of being subject to unreasonable and antiquated covenants, and the injustice of sinking his capital in another man's soil in making any alterations or improvements, were dwelt upon. These troubles were, it was suggested, intensified where the lease is granted for lives and not for years, and the pernicious and immoral effects of this system were enlarged upon. Stress was laid upon the fact that the evils of leasehold tenure were not confined to the individual tenant, but that the community was interested in repressing the jerry building, the scamped work, and the sordid uniformity that disfigured the suburban districts, and attention was directed to the fact that neglect on the part of anyone of sanitary precautions may injuriously affect the health of others, however observant of hygienic requirements. The provisions of the two Bills introduced into Parliament by Mr. Broadhurst and Lord Randolph Churchill were briefly referred to. It was, however, suggested that there was one class of persons, the occupiers, whose interest deserved legislative consideration. The occupier was, for the time being, largely interested in the house, and the writer would confer on a *bonâ-fide* occupant, a person who had been in continuous occupation for, say five years, the right to acquire all superior interests. A special tribunal, after the model of the Court created by the Irish Land Act, was advocated as the best form of tribunal for assessing values.

Professor Leone Levi, in opening the discussion, said he desired that the labouring classes should have a greater interest in property. Let the franchise be extended to them, but give them, at the same time, something to defend. He presumed that the readers of the papers would limit their ideas to municipal areas; therefore they were now speaking of house property within the towns, and not of land in general. The terms would have to be settled by arbitration or by a competent tribunal. It was not a question of confiscation, but of giving fair value, and there would be considerable difficulty in settling the values of certain properties.

Mr. Hurst was inclined to believe that a man who had a ninety-nine years' lease was likely to build as well or even better than he would on his own land.

Mr. Rowlands (hon. secretary to the Leaseholds Enfranchisement Association) believed that no private Bill would carry out what they desired, but it could be done with the aid of the legal officers of the Crown. There seemed to be a tendency to deal with the matter only in its relation to London, but he believed the leasehold system had a much more detrimental effect in some of the provincial towns.

Mr. King Fordham thought that the evils of the present system were very much exaggerated. Those who wished to live in houses of their own would find little difficulty in doing so. It was desirable that there should be two distinct classes, the capitalists who built and the occupiers who inhabited.

Councillor Granger (Birmingham) remarked that the papers had only dealt with the transference of property from one individual to another, forgetting that it was the community at large who made the increased value, and who should have the advantage of the unearned increment. Land ought to be made a marketable commodity; and the proposals of Mr. Broadhurst and Lord Randolph Churchill were a mere tinkering with the question. It was said that a man who built ought to be able to purchase the ownership of the land, but the most difficult part of the question was the standard of value to be fixed. In order to maintain the sanitary position of large towns the generality of dwelling-houses ought to be rebuilt every third generation. There was a great difference between moderately substantial and "jerry" buildings. He admitted the want of a thorough reform of the land laws, but unless it were thoroughly done the land would get into the hands of capitalists, who were worse, as far as workmen were concerned, than the large landholders. The Scotch system of feuing would, if adopted in England, meet all the wants of the community as far as the individual transfer of land was concerned. The Birmingham Improvement Scheme was running on the right lines. The Corporation bought land at its current value, but anticipating that with the progress of the town its value would increase, and giving the community the whole of the increased value.

The Chairman, in summing up, said they were all convinced of the importance of increasing the ownership of land. He had gone so far in that direction as to second on two occasions a proposal introduced by Mr. Jesse Collings, which would have the effect of enabling the State to lend its credit for the purpose of increasing the number of owners. He had opposed Mr. Broadhurst's Bill, not being convinced of its practical benefit. The gist of the matter depended on the unearned increment on land. The great question was to make the law insist that the tenure of land in the large cities should be used for the advantage of the community and not of the individual. Mr. Broadhurst suggested that this would, to a large extent be effected by conferring on every leaseholder the potential right to become a freeholder. In the course of the debate those who supported his views had not answered the financial difficulties embodied in the proposal. It seemed to him that Parliament had a doubtful right to interfere with and override the conditions of a contract originally entered into. The solution of the question seemed to be in the direction of the municipalisation of land, and he could not see why large corporations should not possess compulsory powers to purchase land from individuals on fair terms.

### HEALTH DEPARTMENT.

In this department, Mr. J. Hamer, honorary secretary to the Mansion House Council on the Dwellings of the People, contributed a paper upon "What are the best means, legislative or other, of securing those improvements in the dwellings of the poor which are essential to the welfare of the people." Amongst the "other" means for remedying the particular evils, the writer placed in the foremost rank associations of men and women whose object was by personal visitation of and familiar intercourse with the masses to arouse

quality of architectural design,—dignity,—it is superior to them. The introduction of columns extending through two stories secured this effect, so important in a national building of immense size, while, at the same time, variety in the subdivision of the height of the façade was secured. All things considered, I venture to think that the judges have come to a fair and just decision. At the same time, it must be remembered that there are 119 other designs which the judges alone have seen, but which I venture to assert the public had a *right* to inspect. What I have ventured to object to above is,—though very important,—a matter of detail. It shows, however, such poverty of resource that I feel convinced it will, in some way or other, be altered. The lower entablature must be got rid of. The fenestration is, of course, fixed. The difficulty would appear to me to be solved by slightly reducing the height of the columns and turning arches from them. By this arrangement we should have elegance and variety in place of the proposed rigidity and monotony.

SIGMA.

## The Student's Column.

### ON THE CONSTRUCTION OF FLOORS.

I.

THE nature of the materials employed in the construction of the floors of a building, as well as the mode in which they are applied, must depend on the character of the building, and the uses to which it is to be put when completed. The surface of the floor may be of wood, stone, cement, or asphalte, while the substructure may be of timber, iron, concrete, or brick.

Wooden floors are those most commonly used in this country, and consist of thin smooth boards, nailed closely together, and laid perfectly level upon a row of timbers placed across from wall to wall, and called *joists*. In carpentry the term "floor" is applied to the timbers only which carry the boarding, to which the term "naked flooring" is sometimes applied, and we shall now consider the modes in which these timbers can be arranged so as to give the greatest amount of firmness to the floor.

*Single-joisted* floor is the simplest kind of naked flooring that can be employed, and is the one most commonly used for private dwellings and other buildings where the span between the walls is not very great. The joists are narrow beams, 2 in. to 3 in. thick, and varying in depth from 4 in. to 12 in., according to the distance apart of the bearings; these are placed horizontally across from wall to wall without any intermediate supports, and from 10 in. to 12 in. apart, their ends should be made to rest upon flat pieces of timber bedded on the walls and called *wall-plates*, which are generally 4½ in. wide by 3 in. thick; the ends of the joists being spiked to the plates, and resting not less than 4 in. upon them. The ends of the joists should not touch the brickwork or masonry, but a space of about ½ in. should be left between the wood and the walling to allow the circulation of air, and prevent the ends of the joists from rotting. In houses having back and front rooms with a partition between them, the joists should, if possible, be laid in one length from front to back wall, and rest upon a plate on the cross-wall or partition, as their strength and stiffness are greater when they are in one length than when in two lengths. The joists should never be laid wider apart than 12 in. where ordinary floor-boards and ceiling-laths have to be fixed to them; in fact, 12 in. from centre to centre is the most convenient both for floor-boards and ceiling-laths, since the latter are generally 3 ft. in length.

The *scantling* of joists, or the dimensions of breadth and thickness, will depend upon the length of bearing or clear space between the points of support. Allowing 1 cwt. per foot superficial as the utmost weight that an ordinary house-floor will have to sustain, the minimum depth for fir joists 2 in. thick and 12 in. apart from middle to middle, should be as follows:—

| Length of Bearing. | Depth. |
|---|---|
| 5 feet. | 4 inches. |
| 7 ,, | 5 ,, |
| 10 ,, | 7 ,, |
| 13 ,, | 9 ,, |
| 16 ,, | 11 ,, |
| 18 ,, | 12 ,, |

If the scantling is made less than the above, the vibration produced by persons moving about on the floor will cause cracks to appear in the ceiling below, and will also tend to weaken the walls of the house. When the bearing exceeds 8 ft., it is advisable to stiffen the joists by means of a row of crossed pieces of wood nailed between each pair, called *herring-bone strutting*; of which there should be two rows when the bearing exceeds 12 ft. Before fixing the strutting, a slight camber is sometimes given to the joists by placing a plank underneath them, and forcing up the centre about 1 in.; this plank being removed after the strutting is fixed causes it to tighten so as to render the floor more rigid.

In order to lessen the liability of the ceiling under a single-joisted floor to become cracked, Tredgold suggests that every third or fourth joist be made a little deeper than the rest, and the ceiling joists fixed to the deeper ones, and crossing them at right angles, being notched and spiked to the underside; by this plan the depth is but slightly increased, sounds will not pass so freely as in an ordinary single-joisted floor, and the ceilings will stand better.

The passage of sound through floors is usually prevented to a considerable extent by nailing fillets of wood half-way down the sides of the joists, and laying short pieces of rough board upon them, so as to form a floor on which a coating of rough plaster, called pugging, is laid about 2 in. in thickness.

It is sometimes necessary to leave an opening in the naked floor wider than the space between two joists, in which case one or more joists have to be stopped short of the opening, and their ends are let into a cross piece of timber called a *trimmer*, which itself has the ends let into the two joists which form two sides of the opening. A plan of this arrangement is shown on fig. 1, where *a a* are the trimmers; *b b* the

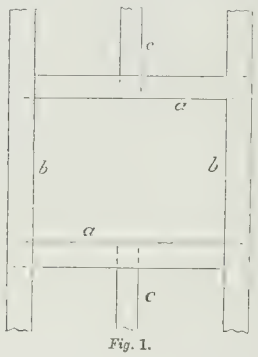



*Fig.* 1.

trimmer joists, to which the trimmers are fixed by means of tenons cut on their ends, and let into mortises in the middle of the joists; the joists, *c c*, are cut off to allow for the opening and their ends tenoned into the trimmers. The trimmers and trimmer-joists should be rather thicker than the other joists, to allow for the additional strain upon them, and the reduction of strength by cutting away for mortises. In the case of a chimney opening, the trimmers have one end resting on the wall at the side of the chimney-breast, and a fillet of wood is nailed at the side of the trimmer-joist to support one side of a brick trimmer-arch, which is thrown across to the chimney-breast for the purpose of carrying the stone hearth. According to Tredgold, it will be sufficient to add ⅛ in. to the thickness of a trimming-joist for each joist supported bp the trimmer.

The mode of constructing the lowest floor of a building where the floor is raised only a foot or two above the ground, differs somewhat from that of the upper floors, advantage being taken of the nearness of the ground to make it act as a direct support to the timbers. Brick piers or walls are built about 5 ft. apart across the building, and on these are laid horizontal pieces of timber called *sleepers*, generally about 4 in. by 3 in.; the floor-joists are laid across the sleepers and spiked to them; the bearing being short we are enabled to use joists of light scantling, about 4 in. by 2 in. being sufficient for ordinary floors. In this kind of floor no trimming is required round the fireplace, *fender* walls being built to support the hearth, and also to receive the ends of the joists. Air gratings should always be introduced in the outer walls below the level of the ground-floor to allow a free circulation of air, so as to prevent the timbers from being affected by dry-rot. A coating of concrete and asphalte, or else a layer of smith's ashes should be laid on the surface of the earth to prevent damp and noxious exhalations from rising to the floor above, and all vegetable mould or other organic matter must be removed from the ground before the building is commenced. It is recommended that the sleepers should be charred on the surface before being laid to prevent them from being attacked by dry-rot.

*Double-floors* are those in which the floor-joists and ceiling-joists are quite distinct, being notched and spiked to stronger timbers called *binders*, which are laid from wall to wall, and placed from 5 ft. to 10 ft. apart. Fig. 2 shows

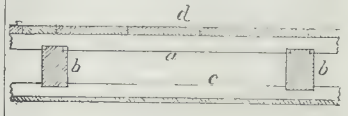



*Fig.* 2.

section of a double-floor taken across the binders, *b*; *a* being the floor-joist notched upon the top of the binders, *d* the floor-boards, *c* the ceiling joist notched to the underside of the binders. Fig. 3 is a section taken at right

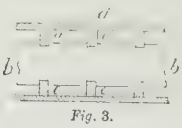



*Fig.* 3.

angles to the previous one, and across the joists *a* and *c*, *b b* representing the binder taken longitudinally. This kind of floor is most effective for preventing the passage of sound, and also for preserving the ceiling from being injured by cracks. The following are the depths that may be given to the binders when placed 6 ft. apart according to the length of span for ordinary house floors, the breadth being supposed to be 6 in. in all cases; for 12 ft. bearing, 11 in. deep; for 15 ft., 13 in. deep; for 18 ft., 16 in. deep. The floor-joists may be 4½ in. by 2 in., and the ceiling-joists 3 in. by 2 in. If the binders are placed further apart than 6 ft., their scantling must be increased accordingly, and that of the floor-joists must be as given above for single joisted floors.

If the floor has to carry heavy weights, as in warehouses, the scantling of the binders and floor-joists must be increased; for ordinary warehouses, binders having a 10 ft. bearing require to be 12 in. deep by 10 in. wide if placed 6 ft. apart; for 15 ft. bearing they should be 12 in. wide by 15½ in. deep; and for 20 ft. bearing they require to be 14 in. wide by 19½ in. deep. The floor-joists having 6 ft. bearing should be 9 in. deep by 3 in. thick.

In framing these floors the notching out of the joists where they rest on the binders should be as small as possible, since the more we cut away the weaker they become; a notching of 1 in. in depth will generally be ample, and a notching, 1 in. square, may be cut out of each side of the binder, so as to allow the full depth of the joist to rest upon it, as shown at *b* in fig. 2.

Sometimes the floor-joists are omitted altogether, and floor-boards, 3 in. thick, laid directly on the binders, which, in that case, must not be placed more than 3 ft. apart; this method, however, is not an economical one as far as quantity of material is concerned, although there is less labour required in the construction; it is only employed where an extra thickness of floor-board is necessary from the heavy wear and tear to which the floor is subjected.

*Framed-floors*, properly so called, are those in which the binders do not rest directly on the walls of the building, but have their ends framed into larger beams, called *girders*, laid across from wall to wall. This method is generally used where the span between the walls is very considerable. The method of framing the binder into the girder is shown on fig. 4, where *G* represents the cross-section of the girder, *B* the binder placed lengthwise at right angles to the girder; the tenon *a* should be about one-sixth the depth of the binder, and should be cut at one-third of its depth from the bottom; it should enter the girder as near as

possible to the middle of the depth of that beam which is the part where the girder is subjected to the least strain. The floor-joists *b* are notched on the top of the binders as before

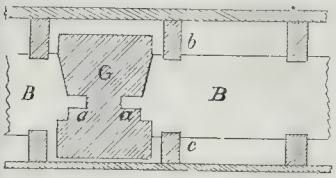



*Fig. 4.*

described, unless thick boards are used for the flooring and nailed upon the binders themselves, in which case the top of the binders must be placed on the same level as the top of the girders. If there is to be a ceiling below, then the ceiling-joists *c* must be fixed to the bottom of the binders, and must be of sufficient depth to clear the bottom of the girder as shown in the figure.

The scantling of the girders depends upon the distance they are placed apart, the length of bearing or span between the walls or supports, and the loads they have to carry. When placed 10 ft. apart from middle to middle the scantling of girders for ordinary floors, allowing 1 cwt. as the load on every square foot of flooring, should be as follows:—For 17 ft. bearing, 12 in. wide by 13 in. deep; for 20 ft. bearing, 12 in. wide by 15 in. deep; for 22 ft., 12 in. by 16 in.; for 25 ft., 12 in. by 18 in.; for 30 ft., 15 in. wide by 22 in. deep. If the floor has to carry very heavy loads, as in warehouses, factories, and such like buildings, the additional strength may be obtained by placing a pillar of wood or iron under the centre of the girder, by which means it is enabled to carry four times as much load as before. If the length of the pillar is 12 ft., and made of oak, it should be $6\frac{3}{4}$ in. square for a girder of 20 ft. bearing, and $7\frac{1}{2}$ in. square for a girder of 30 ft. bearing.

When timbers of large scantling are employed for girders it is best to saw them down the middle longitudinally, reverse the ends and bolt them together, with slips of wood between the two halves to keep them about an inch apart, the saw-cut being vertical. By this means the carpenter is enabled to see whether the baulk is sound in the middle, as it is in the centre that decay usually commences. By reversing the ends the strength of the beam is more equalised; and by leaving a space between the halves the air is allowed to circulate, and prevents decay. The strength may be somewhat increased by fixing an iron tie-rod between the two halves of the girder, in the manner shown on fig. 5, two pieces of iron being fixed

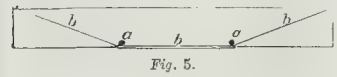



*Fig. 5.*

at *a* on the bottom edge of the beam, the rod *b* being passed under them and bent at an angle, and secured at the top ends of the beam by means of nuts and screws, which enable it to be tightened up; by this means a slight camber or rise in the middle can be given to the beam, and its stiffness considerably increased. This method is called trussing a beam, and a girder so treated is termed a *trussed girder*.

A method of increasing the stiffness of a girder is shown on fig. 6; the beam being

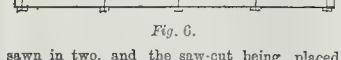



*Fig. 6.*

sawn in two, and the saw-cut being placed horizontally; the two halves are kept apart by blocks of wood, *a*, which increase its depth, and thereby the resistance of the beam to flexure, which, as we shall presently see, varies as the cube of the depth. Light iron bolts are used to hold the two halves together, the bolts passing through the intermediate blocks. By this method we can get a beam of greatly increased strength and stiffness, with very little more material than is used in a much weaker beam, as the middle of a beam has very little strain put upon it when loaded, and the removal of that portion takes very little away from its strength.

## TEACHING PERSPECTIVE.

Sir,—The diagrams and explanations giving a simple lesson in perspective in the Student's Column of your last issue show lucidly the system as adopted by architectural draughtsmen, and as taught in architects' offices. The principle can be mastered in half an hour, and is applicable to the most elaborate architectural drawing. Students who have not been taught this practical way must be indebted to you for publishing it.

I wish, however, to call your attention to the fact that the examination papers issued by the Science and Art Department at South Kensington to schools are prepared in such a way as prevents students from applying your system; and further, I am informed, by students who have attempted to work out their papers by this simple rule, that they have not passed, although able to draw correct archi ectural perspectives. I have also found from experience that students who had learned the complex mathematical system of the text-books used and taught from in schools of art, and had received the certificate of the Department, could make no *practical* use of the rules they had been taught.

I am in hopes you will use the powerful influence of your journal to get such a stumbling-block removed from the path of students.

David Barclay, F.R.I.B.A.

*Glasgow, Sept.* 27, 1884.

*** We have always considered, and have frequently said, that the study of perspective is rendered needlessly difficult by those complicated systems and diagrams which make a mystery of what really is a simple principle, capable of universal application when once grasped.

## THE SOANE MEDALLION COMPETITION.

Sir,—I should be much obliged if any reader could tell me whether persons other than students or members of the Royal Institute of British Architects can go in for the "Soane Medallion" competition. Jack.

*** The competition for the Soane Medallion is open to *all members of the profession under the age of thirty years*. See "General Conditions" and particulars, which may be had for a few pence by writing to the Secretary of the Institute.

## MEETINGS.

Monday, October 6.

*King's College, London.*—Mr. W. G. McMillan on Fuel (1). 7 p.m.

Tuesday, October 7.

*Royal Victoria Hall (Waterloo-road).*—Mr. P. H. Carpenter on "Our Bodies, and How they are Kept Going" (Penny Science Lecture). 8.30 p.m.

Wednesday, October 8.

*Crystal Palace School of Art.*—Mr. G. Richards Julian on "Styles of Architecture and their Relation to the Art of Landscape Gardening" (1). 4 p.m.

Friday, October 10.

*Architectural Association.*—Annual *Conversazione*, in the galleries of the Royal Institute of Painters in Water Colours, Piccadilly. 8 p.m.

# Miscellanea.

**Builders' Clerks' Benevolent Institution.** A special general meeting of the subscribers and donors was held at the new offices of the Institution, 21, New Bridge-street, Blackfriars, on Tuesday evening last, September 30th, when Mrs. M. E. Robinson and Mrs. A. P. Friend were duly elected pensioners on the Relief Fund. At the close of the proceedings, a vote of thanks was tendered to Mr. Thos. Stirling (who was supported by Mr. J. Howard Colls, Mr. H. Weller, of the Weston Quarries, and other gentlemen) for his kindness in presiding in place of the president, Mr. Joseph Randall, who was unable to attend.

**Typhoid Fever in Kidderminster.**—In consequence of the alarming spread of typhoid fever in Kidderminster a Local Government Board Inquiry is being held by Dr. Parsons, and the Corporation and their sanitary officers are now engaged in investigating the cause of the epidemic. The Corporation have called in to advise them Mr. Edward Pritchard, C.E., of Birmingham.

**Glasgow Institute of Architects.**—On the 25th ult. the annual excursion of the Glasgow Institute of Architects took place. The party started by the 9.50 train from the Central Station, and arrived at Merchiston, near Edinburgh, about eleven o'clock. From Merchiston they drove to Dalmeny Church, where nearly an hour was spent in examining this interesting building, claimed to be the most perfect remaining example of Norman work in Scotland. Lunch was served at South Queensferry, and the party then drove on to Hopetoun House, the seat of the Earl of Hopetoun. The central portion of this large building was designed by Sir William Bruce in 1702, and the wings by Robert Adam at a later date. The collection of paintings and other works of art was examined with great interest. About half-past three the party arrived at the Forth Bridge works, where they were met by Mr. Arrol, and the rest of the afternoon was syent in a careful examination of this undertaking. A drive to Edinburgh, and dinner in the Windsor Hotel, under the presidency of Mr. James Thomson, F.R.I.B.A., closed the excursion, and the party returned by an evening train to Glasgow.

**Art Copyright.**—A telegram from the Brussels correspondent of the *Daily News* states that at the Wednesday morning sitting of the Literary and Artistic Congress, in the discussion of the question of artistic property it was admitted that there are two kinds of property involved,—the one material (that of the picture or statue sold), the other immaterial (that of the conception of the work of art). It was impossible for the congress to settle the relations between the artist and the purchaser. After a debate in which several members took part, the congress voted two resolutions proposed by the committee:—First, the right of reproduction of a work of art belongs to the artist independently of the material property of the work. Consequently, the disposal of a work of art does not imply on the part of the artist, unless in case of express stipulation, the alienation of the right of reproduction. Secondly, All reproduction unauthorised by the artist, even by a different art, is an infringement of the artist's right.

**Cumberland and Westmoreland Archæological Society.**—The second two days' meeting of the season of the Cumberland and Westmoreland Antiquarian and Archæological Society commenced on the 25th ult. Under the guidance of Dr. Parker the company went, in the first place, to Waberthwaite from Eskmeals, visiting the church and cross. After luncheon they went along the new road which Lord Muncaster has made through his park at Muncaster Head, and visited the Roman tile-kiln which was found when excavating the new road. This kiln was explained by Dr. Parker and Mr. Ross, Lord Muncaster's steward. From here the company went to Dalegarth Hall, and Mr. C. J. Fergusson, of Carlisle, and Dr. Parker read papers. The visitors then proceeded to Hardknott Camp, and to Seascale, where, after dinner, a meeting for the transaction of business was held, Dr. Parker presiding.

**A Man Killed by Electricity at the Health Exhibition.**—Mr. A. Braxton Hicks, the deputy-Coroner for Westminster, held an inquiry on Wednesday at St. George's Hospital respecting the death of Henry Pink, working electrician, who was killed at the Health Exhibition by an electric shock on Saturday evening last. The deceased has been engaged at a powerful dynamo machine, which generated a current utilised for illuminating purposes. He had informed his father that he was acquainted with the working of the machinery, but it appeared by some carelessness or inadvertence he placed his hands in such a position that the current was diverted, and, passing through his body, killed him. The jury returned a verdict of "Accidental death," expressing their opinion that, though there was no danger to the public, a notice that the machines should not to be touched with both hands at the same time should be posted at the spot.

**The National Art Library.**—The new rooms devoted to the National Art Library at South Kensington Museum were opened for public use on Tuesday last. There are in the library upwards of 60,000 volumes and over 196,000 drawings, designs, engravings, prints, and photographs, all bearing upon art. The number of readers has reached a normal yearly average of 24,000. The new reading-rooms will accommodate about 160 readers with comfort.

**The Fatal Accident in a Board-School Playground.**—Last week Dr. Diplock, the coroner for Middlesex, concluded the inquiry into the death of the little girl who was killed by the breakage and fall of a pole of the "giant's stride" which formed part of the gymnastic apparatus in the playground of a Board-school at Queen's Park, Paddington. On behalf of the School Board, Mr. Spencer Chadwick, of 17, Parliament-street, Westminster, architect and surveyor, deposed that he had seen the pole, and was of opinion that had it been in frequent use it would have shown signs of weakness before it fractured, and had the pole been moved, as it would have been by use, the water would have found its way down to a lower level than where it had evidently lodged, and that portion where the fracture is would then never have become so saturated. The pole was comparatively sound a few inches below the fracture, and was a good piece of wood. On the other hand, William Brace was called, and said that he was a timber foreman, and had been thirty-two years in the business. He had examined the broken pole, and his opinion was that the timber was put into the ground when it was wet. It was also tarred, or "pickled," which caused the sap to flow to the heart of the wood and perish the grain.—By jurymen: A pole planted in that condition would rot in five to seven years. That in question was yellow Dantzig (spruce) (?). In his opinion, it had never been properly inspected.—The jury announced as their verdict, "Accidental death," expressing the opinion that the School Board for London was to blame for not providing efficient inspection.

**Amusements for the People.**—The concert season at the Royal Victoria Hall and Coffee Tavern (long known as the Victoria Theatre), Waterloo Bridge-road, commenced on Thursday last, Oct. 2. This and the second Thursday evening concert, to take place on Thursday next, are under the charge of Mr. Lenthal Swifte. Arrangements for several succeeding concerts are being rapidly completed with well-known singers. Much care is being given to the arrangement of the programmes so as to secure all possible brightness and variety. The "penny science lectures" have also been commenced, the first one having been given by Dr. Andrew Wilson on "Our Bones: what they are, and how they are made." The lecture for Tuesday next will be by Mr. P. H. Carpenter on "Our Bodies, and how they are kept going." The lecture on Tuesday, Oct. 14, will be on "Air and Ventilation," by Mr. J. M. Thomson, F.R.S.E.

**East London Union for Advanced Education.**—This society is commencing a series of evening classes on Monday evening next at Dempsey-street, Jubilee-street, Mile End, and we learn that the Council have secured the services of Mr. Howlett, practical carpenter and builder, certificated by the Science and Art Department and the City and Guilds of London Institute, to teach Building Construction and Carpentry during the course extending from October to May. The Council have also secured the services of Mr. G. C. Dymond, practical engineer, certificated by the Science and Art Department, to teach Machine Construction, Mechanical Engineering, and Steam; and those of Mr. Cooms, architect, to teach Practical, Plane, and Solid Geometry. The Hon. Secretary of the classes is Mr. F. H. Parsons, White Horse-lane, E.

**The Societe d'Encouragement pour l'Industrie Nationale**, founded in 1801, and declared of public utility by a decree of 21st April, 1824, has determined the subjects for the competition of 1886. The large medal, bearing the image of Jean Goujon, will be devoted to Architecture and the Fine Arts. The following have been the recipients of this prize:—1870 (Commerce), M. F. de Lesseps; 1870 (Chemistry), M. H. Sainte Claire Deville; 1872 (Agriculture), M. Bonssingault; 1873 (Physics), Sir Charles Wheatstone; 1875 (Commerce), Mr. Jacques Siegfried; 1876 (Mechanics), M. H. Giffard; 1877 (Chemistry), Mr. Walter Weldon; 1880 (Fine Arts), M. Charles Garnier. Further information may be obtained at, and descriptions should be addressed to, the offices, 6, Place Saint-Germain des Prés, Paris.—*Society of Arts Journal.*

**Crystal Palace School of Art, Science, and Literature.**—The programme for the twenty-fifth session, 1884-85, includes a course of six lectures on "Styles of Architecture and their Relation to the Art of Landscape Gardening," by Mr. G. Richards Julian, A.R.I.B.A.

**Building Estates at Clapham and Stockwell.**—The estate on the east side of High-street, Clapham, formerly belonging to the trustees of the Clapham Grammar School, is about to be built upon, having just been disposed of on lease. The estate covers an area of between two and three acres, and has been laid out for the erection of about sixty houses, letting at rentals ranging from 50*l.* to 60*l.* per annum. A new road, 40 ft. in width, called St. Luke's-road, approached from High-street, passes through the centre of the estate, and is at present being drained and paved by the freeholder. The houses are intended to be built with red brick. The architect to the estate is Mr. W. Randal Lacy, and amongst the principal lessees and builders are Mr. H. A. Brown and Mr. Bach, both of Clapham.——The Stockwell Small-pox Hospital in Landor-road, about midway between the Brixton and Clapham roads, seems no longer to have any terrors for the speculative builder. Within the last twelve months upwards of 500 houses have been erected on two large estates, which have been laid out immediately in front of the Hospital, and tenants are found for the houses almost before they are completed. What has for many years been known as Theobald's Farm, immediately adjoining the Hospital, on the east side, has now got into the hands of the builder, and the stables and other buildings on the estate are now in course of demolition preparatory to the laying-out of several new streets, in which between 300 and 400 houses will shortly be erected.

**The Surveyorship of Chelsea.**—At the meeting of the Chelsea Vestry on the 16th inst. consideration was given to the letter from Mr. George H. Stayton, C.E., dated August 5th (to which we have previously referred), resigning the office of Engineer and Surveyor to the Board. Mr. Churchwarden Wheeler moved "That Mr. Stayton's resignation be accepted by the Board, with very sincere regret, accompanied with every expression of their high appreciation of the talents he has displayed during the nine years and a half he has held the appointment, and with their best wishes for his health, prosperity, and success in any sphere of action he may hereafter enter upon." In supporting the resolution, Mr. Wheeler spoke at length upon the importance of the works carried out by Mr. Stayton, of his successful administration, and of the great regret that all felt at his departure. Mr. Davidge seconded the resolution, which was agreed to *nem. con.*, and it was determined to engross it, and present it to Mr. Stayton. Mr. Stayton at the same meeting submitted to the Vestry a report which he had been instructed to make to them as to the electric lighting at Colchester, to which we may return.

**Conservatory at Bradford.**—The Mayor of Bradford has just added a spacious conservatory to his residence at Daisy Hill, Bradford. All the latest improvements in ventilating apparatus and hot-water heating have been introduced. The conservatory may be described as a rectangular building, 40 ft. long by 25 ft. broad. The whole work has been designed and carried out by Messrs. Messenger & Co., horticultural builders, of Loughborough, who have also carried out the heating of the building with their patent elastic jointed pipes.

**University College, Bristol.**—As will be seen by an advertisement in another column, a special course of instruction has been arranged for those intending to become architects, which has received the entire approval of local architects. Among other lectures and classes are included lectures on the history of architecture, and also the theoretical and practical treatment of the science of building. The engineering department of the college also includes special courses for those intending to become civil, mechanical, or electrical engineers, or surveyors.

**The New Council Chamber of the City of London** was opened on Thursday last, the 2nd inst. The building has already been pretty fully described in our columns, but there are a few details of interest to which we may return. A large view of the interior was published in the *Builder* nearly a year ago (Dec. 1, 1883). The building reflects much credit on the City Architect, Mr. Horace Jones.

**"Sanitation at Brighton."**—As to the notice of Mr. Chappell's new flats at Brighton under the above heading in last week's *Builder* (p. 421), we are asked to say that they were dried by Messrs. A. Dreyfus & Co. with "Ligny's Patent Process."

**New Bank of Victoria, South Melbourne.** One of the newest buildings in the new city of South Melbourne is that lately erected for the Bank of Victoria. It has a frontage of 40 ft. to Clarendon-street, with an elevation of 41 ft. The lower story is carried out in the Doric order, set on a polished Malmsbury base-course, having an imposing entrance to the banking-chamber, with columns on each side, surmounted with pediment, terminating with a Doric cornice. The upper story is in the Corinthian order, with columns above the main entrance, and circular windows and enriched impacts, above which is the Corinthian cornice and balustrade. The whole building (including fittings) have been erected under the supervision of and from plans drawn by Mr. W. S. Law, architect, South Melbourne. Mr. C. H. Martin is the contractor for the buildings, and the fittings were executed by Mr. Charles Beecham, of Post-office-place. The building will cost about 3,000*l.*—*Australasian Sketcher.*

**Phosphorised Brass Wire.**—The advantages of phosphorised wire are that it is very tough, takes a high polish, and does not corrode. The operation consists in placing bronze or brass wire in a solution of from 1 to 5 per cent. of phosphorus in either bi-sulphide of carbon or olive oil, together with 5 to 10 per cent. of sulphuric acid and 85 to 95 per cent. of water, until the metal takes up the phosphorus. The wire is then drawn to one number finer, and placed in a closed retort, with a thin layer of phosphorus, so that the vapour may spread over the surface of the wire. It is next packed in charcoal and kindled, and, after proper annealing, the wire can be again drawn to a finer number, the process being repeated until the desired fineness is obtained.

**Commercial Failures.**—According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the week ending Saturday, September 27th, was sixty-one. The number in the corresponding week of last year was 147, showing a decrease of eighty-six, being a net decrease in 1884, to date, of 5,033. The failures in the building trades last week numbered four, as against eighteen and fifteen in the corresponding weeks of 1883 and 1882 respectively.

**Westminster Technical Schools.**—The Technical Classes in connexion with the United Westminster Schools were opened on Wednesday evening by Sir J. C. Lawrence, bart., M.P., Mr. W. E. M. Tomlinson, M.P., and other Governors. The classes are held in the evening. The prospectus sets forth the very complete scheme of classes and lectures which has been arranged, the subjects including Drawing, Building Construction, and Machine Construction and Drawing. The fees are low.

**Westminster Abbey.**—The stone which is being used in the restoration works now in progress at Westminster Abbey is, we understand, being supplied by Mr. T. P. Lilly, of the Chilmark and Wardour stone quarries, Wiltshire. Mr. Lilly has supplied stone for a long time for restoration at Westminster Abbey, the Chilmark stone having been used by Messrs. H. Poole & Sons, the Abbey masons, for many years, notably in the Chapter House, the south transept front, and the north porch.

**Alnwick Water Supply.**—For some time past considerable inconvenience has been felt in summer time in consequence of insufficiency of water at Alnwick, and the local authorities have therefore resolved to go thoroughly into the question of increased supply and new waterworks. They have called in Mr. J. P. Spencer, C.E., of Newcastle-on-Tyne, to report upon the whole subject, and advise them as to the best means of providing for the requirements of the district.

**The Statuary for Blackfriars Bridge.**—The groups of equestrian statuary designed for the pedestals at the extremities of Blackfriars Bridge appear to have been decided on, and to include representations by Mr. Brock of Edward III.; by Mr. Hamo Thornycroft of Edward I.; by Mr. Birch of Henry V.; and by Mr. Belt of William the Conqueror.—*Athenæum.*

**Exhibition at Eastbourne.**—The Eastbourne Arts, Sciences, and Sanitary Exhibition was opened on the 23rd ult., in the Pavilion, Devonshire Park. Lectures on subjects more or less bearing upon the objects of the Exhibition have been delivered.

**Mr. Thomas W. Cutler.**—We learn with regret, which will be shared by many of our readers, that Mr. T. W. Cutler lies seriously ill at his house in Queen-square, Bloomsbury.

**Photographic Society of Great Britain** The private view of this year's exhibition takes place to-day (Saturday), October 4th. The exhibition will be opened to the public on Monday next, and will remain open until the 13th of November.

**The Inner Circle Railway.**—The Inner Circle completion line was opened for experimental traffic on Wednesday morning. In the event of the directors' expectations being realised, the line will be available for public traffic on Monday next.

# CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Broken Granite | Aldershot Local Board | W. L. Coulson | October 6th | ii. |
| Effluent Sewer | Warwick Town Council | E. M. Richards, C.E. | do. | ii. |
| Filter Bed | do. | do. | do. | ii. |
| Kerbing, Tar-Paving, &c. | Lewisham Brd. of Wks. | ... | October 7th | ii. |
| Building Room, Lambeth Infirmary | Guardians | ... | October 8th | ii. |
| Paving and Sewage | St. Luke's Vestry | *Official* | do. | xiv. |
| Workhouse at Mitcham | Grdns. of Holborn Un. | H. Saxon Snell & Son | do. | xiv. |
| Erection of Houses, Shops, &c. | ... ... | Geo. Fuller | October 9th | ii. |
| Supplying and Laying Cast-Iron Pipes | Hartley Wintny R.S.A. | J. R. Sisterson | October 11th | ii. |
| Brick Sewers | Birmingham Town Cncl. | W. S. Till | October 13th | ii. |
| Road Making and Paving | Camberwell Vestry .. | *Official* | do. | xiv. |
| Paving | Willesden Local Board | C. Claude Robson | October 14th | xiv. |
| Construction of Dock | Barry Dock & Railway Company | J. W. Barry & H. M. Brunel | do. | xiv. |
| New Post-office, Watford | Commissnrs. of Works | *Official* | do. | ii. |
| Structural Alterations, Town Hall | | | | |
| Heating and Ventilating | | | | |
| Tiled Dadoes | St. Helen's Corporatn | E. Kirby | do. | ii. |
| Marble Linings | | | | |
| Cleaning, Painting, &c. | | | | |
| Wood-Panelling | | | | |
| River Wall | West Ham Local Brd. | Lewis Angell, C.E. | do. | ii. |
| Repairing Tramways | St. Helen's Corporatn | G. J. C. Broom, Assoc. M.I.C.E. | October 15th | ii. |
| Masonry | Fulham Board of Wrks | *Official* | do. | xiv. |
| Drainage Works and Extension of Baths | Croydon Town Council | do. | October 16th | ii. |
| New Post-office, Victoria Docks | Commissnrs. of Works | do. | October 18th | ii. |
| Cast-Iron Pipes | Torquay Local Board | T. S. Weeks | October 20th | ii. |
| Sewers, Gullies, &c. | Commissioners of Sewers | *Official* | October 21st | ii. |
| Kerbing, Channelings, &c. | Brentford Local Board | — Lacey | do. | ii. |
| Steam-Engines, Boilers, &c. | Darlaston U. S. A. | E. Pritchard, M.I.C.E. | October 23rd | xiv. |
| Re-seating, &c., Parish Church, Lyme Regi | R. W. Hillman, Solicitr | Not stated | October 25th | ii. |
| Roads and Sewers | Boscmbe Con. Land Soc | R. G. Pinder | Not stated | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Surveyor | Chelsea Vestry | October 14th | 400*l.* per annum | xviii. |
| Borough Surveyor | Grimsby Town Council | October 18th | 200*l.* do. | xviii. |

## TENDERS.

For building Convalescent Hospital at Winchmore Hill, for the Metropolitan Asylums Board. Messrs. Pennington & Bridgen, architects:—

| | |
|---|---|
| Higgs & Hill | £91,840 0 0 |
| Lovatt | 91,316 0 0 |
| Parnell & Son, Rugby | 89,396 0 0 |
| J. Morter | 87,684 0 0 |
| Stevens & Bastow | 86,591 0 0 |
| Wm. Brass | 85,871 0 0 |
| G. Shaw | 85,800 0 0 |
| Chappell & Son | 85,444 0 0 |
| W. & J. Croaker | 84,889 0 0 |
| B. E. Nightingale | 84,839 0 0 |
| Wm. Shurmur | 84,700 0 0 |
| J. Lawrence | 84,000 0 0 |
| Neall & Son | 81,850 0 0 |
| Perry & Co. | 81,000 0 0 |
| Southern | 80,170 0 0 |
| E. C. Howell & Son | 79,900 0 0 |
| Wall Bros. | 79,427 0 0 |
| D. D. & A. Brown | 78,557 0 0 |
| Bull & Co. | 74,000 0 0 |
| Martin | 64,159 0 0 |

For new Board Schools, Queen's Head-street, for the School Board for London. Mr. E. R. Robson, architect:—

| | |
|---|---|
| L. H. & R. Roberts | £13,867 0 0 |
| J. & J. Greenwood | 13,650 0 0 |
| W. Goodman | 13,550 0 0 |
| W. Downs | 13,476 0 0 |
| Bangs & Co. | 13,326 0 0 |
| Scrivener & Co. | 13,229 0 0 |
| J. W. Hobbs | 13,168 0 0 |
| G. J. Williams & Son | 13,055 0 0 |
| J. Holloway | 12,990 0 0 |
| W. Shurmur | 12,978 0 0 |
| Stimpson & Co. | 12,969 0 0 |
| Lawrence & Sons | 12,953 0 0 |
| S. J. Jerrard | 12,933 0 0 |
| Perry & Co. | 12,915 0 0 |
| C. Wall | 12,850 0 0 |
| J. Grover | 12,846 0 0 |
| Lathey Bros. | 12,787 0 0 |
| Wall Bros. | 12,745 0 0 |
| W. Johnson | 12,700 0 0 |
| Atherton & Latta | 12,700 0 0 |
| C. Cox | 12,460 0 0 |
| J. R. Hunt | 12,389 0 0 |

For construction of reservoir, filter-beds, conduit, and the laying of eleven miles of cast-iron pipes, in connexion with the Stratford-on-Avon Water Works. Contract No. 4. Mr. E. Pritchard, C.E., engineer, Westminster and Birmingham:—

| | |
|---|---|
| Hilton & Sons, Birmingham | £23,170 0 0 |
| Crea & McFarland, Westminster | 20,455 4 5 |
| Evans Bros., Wolverhampton | 17,600 0 0 |
| B. Cooke & Co., London | 16,709 0 0 |
| Currall & Lewis, Birmingham | 16,300 0 0 |
| John Jevons, Dudley | 15,282 18 3 |
| George Law,* Kidderminster | 14,077 0 0 |

* Accepted.

For the erection of a police court and offices in West Ham-lane, for the West Ham Local Board. Mr. Lewis Angell, architect. Quantities by Messrs. E. L. Curtis & Son:—

| | |
|---|---|
| J. W. Wyles | £6,673 0 0 |
| A. Reed | 6,470 0 0 |
| J. G. Horlock | 6,300 0 0 |
| F. Deacon | 5,995 0 0 |
| Thomerson & Son | 5,975 0 0 |
| Staines & Son | 5,944 0 0 |
| Scharien & Williams | 5,690 0 0 |
| Holloway | 5,690 0 0 |
| C. Barnes | 5,659 0 0 |
| J. R. Hunt | 5,587 0 0 |
| W. Grogar | 5,560 0 0 |
| G. W. Beale | 5,557 0 0 |
| D. D. & A. Brown | 5,533 0 0 |
| O. T. Gibbons | 5,500 0 0 |
| Balaam Bros. | 5,459 0 0 |
| J. Morter | 5,421 0 0 |
| Magee & Co. | 5,397 0 0 |
| J. J. Robson | 5,324 0 0 |
| Howell & Son | 5,300 0 0 |
| England & Thompson | 5,299 0 0 |
| M. Gentry | 5,250 0 0 |
| C. Cox | 5,220 0 0 |
| Palmer & Son (accepted) | 4,995 0 0 |

For the erection of lithographic and printing works and offices at Middlesbrough. Mr. John W. Alexander, architect, Middlesbrough and Stockton-on-Tees. Quantities by Mr. Wm. Lunn, Kidderminster:—

| | |
|---|---|
| T. D. Ridley, Middlesbrough | £4,725 0 0 |
| J. Perks, Stockton | 4,353 12 0 |
| Craggs & Benson, Stockton | 4,334 19 0 |
| J. Lord, Middlesbrough | 4,276 0 3 |
| R. Wilkinson, Middlesbrough | 4,213 0 0 |
| T. Dickinson, Saltburn | 4,210 0 0 |
| E. Atkinson, Middlesbrough | 4,100 0 0 |
| J. R. & W. Sturdy, Middlesbrough | 4,087 10 0 |
| J. Johnson, Acklam-terrace, Middlesbrough | 4,075 8 0 |
| A. White, Gainsborough | 3,995 10 0 |
| Revised estimates as per reduced quantities:— | |
| E. Atkinson | 3,570 0 0 |
| J. Johnson | 3,506 10 0 |
| A. White | 3,460 6 0 |
| J. R. & W. Sturdy (accepted) | 3,376 0 0 |

For widening, altering, and removing a portion of an existing bridge over the Pudding Mill river, in Marsh Gate-lane, Stratford, E., for the West Ham Local Board. Mr. Lewis Angell, C.E., engineer:—

| | |
|---|---|
| G. Potter | £430 0 0 |
| W. Jones | 349 19 11 |
| Schofield & Co. | 325 0 0 |
| G. Bell | 291 5 1 |
| Wm. Harris | 282 0 0 |

Accepted for broken granite flints, &c., for the Richmond Urban Sanitary Authority. Mr. Walter Brooke, town surveyor:—

Downs, Kennedy, & Co., Richmond, at prices as follow, viz.:—granite (broken), 12s. 9d. per cubic yard; chalk flints, 4s. 8d.; brown flints, 4s. 6d.; granite siftings, 9s. 11d.; hill picked flints, 7s. 3d.

For girls' and infants' department of Board Schools Edward-street, Deptford, for the School Board for London Mr. E. R. Robson, architect:—

| | |
|---|---|
| J. W. Hobbs | £11,400 0 0 |
| Turtle & Appleton | 11,094 0 0 |
| J. Grover | 10,567 0 0 |
| C. Cox | 10,536 0 0 |
| Stimpson & Co. | 10,533 0 0 |
| Scrivener & Co. | 10,520 0 0 |
| W. Downs | 10,484 0 0 |
| Wall Bros. | 10,462 0 0 |
| Atherton & Latta | 10,400 0 0 |
| W. Bangs & Co. | 10,340 0 0 |
| C. Wall | 10,330 0 0 |
| H. Hart | 10,306 0 0 |
| Lathey Bros. | 10,232 0 0 |
| W. Johnson | 10,182 0 0 |
| Kirk & Randall | 10,114 0 0 |
| S. J. Jerrard | 10,039 0 0 |
| W. Oldrey | 10,000 0 0 |
| J. Holloway | 9,861 0 0 |

For rebuilding workshops and organ-room, Kings-road, Camden Town, for Messrs. Goodall. Mr. Silvester C. Capes, architect. No quantities:—

| | |
|---|---|
| Wall Bros. | £540 0 0 |
| A. G. Bolding | 517 0 0 |
| Oldis Bros. | 460 0 0 |

For alterations to 3, Jewry-street, Aldgate, for the Great Tower-street Tea Company. Mr. Richard Peters, architect, 72, Wool Exchange, Coleman-street, E.C.:—

| | |
|---|---|
| Ormson & Co. | £1,100 0 0 |
| Richardson Bros. | 888 0 0 |
| Kemp | 812 0 0 |
| Watson (accepted) | 731 0 0 |

For the erection of church and presbytery, Broxwood, near Pembridge, Herefordshire. Mr. C. F. Hansom, architect, Clifton, Bristol. Quantities supplied:—

| | |
|---|---|
| Bullock & Co., Wellington, Salop | £2,738 0 0 |
| J. Sandford, Letton, near Hereford | 2,725 1 5 |
| J. Wilkins, Bristol | 2,710 0 0 |
| R. Morgan, Kington, Herefordshire | 2,639 0 0 |
| C. Edwards, Leominster | 2,477 14 8 |
| J. Perrott, Bristol | 2,294 0 0 |
| J. Williams, Knighton, Radnorshire | 2,218 7 0 |
| H. Welsh, Hereford (accepted) | 2,200 0 0 |

For the pulling down and rebuilding of the Raven Inn, situate in Rawson-street, New Basford, Nottingham, for Mr. Wm. Maltby. Mr. Herbert Walker, C.E., architect, Nottingham:—

| | |
|---|---|
| Dudson & Parrish | £1,369 13 9 |
| E. Hind | 1,317 0 0 |
| Wooll Bros. | 1,270 0 0 |
| Bell & Son | 1,260 0 0 |
| H. Vickers | 1,253 0 0 |
| J. R. Morrison | 1,240 0 0 |
| J. F. Price | 1,230 0 0 |
| Wheatley & Maule | 1,220 0 0 |
| G. Brownsell | 1,220 0 0 |
| S. J. Cargell | 1,200 0 0 |
| H. Scott | 1,179 0 0 |
| Bains & Turton | 1,170 0 0 |
| W. H. Taylor | 1,122 10 0 |
| W. Bailey | 1,097 0 0 |
| J. Noble (accepted) | 1,089 0 0 |

[All of Nottingham]

For the erection and completion of the Smith's Arms Inn and four sale shops with dwelling-houses, to be situate in Radford-road, Hyson Green, Nottingham, for Mr. John Robinson. Mr. Herbert Walker, architect:—

| | |
|---|---|
| Wooll Bros. | £3,200 0 0 |
| Lynam & Kidd | 3,185 0 0 |
| Bell & Sons | 3,114 0 0 |
| Bains & Turton | 3,100 0 0 |
| H. Scott | 3,050 0 0 |
| H. Vickers | 3,045 0 0 |
| E. Hind | 3,031 0 0 |
| Wheatley & Maule | 3,020 0 0 |
| J. J. Adams | 3,000 0 0 |
| G. Saddler | 2,997 10 0 |
| W. Bailey | 2,996 0 0 |
| J. Noble | 2,940 0 0 |
| J. F. Price | 2,860 0 0 |
| Ireson, Wade, & Gray | 2,775 0 0 |
| Stainforth Bros. | 2,765 0 0 |
| Houldsworth,* Hacknall Torkard | 2,746 13 10 |
| Cuthbert Bros.,† Hyson Green | 2,620 0 0 |

* All others of Nottingham. † Accepted.

For villa on the Hale Park Estate, Hale End, Walthamstow. Mr. W. H. Funnett, architect, 15, King-street, Cheapside:—

| | |
|---|---|
| John Church | £880 0 0 |
| J. Bowden & Son | 795 0 0 |
| J. A. Reed | 710 0 0 |
| A. Barton | 518 0 0 |
| J. Abbott | 470 0 0 |
| E. Fuller | 457 0 0 |
| G. Wright & Co. | 431 0 0 |

For proposed new building at Christ's Hospital, Hertford. Mr. Henry S. Legg, architect:—

| | |
|---|---|
| L. & W. D. Patman | £1,048 0 0 |
| Fred. Hitch | 1,045 0 0 |
| Henry Ekins | 1,037 0 0 |
| Henry Norris | 1,030 0 0 |
| Thomas Hunt | 973 0 0 |

For the erection of school at Rose Hill, Ipswich, for 164 infants, for the Ipswich School Board. Mr. E. F. Bishop, architect, Museum-street, Ipswich:—

| | |
|---|---|
| Wm. Graystone | £1,885 0 0 |
| G. Kenney | 1,860 0 0 |
| T. Thwaites | 1,649 0 0 |
| R. S. Smith (accepted) | 1,393 12 6 |
| C. O. Wyatt | 1,196 0 0 |

[All of Ipswich.]

For rebuilding the Black Bull Tavern, High-street, Lewisham, for Mr. George Shaw. Mr. Horace T. Bonner, architect, Lewisham:—

| | |
|---|---|
| Major | £1,147 0 0 |
| Amer | 1,100 0 0 |
| Staines & Son | 1,066 0 0 |
| Jerrard | 1,043 0 0 |
| Kirk | 997 0 0 |
| Hubble & Trott | 996 0 0 |
| Burman & Son | 987 0 0 |
| Holloway | 975 0 0 |

For sewer at Grove Park and Eltham, for the Metropolitan Board of Works. Sir Joseph Bazalgette, engineer :—

| | | | |
|---|---|---|---|
| Williams, Son, & Wallington | £10,400 | 0 | 0 |
| Kellett & Bentley | 9,651 | 0 | 0 |
| Woodhams Bros. | 7,895 | 0 | 0 |
| G. Felton | 7,540 | 0 | 0 |
| Mowlem & Co. | 7,500 | 0 | 0 |
| B. Cooke & Co. | 7,300 | 0 | 0 |
| T. S. Ridley | 7,251 | 0 | 0 |
| J. Hayward | 7,155 | 0 | 0 |
| J. W. & J. Neave | 6,986 | 0 | 0 |
| Bottoms Bros. | 6,858 | 0 | 0 |
| W. J. Butterill | 6,467 | 0 | 0 |
| McKenzie & Co. | 6,130 | 0 | 0 |
| Beadell Bros. (accepted) | 5,836 | 0 | 0 |
| J. Roberts | 4,812 | 0 | 0 |

For the construction of pipe sewers, manholes, flushing chambers, &c., at Buckhurst Hill, for the Epping Rural Sanitary Authority. Mr. Lewis Angell, C.E., engineer :—

| | | | |
|---|---|---|---|
| J. C. Trueman | £4,059 | 0 | 0 |
| G. Pound | 3,309 | 0 | 0 |
| G. Bell | 2,797 | 0 | 0 |
| Jesse Jackson | 2,666 | 0 | 0 |
| J. Steward | 2,635 | 16 | 9 |
| E. Bentley | 2,502 | 0 | 0 |
| Cook & Co. | 2,488 | 0 | 0 |
| Cardus & Prouse | 2,484 | 0 | 0 |
| Bottoms Bros. | 2,469 | 0 | 0 |
| J. Bingham | 2,428 | 0 | 0 |
| J. Dickson | 2,400 | 0 | 0 |
| Schofield & Co. | 2,375 | 0 | 0 |
| Killingback | 2,349 | 0 | 0 |
| G. Egan | 2,289 | 0 | 0 |
| W. Nicholls | 2,284 | 0 | 0 |
| J. Adams | 2,276 | 17 | 4 |
| John Jackson | 2,275 | 0 | 0 |
| H. Potter | 2,230 | 0 | 0 |
| Beadle Bros. | 2,220 | 0 | 0 |
| J. J. McKenzie | 2,198 | 0 | 0 |
| J. W. & J. Neave | 2,194 | 0 | 0 |
| H. Saunders | 2,148 | 0 | 0 |
| A. T. Catley | 2,000 | 0 | 0 |
| Peill & Son | 1,996 | 0 | 0 |
| S. & J. Saunders, Hughan-road, Fulham (accepted) | 1,894 | 12 | 6 |

For alterations, additions, &c., at 55, Porchester-terrace, Bayswater, W., for Mr. E. Schumacher. Messrs. William Wallace & Flockhart, architect. Quantities by Mr. Frederick Thomson :—

| | | | |
|---|---|---|---|
| Buckridge | £3,541 | 0 | 0 |
| Curtis | 2,652 | 10 | 8 |
| G. Shaw | 2,374 | 0 | 0 |
| Manley | 2,297 | 0 | 0 |
| Dowsing & Son | 2,186 | 0 | 0 |
| E. Toms (accepted) | 2,089 | 0 | 0 |

For the erection of house, Sutton Court-road, Sutton, Surrey, for Mr. Chandler. Mr. Herbert D. Appleton, architect, the Wool Exchange, E.C. Quantities by Mr. F. T. W. Miller, Guildhall Chambers, E.C. :—

| | | | |
|---|---|---|---|
| Hobbs | £1,123 | 0 | 0 |
| Redman | 1,119 | 0 | 0 |
| Ward | 920 | 0 | 0 |
| Burrage | 918 | 0 | 0 |
| Smith | 895 | 0 | 0 |
| Humphris | 880 | 0 | 0 |
| Potter | 794 | 0 | 0 |
| Robinson | 640 | 0 | 0 |

For making up road on Wright's Park, for the Hornsey Local Board of Works :—

| | | | |
|---|---|---|---|
| Potter | £663 | 0 | 0 |
| Walker | 500 | 0 | 0 |
| Jackson | 495 | 0 | 0 |
| Pizzey | 491 | 0 | 0 |
| McKenzie | 440 | 0 | 0 |
| Brown | 410 | 0 | 0 |

For constructing new roads and surface water drains at Dartford :—

| | | | |
|---|---|---|---|
| Beadle Bros. | £465 | 0 | 0 |
| Adams | 419 | 0 | 0 |
| Lansbury | 389 | 0 | 0 |
| Pizzey (accepted) | 383 | 0 | 0 |

For new road and surface drain at Penge :—

| | | | |
|---|---|---|---|
| Lloyd | £289 | 0 | 0 |
| Beadle Bros. | 283 | 0 | 0 |
| Harris | 267 | 0 | 0 |
| Bell | 255 | 0 | 0 |
| Catlin | 250 | 0 | 0 |
| Marshall | 245 | 0 | 0 |
| Pizzey (accepted) | 213 | 0 | 0 |

For proposed alterations and additions at the Croydon Union Vagrant Wards :—

| | | | |
|---|---|---|---|
| Hann & Co. | £4,293 | 0 | 0 |
| Hill Bros. | 4,198 | 0 | 0 |
| Howe & White | 4,070 | 9 | 3 |
| Parker | 4,000 | 0 | 0 |
| Longley | 3,895 | 0 | 0 |
| Taylor & Son | 3,884 | 19 | 9 |
| Sedgwick | 3,845 | 0 | 0 |
| H. J. Sanders | 3,813 | 0 | 0 |
| Smith & Bulled | 3,789 | 0 | 0 |
| E. C. Howell & Son | 3,725 | 0 | 0 |
| Thos. Dean | 3,667 | 0 | 0 |
| T. W. Jones | 3,629 | 0 | 0 |
| G. Stephenson | 3,585 | 0 | 0 |
| F. Higgs | 3,190 | 0 | 0 |
| Potter | 3,298 | 0 | 0 |

[All amounts net after deducting for old materials.]

For alterations to the Builders' Arms Public-house, Pentonville. Mr. R. A. Lewcock, architect :—

| | | | |
|---|---|---|---|
| H. J. Backholer | £1,093 | 0 | 0 |
| J. Apley | 955 | 0 | 0 |
| W. Shurmur | 945 | 0 | 0 |
| E. Toms | 873 | 0 | 0 |
| Oldis Bros. | 850 | 0 | 0 |
| Jackson & Todd | 795 | 0 | 0 |

For taking up old drains, relaying new drains, and fitting up water closets, &c., to Great Eastern Hospital, Deptford :—

| | | | |
|---|---|---|---|
| Maycraft & Co. | £4,859 | 0 | 0 |
| Bell | 4,496 | 0 | 0 |
| Killingback | 4,340 | 0 | 0 |
| Mowlem & Co. | 4,156 | 0 | 0 |
| Knight | 4,117 | 0 | 0 |
| Cooke & Co. | 4,090 | 0 | 0 |
| Adams | 3,999 | 0 | 0 |
| Wall Bros. | 3,997 | 0 | 0 |
| Beech | 3,481 | 0 | 0 |
| Holland | 3,289 | 0 | 0 |
| Hare | 3,100 | 0 | 0 |
| Schofield | 3,060 | 0 | 0 |
| Ivory | 3,043 | 0 | 0 |

For rebuilding premises, Nos. 6 and 6A, Oxford Market, W., for Mr. J. A. Mitchell. Mr. Walter J. Miller, architect :—

| | | | |
|---|---|---|---|
| E. Conder | £3,777 | 0 | 0 |
| Bangs & Co. | 3,676 | 0 | 0 |
| Patman & Fotheringham | 3,573 | 0 | 0 |
| Nightingale | 3,422 | 0 | 0 |
| Scrivener & Co. | 3,369 | 0 | 0 |
| Manning | 3,350 | 0 | 0 |

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

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### TO CORRESPONDENTS.

Received.—J. B. T.—P. Bros.—F. H. N.—W. W.—C. H. T.—J. P.—W. B. G. B.—D. L. A.—C. & M.—M. P. B.—J. H.—Justitia.—G. N.—Name (send name and address).—J. & J. S. E. (next week.—Strictly too late for this week.—W. G. (38) received.—E. C. (your letter painfully true, we fear, as to facts, but the deductions therefrom quite untenable, not to say mischievous).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

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[ADVT.

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(Ground or Lump),
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LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description.

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# The Builder.

VOL. XLVII. No. 2175. SATURDAY, OCTOBER 11, 1884.


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### *Bricks, Tiles, and Terra Cotta.*

MR. DAVIS'S work on the manufacture of bricks, tiles, and terra cotta* in every respect bears out its title of "A Practical Treatise," and is eminently characteristic of the nationality of its author, for it deals only with the practical side of the art on which it treats, and enters into the minutest details of the various branches into which that art is divided. We have hitherto flattered ourselves that as a nation we had pretty well mastered the art of brick-making, however short we may have come in the manufacture of the finer descriptions of pottery, but a perusal of Mr. Davis's work shows that we have yet a good deal to learn in all the various processes through which a brick has to pass before it arrives at the proper degree of perfection for the particular purpose for which it may be required. While admitting, however, that in this special class of our manufactures there may yet be much to be desired, we hope Mr. Davis's anticipations are not likely to be realised, that it has reached its highest standard, and will henceforth have to give way before the superiority of American art, and that Staffordshire is destined to become the *entrepôt* of American tiles, as Liverpool is of American meat. "Sending tiles to Staffordshire may seem to the majority of Englishmen as a wild improbability, but ere long that fact will be established," writes our author; but the fact which he assigns as aiding to this end is not usually understood as "too entirely dominating the English mind," viz., "a tendency to lower the high standard of wares, and produce something cheap." We are accustomed, on the contrary, to attribute this failing to our cousins, and to wonder how it can ever be worth while to produce even, much less to export, the number of cheap trifles which are exhibited in the special "notions" shops to be found in some of our principal streets. There can be no doubt, however, as to the rapid strides which America has made in ceramic art, and there are many valuable hints and facts to be gathered from Mr. Davis's work, which as a whole, cannot fail to be appreciated in this country, embracing as it does the entire field of manufacture, from the simple plain wall-brick to the artistically-ornamented encaustic tile or terra-cotta ware.

* "A Practical Treatise on the Manufacture of Bricks, Tiles, Terra Cotta, &c." By Charles Thomas Davis. London: Sampson Low, Marston, & Co. Philadelphia: H. C. Baird & Co.

It would scarcely be supposed that so prosaic a subject as that of brick-making could offer attractive material for history; but the first chapter in the book contains much which is interesting even to the general reader. In it is traced the manufacture from its commencement on the plains of Shinar, when the descendants of Noah in 2247 B.C. said "Go to, let us make bricks and burn them thoroughly," through the period of Israel's bondage to their Egyptian task-masters, down to the age of Grecian and Roman dominion, along Mediæval times, and ending with the present day. During the first two centuries of the Christian era, the art under the Romans appears to have reached perfection, only afterwards to decline until the fifteenth century, when it revived, as evidenced in England by such specimens as the Lollards Tower and Hampton Court; and in Italy, in the beautiful brickwork and elaborate ornamentation of its ecclesiastical and palatial architecture. In Holland, however, brick was the chief building material from the earliest times, and it was under the direction of a Dutch Governor seemingly that bricks were first used in the construction of houses in America; but it was not until the eighteenth century that they were brought into common use, and then only such as were imported from England. For some time America appears to have made but little progress in the art; "but," adds Mr. Davis, "at the present time, for both quantity and quality, we have no equal in any nation of the world," being indebted, in his opinion, for this position "to the American patent system, which greatly fosters and encourages development in this line, as in other and kindred arts." That the patent system of Great Britain is faulty is generally acknowledged, and steps have recently been taken for its amendment, but it is questionable whether its defects are answerable for all the results attributed to it by Mr. Davis, and whether the machines for the production of bricks described in the volume, and which are said to be fruits of the superior American patent system, "evidences of a high civilisation" though they may be, yet deserve to be considered "as but tokens which are in time to place the manufacturers of the world under American control." Mr. Davis, however, discusses the conditions of the amended Patent Law, and while admitting that some of its points are worthy to be copied, yet describes it on the whole "as too much a relic of a period which is long since past," and the general conclusion at which he arrives is that a nation which adheres to antiquated ideas and customs must give place to the one whose new-born energy is continually causing it to develope its ingenuity in new and varied directions. The argument would have weight if the premisses were correct, but the fallacy consists in the assumption of our adherence to an obsolete past. That necessity stimulates the faculty of invention is undeniable, but it is this very necessity, engendered by the keen competition of the present day, that is acting on the English inventive faculty, just as it has done in America, and is daily calling forth in this country discoveries in science, and improvements in manufactures such as have never before been witnessed, and which will continue to keep Great Britain in the van amongst the nations of the world.

Before describing the processes or the machines employed in the manufacture of bricks, the author devotes a chapter to a description of the various clays, and of the changes they undergo under the several conditions to which they are subjected, justly observing that a thorough knowledge of the clay to be employed in any particular manufacture is essential to insure a successful result. It sometimes occurs that clays are found satisfying all the conditions necessary for turning out good bricks, but more often the earth requires an admixture of other material, or else has to be specially treated in order to get rid of substances which are hindrances to the production of even a passable quality of building bricks. The proper way of overcoming these and other difficulties is clearly explained, and the various methods to be employed in dealing with the different descriptions of argillaceous earth that are suitable for brick manufacture are minutely detailed. The efflorescence, commonly known as "saltpetering," that is so often to be seen on buildings and walls is a phenomenon better known than understood. It is remarkable that during the autumn of 1882 more of this efflorescence was to be seen upon buildings on both sides of the Atlantic than had appeared for many years; old structures as well as new, and those in process of construction, such as the Technical College at South Kensington, being covered with it. "The question of what this efflorescence was, and its cause was investigated by various scientific societies, the Academy of Natural Sciences in Philadelphia discussing it at length; and the substance of their decision was that it was simply ordinary Epsom salts or sulphate of magnesia, which dissolved in the water passing over the bricks, and in evaporating left the deposit; the sulphurous acid, resulting from burning coal, combining in the presence of moisture with the magnesia in the mortar and forming the salts." Various other theories have been set forth as to its origin, but Mr. Davis adds that "there appear to be certain conditions which facilitate the production of the saltpetre, viz., a degree of humidity about equal to that of

garden earth is very favourable; between 60 deg. and 70 deg. Fahr. vitrification is the most abundant; at 32 deg. it does not take place at all." Whatever the cause of it, however, there is no doubt but that it should, as urged by the author, "render the research into it highly interesting to the architect and the builder, on account of the disagreeable effect it produces upon decorations, internal as well as external, and of its action in greatly lessening the durability of stone," an instance of which occurs in the Houses of Parliament. It is well known to engineers, however, that its appearance is not always due to the bricks, but that it is often owing to the ingredients of which the mortar has been composed; and hence, probably, its effect upon buildings erected or faced with stone.

While on the subject of clays, mention is made of the earth described by Strabo A.D. 24 as found at Pitane in the Troad, from which bricks were made so light as to float upon water. For centuries the art was lost until rediscovered by Giovanni Fabroni, in Tuscany, in A.D. 1791, who succeeded in making such bricks, the strength of which at the same time was but little inferior to that of ordinary building bricks. One remarkable peculiarity possessed by them was that of being very poor conductors of heat, as they could be held by one end with the bare hand while the other was red hot,—the practical use to which that property could be turned being illustrated by the experimental construction of a powder magazine on board a wooden ship, which, being set on fire, sank without explosion of the powder. There are several purposes to which these bricks can be profitably applied, such as the fireproofing of floors, ceilings, and roofs,—and notably in the construction of walls in substitution of the frame partitions now commonly used in the upper stories of lofty buildings for the sake of lightness, wherein economy is studied at the expense of security against fire. Hollow bricks of this description, it is suggested, would be sufficiently light to be easily supported by the iron girders now used wherever large spans of floors are required to be partitioned off, while the advantage of diminishing the danger from fire would lessen the rate of insurance, not only on the building but on the stock it contained, and so, probably, be a sufficient set-off against the increase, if any, in the cost of construction.

A common practice in this country, viz., that of mixing ashes in large quantities with the clay, with the view of gaining time in the burning, is severely condemned by Mr. Davis, not only as rendering the bricks "very porous, greatly weakened, and generally shaky," but as causing an intolerable nuisance to the whole neighbourhood where the kilns are in operation, and a serious source of injury to the health of the inhabitants in the nauseating fumes given out from the various substances which are mixed up in the "soil." That the odours arising from brick-kilns are unpleasant is unquestionable, but they are not generally understood to be injurious to health. No doubt, however, that the practice is rightly condemned, and that brickmakers would consult their interests best by abandoning it. Some interesting particulars are given as to the strength of different descriptions of bricks, and perhaps few people are aware of the enormous pressure that the best quality of hard-burned bricks are capable of bearing. Mr. Davis states that, according to tests made by the direction of an officer of the United States army, the bricks used in the erection of the Pension Office at Washington stood a pressure of from 6,050 lb. to 10,290 lb. per square inch, or from 420 to 700 tons to the square foot, "which is more than good granite, and three times as much as good building stone will stand." In comparing the merits of dry and damp clay, preference is given to the latter, for the reason that "the nearer clay approaches the plastic condition when moulded into bricks, the better will be the stock produced; for when clay is dried before being moulded it is impossible to produce a strong brick, the particles of clay will not agglutinate under pressure, and in the kiln the heat will pass through the brick and not be so effective as in a damper and denser made brick." Not only so, but "it will require 25 per cent. more fuel and longer time to burn the dried clay brick than the one made with damp clay," a fact which is probably not known to many manufacturers. Much valuable information follows in the two sections of Chapter III. on the process of enamelling and glazing bricks and tiles, earthenware, &c., and on the various substances used for the purpose, accompanied by some illustrations of ornamental bricks produced by the Peerless Brick Company, of Philadelphia.

A couple of chapters are devoted to the manufacture by hand and by machines, in which the details of preparation of the clay, and of the processes of tempering, moulding, drying, conveyance to the kiln, and burning, are minutely described and discussed. Mr. Davis claims for the bricks manufactured in Washington and its neighbourhood a superiority over any and all others in any part of the world for "strength, uniformity in colour, as well as in size, good edges and corners, and for all other reasons that can be named," alleging as the reason for this "that the enormous quantities of bricks consumed by the United States Government and the local Government have in both cases to pass the inspection of Engineers of the United States Army, or of experts employed for the purpose." We doubt if English manufacturers are prepared to admit such a claim, and shall be greatly surprised if equally good samples of every kind of brick that is made are not to be found in this country. At the same time, unquestionably many improvements appear to have been introduced in the American machines and modes of manufacture, which, if not already known in this country, will soon be appreciated and adopted. Amongst other minor articles is a pattern of brickyard barrows so constructed as to be easily folded up for transportation, to be used wherever needed in the construction of tunnels, culverts, on lines of railways, or other purposes.

The hints given on the burning of bricks, with the improved designs for kilns, are invaluable, inasmuch as they are the results obtained from actual working, the arrangement of the flues being especially noticeable as calculated to effect a more regular and equable diffusion of the heat than takes place in the kilns in ordinary use in this country.

Perfect, however, as hand-made bricks are, yet the enormous demand which has arisen consequent on the development of railways and extension of public works generally has rendered the introduction of brick-making machinery a necessity, and has called forth much ingenuity in the construction of machines for saving labour in the moulding of bricks from the crude clay. Of these machines there are two classes,—one employing moulds, into which dry clay is forced and shaped; the other, in which moist or plastic clay is forced through a die in the pug-mill in a continuous string, and cut off by some arrangement to the requisite size. The author is of opinion that bricks produced from dry-clay machines are unsuitable for engineering construction, though they may be used for architectural purposes, but inasmuch as their porosity is considerable, and they consequently absorb moisture very readily, it is necessary to be very careful in their selection, especially for buildings which are to be devoted to public speaking or to music, for dampness in walls affects the acoustic property of rooms by conducing to a great reverberation and confusion of sound. Consequently much importance is attached to the drying of bricks thoroughly. This operation is carried on in America by means of steam-driers, the use of which, besides effecting great economy in the after consumption of fuel in the kilns, saves handling the stock twice,—once in the "packing," and once in conveyance to the kilns. "The cost of coal to dry bricks artificially is therefore much more than saved by the economy of labour, while the amount of fuel to burn the bricks is less because they have been more thoroughly dried than by the open air." Hence, it is asserted, "the expense of artificial drying is less than that of sunshine." There is also the additional advantage of being able to keep the establishment employed in all weather, and throughout the whole instead of only a portion of the year, "but," adds our author, "these advantages sink into insignificance when the superior quality of the bricks is considered."

The chapter devoted to fire-clays, fire-bricks, and other products affords much valuable information, especially as to the composition and varied constituents of fire-clays, a point, however, on which the practical brickmaker does not usually much trouble himself, being content with that material which yields the best results in actual use. It is here that the dry-clay machines are invaluable, as the quality required in fire-bricks is not strength, but resistance to heat, a property which is secured by severe pressure producing tenacity of texture, the best condition for assisting vitrification. Illustrations are given of several machines for the treatment of fire-clays and for working them into any desired degree of fineness, one of the best being an arrangement of elliptical rollers by which the material is subjected to a *rubbing* action between their impinging surfaces. Amongst other purposes to which fire and terra-cotta clay has been applied, an instance is quoted of the columns which have been constructed in the United States Peruvian office for supporting the galleries which run entirely around the interior of the building, which is 400 ft. long by 200 ft. wide. The columns are bricks in sections 6 in. thick, laid in Portland cement, in which material the bottom section is carefully bedded, being encircled with a cast-iron rim, and forming the base of the column. When finished, the whole is cemented over with the same cement kept damp for several days to prevent its drying too rapidly. In the same building hollow fire-clay tiles are used for the floor-arches and ceilings, an 8-in. tile arch, with a span of 5 ft. between the beams, sustaining a weight of 2,000 lb. per square foot of floor. General Meigs, of the United States Army, who is superintending the construction of the same building, has carried out a series of tests as to the resistance of terra-cotta sheathing-tiles to a superimposed weight, which was applied to the middle of the tiles, the edges of which were supported so as to leave a clear span of 22 in. "Tiles of pure clay sustained a weight of 2,394 lb. before yielding, while those of mixed clay and sawdust gave way under a pressure of 1,940 lb."

The seventh chapter in the book is devoted to terra cotta, and opens with the following interesting remarks as to its durability:—"Many early productions, even of less durability than those now made, are found in ruins of stone, in which the latter material has been steadily disintegrating for thousands of years; but leaving the terra cotta as perfect, in many cases, as if recently produced. In faithfully-made and vitrified terra cotta we have the great and only lasting triumph of man over natural productions; for timber will rot; stone, even granite, will disintegrate; iron will oxidise. These and all other metals will succumb to the action of fire and other destroying influences of the elements; but properly-made and thoroughly-burned terra cotta will pass through the centuries and be the last to yield to those influences to which all natural productions must give way, the material being not only absolutely fire-proof, but also, in all architectural employments, practically time-proof and indestructible. Bank-notes, notes of hand, deeds of property, private transactions, public records, and many things of this character, have been and can still be found in a good state of preservation among the ruins of the great city, ancient Babylon, but they are not in the shape of perishable paper or parchment, but in the indestructible terra cotta." The application of terra cotta to many purposes and in many designs is clearly explained, but the character of design and the manner of treating it are well said to be subjects for much thought, and a true piece of criticism is conveyed in the following sentence:—"Truth is an absolute necessity in all terra-cotta designs, and as a desire for real in the face of sham materials is the cause of its revived use, why should the object of its employment be defeated" by using it so as to imitate other materials? One use to which terra cotta has been turned in

America is the manufacture of "lumber," by mixing resinous sawdust with the wet clay, which is left porous after the burning by the sawdust being consumed. After being treated in the mill, compressed, dried, and finally burned, it is planed, tongued, grooved, or sawn into any desirable shape, and is capable of being applied to a variety of uses. It can be united like joiner's work, or nailed into place like so much wood. It has been used for filters on waterworks, and, as a good insulator, being easily made water-proof, it will probably be utilised for underground telegraphy. If all that is stated of it turns out to be correct, the New York Terra-cotta Lumber Company has seemingly a brilliant future before it.

The next chapter is occupied with the manufacture of roofing-tiles and sewer-pipes, and contains minute descriptions of the various labour-saving machines which have been invented and are in use in America, and, with reference thereto, certain remarks are made with regard to the unreasoning objection of labouring men to machinery which deserve to be quoted in full :—

"Machines stimulate business, add increased interest to all pursuits, concentrate the hours of employment, and it is only from this source that the hours of labour which the working-men in all countries are trying to curtail, can be successfully reduced, and all the wants of mankind supplied at the same time. From the start, working-men have directed their influence against labour-saving machinery ; but in defiance of their efforts against it good has resulted to them in spite of themselves. Would they like to go back to the old hours of labour, from sunrise to sunset, live as they did then, and do without the advantages of education to themselves and children, now so common in this country ? Cheap homes, food and raiment, as well as cheap books and other sources of knowledge are the results of labour-saving machinery."

The manufacture of roofing-tiles and sewer and drain pipes has reached a pitch of such excellence in this country that it is doubtful whether it is surpassed by that of any other country, and whether England has anything to learn in this respect ; so also with ornamental tiles, which form the subject of the concluding chapter of Mr. Davis's work. We have already alluded to his expectation that America is to supplant the rest of the world in this as well as other branches of manufacture, and excellent as some of the pottery out-turn of that country may be, we certainly cannot agree in the assertion which claims for it a superiority over English manufactures, or that "English art in the whole line of artistic pottery has reached the highest points of development that it can ever attain under the present constitution of its society, and, what is more, it has been stationary, but is now on a decline." A visit to any of our principal potteries would be sufficient evidence that our author's assertion is incorrect. While quite ready to acknowledge the wonderful inventive faculty exhibited by Americans, and the exceedingly practical results attained by it, we scarcely think the time has yet arrived for the displacement of English for American machinery. It is certainly with great interest that we look forward to the Exhibition of Inventions which has been promised for next year, and hope that we may have an opportunity of seeing for ourselves specimens of all the ingeniously-designed machines which Mr. Davis's volume contains, and we feel sure that whatever merit they may be found to possess will meet with a full appreciation by British manufacturers in every trade ; we would meanwhile commend Mr. Davis's volume to all who are interested in the subjects which it so ably treats.

**Caseine for Sizing.**—An albumenoid substance may be used for paper sizing, but the albumen extracted from eggs or blood is too expensive for general employment. Caseine from milk has been substituted for egg albumen, by M. Muth, of Carlsruhe, for it has the same chemical composition. It is but slightly soluble in pure water, but may be wholly dissolved in water that is slightly alkaline.

## "TO SURVEYORS AND OTHERS."

IT is, unfortunately, a well-known fact that for some considerable time past there has been so great a depression in public works that a large number of engineers and surveyors have had little to do, or have been out of employment entirely. Never do we remember having known Westminster to be so dull. It is a sad reflection that so many well-educated men, who have devoted considerable time and money to qualify themselves for an honourable and distinguished profession, should now have to realise that the market (if we may so call it) is glutted, and there is little or no scope for their abilities. India and the colonies are overflowing, and only in countries of questionable climate does there seem any chance of work. Public works in England have assumed such formidable proportions that with the present condition of affairs little remains to be accomplished for which there is not more than an ample supply of technical skill, whilst on the Continent a vast field of engineering enterprise seems to be stagnated by the clouded state of the political horizon.

We do not wish to appear to take a lugubrious view of the aspect of affairs ; indeed, we earnestly hope that the day is not far distant when public confidence may be restored, and a fresh impetus given to all branches of industry. In the meantime, parishes wanting surveyors appear determined to have a high time of it, and to ride roughshod over unemployed talent. An advertisement will appear in which application is invited from qualified professional men to fill the post of "Surveyor and Inspector of Nuisances," the fortunate aspirant being required "to devote the whole of his time to the duties of his office." He must "be competent to prepare plans, specifications, quantities, and estimates for, and to superintend the construction and carrying-out of, any sewerage, water-supply, or other works, which may be required in the district ; also to perform all the duties of an Inspector of Nuisances, as prescribed by the order of the Local Government Board."

It is further stated that the district over which this enviable officer will have jurisdiction comprises thirty-three parishes, and he will require to keep a horse. Salary, 200*l.* per annum, to include all travelling and other expenses, excepting postage and stationery. Here, at least, is one chance. In the number of those of whom we have spoken, only thoroughly-qualified men of unquestionable ability will stand the slightest chance of securing such a prize, and to avoid any possible disappointment to many who may apply, we propose to briefly glance at what we suppose is expected. The candidate should be an excellent mathematician (a University man preferred), have regularly served his articles with an eminent civil engineer, should have subsequently been engaged upon some of the principal public works in the kingdom, whilst a Continental experience, with a knowledge of several languages, would augment his chances. He should be able to prove to the satisfaction of the Board that his knowledge of water-supply and sewerage is of so advanced a character that, if needful, he could prepare a scheme for the new water-supply of the metropolis, whilst to meet the outcry against the present state of the Thames he is capable of formulating an entirely new scheme for the disposal of the metropolitan sewage. In fact, his experience and abilities should be of so high an order as would enable him at a moment's notice to assume the joint duties of engineer to the City and Metropolitan Board of Works. This is in no way an exaggerated view of the standard which is frequently set up by local magnates who may be in want of a surveyor, and we venture to think that if a record had been kept of the proceedings of various municipal and other authorities upon such occasions the *viva voce* examinations of the select few applicants by members of the Board would clearly substantiate all we have said.

We have occasionally heard accounts, half humorous and half pathetic, of the interviewing of such a candidate by the authorities. Out of several hundred applicants, if he has exceptional testimonials (or, what is better, local influence) he may be one of the fortunate number,—selected for further consideration. And here we may say that, in one instance, an enterprising competitor conceived the happy idea of having his testimonials printed in chocolate ink upon toned paper, with his photograph as a frontispiece. Little attentions like these go down very well with some of the local authorities, who, being butchers, horse-dealers, &c., may be considered fair judges of appearances, possibly more so than of the highest testimony of qualification. Upon a certain date, the "select" are invited to attend a meeting of the Board, where, assembled in solemn conclave, are the intelligent representatives of local constituencies, by whose judgment the important office of surveyor has to be filled. In alphabetical order "the select" are called into their august presence, and it generally happens that amongst their number is a well-to-do builder, a retired cheesemonger, an enterprising ironmonger, or a fairly-informed stationer, who takes a leading part in the affairs of the place, and who either by assumption or general consent constitutes himself the mouthpiece of this collective authority, by whom the candidates are one by one severely interrogated as to their experience and abilities. Now and then some of the other members are bold enough to interpose a question. On one occasion a local shoemaker requested to be informed how much water a wind-mill could pump in a year ; whilst another member of the Board seemed anything but satisfied with the answer to his query as to what size drain-pipe should be laid down a street he had never seen. It was the candidate's first visit to the town, and upon his replying that it was necessary to know the length and fall of the street, and the number of inhabitants at present and in prospective, a very ominous look of incredulity passed round. One intelligent stationer, doubtless availing himself of the facilities of his business, had armed himself with one of Weale's rudimentary books on well-sinking, but the difficulty he experienced in understanding it himself, — and the still greater one the candidate laboured under in understanding what he meant, rendered the case of the latter far from satisfactory. In fact, by not endorsing the theory that water will flow up hill, the said candidate effectually forfeited all claims to have abilities of a character to attain the standard which this gentleman had fixed in his own mind as necessary, and the gentleman with his testimonials upon toned paper and illustrated by his photograph was successful.

It appears that whilst applicants for surveyorships are expected to know and do everything, the real gauge of qualification, in the eyes of many local authorities, is that he should be as "little of the gentleman" as possible. A man of manner and address, bearing evidence of good education and social status, seldom stands much chance with these local magnates, who, even if he be successful, take particular pleasure in snubbing and hurting the feelings of their more intelligent officer ; and, in order to maintain anything like a position in his office, he must divest himself of everything that can possibly bear sign of culture. After paying for interest upon capital for the purchase of the horse (which, with thirty-three parishes to supervise, seems indispensable) and its keep, with travelling and other expenses, the surveyor will have the satisfaction of devoting all his time and abilities, at the "beck and call" of over-exacting employers, for less than *three pounds a week*. Here is a pointed answer to the question of "What to do with our boys ?" Possibly the advice of our humorous contemporary upon the important subject of matrimony will be the best we can give to those of our professional brethren who comtemplate applying for such an appointment ; "Don't."

**New Town-hall, Eastbourne.**—The first stone of this building was laid by Lord Edward Cavendish, M.P., on the afternoon of Thursday last. Mr. W. Tadman Foulkes is the architect.

## EXCAVATIONS AT PIEDIMONTE D'ALIFE.

IN the central valley of the Volturno lies the small mountain village of Alife, built approximately on the site of the ancient Samnite town of Allifæ, the seat of a pre-Roman civilisation. For years past it has not infrequently happened that peasants at work in the fields have lighted on ancient graves and turned up pottery, coins, and even gold ornaments: hence the place is known locally as "La Concha d'Oro." Fortunately for science, this ancient site has recently fallen into the hands of an intelligent man, Giacomo D'Egg. A woollen manufacturer by trade, he employs his leisure hours in superintending careful and exhaustive excavations. These during the past summer have been rewarded by large finds, to which several points of special interest attach. The graves opened are, doubtless, of widely different ages. Sometimes the dead bodies appear to have been simply thrown into the earth without any tomb whatever; sometimes the graves are tiled; sometimes huge coffins are found hewn out of tufa. One uniform burial custom distinguishes all the graves. In the mouth of the dead man is placed a small silver coin; in the right hand is held, or on it is laid, a shapeless copper piece, the raudus, or æs rude. There would be nothing surprising in finding the raudus in the same grave with the silver coin, as the old-fashioned money lingered on long after the new coinage became current, but the fact that the two appear uniformly together, and arrayed always in the same manner, is noteworthy, and seems to point to some ritual custom hitherto unobserved. The matter deserves the attention and investigation of archæologists. The silver coins found have in themselves a further interest, but of forty-three found by Sig. D'Egg, seven belong to Allifæ, twenty-three to Phistaleia, only one to Naples, twelve are yet undetermined. About the *locale* of Allifæ there is no dispute; but controversy has long raged among numismatists as to where the ancient Philisteia stood. Opinion has, on the whole, inclined to placing it on the coast in the neighbourhood of Cumæ. Numismatists have been influenced by the fact that a dolphin, the current symbol of a seaboard town, appears in the coinage type. Signor Minervini has, however, constantly maintained that Phistaleia was situated in the heart of the Samnite mountains. It appears from these recent excavations at Alife that his opinion, which coincided with local tradition, was most nearly, though not quite, right. We can no longer doubt that, when so large a find of Phistaleia coins is discovered near the Samnite town of Allifæ, Phistaleia itself was not far distant. Her coins do not appear except quite occasionally in the necropolis of Capua, where they would assuredly have been found had Phistaleia been situated on the sea-coast. The town then stood not indeed in the heart of the Samnite country, but in the outlying slopes in the middle valley of the Volturnus. The vexed question is thus happily set at rest. But these excavations have a great interest to the general student of ancient art as well as to the numismatist. We are only just beginning to feel our way in the quest of the earliest Italian, i.e., of pre-Roman art. The excavations provide an invaluable store of new material. From the inscriptions in Oscan characters on the coins, and indeed from the style itself of some of the coin-types, we can see at once that we have here to do with no Græco-Campanian art, but with an Oscan-Samnite element, at present but little known. This Oscan-Samnite art we may expect to find, and we do find, characterised by a certain harsh and almost fierce directness of expression foreign to Græco-Italic art. A full account of the excavations is to appear in the next issue of the German Archæological Institute at Rome, whose publications we have recently had occasion to notice. The numismatic and topographical notes that we have here summarised appear in the dedicatory volume presented to Prof. Curtius on his seventieth birthday (Sept. 2).

## NOTES.

THE whole civilised world has just escaped suffering an irreparable loss, for such would have been the destruction of the Thorwaldsen Museum and its contents, which seems to have been at one time imminent during the burning of Christiansborg Castle in the early part of this week. A building between the museum and the burning structure was judiciously blown up with dynamite, and this seems to have placed the relics of the great neo-Greek sculptor (as he may be said to have been) out of danger. The greatest spirit was evidently shown in the attempts to save the larger groups of sculpture within the castle, but one or two fine works by Rauch, who was given to verge on the colossal, proved too heavy to carry off with the immediate means available, and had to be abandoned.

THERE appears to be a clerical demonstration in process against the proposed site for the Liverpool Cathedral, to which we referred some little time back. The main complaint against the site is that it would not allow of the clergy dwelling in cathedral precincts and "under the cathedral shadow." It is quite easy to understand the feeling of a section of the clergy on this point; but the question is whether any site can be commanded which will give sufficient area for "precincts" and residences which will be otherwise so suitable, central, and architecturally effective in locality. As to the latter point, we deny that there are any serious architectural objections to the site. A very fine building may be produced there; but there is no doubt that, owing to the nature of the ground and the close neighbourhood of the surrounding public buildings, some special treatment of the plan and design would be called for to realise the highest effect possible; the building would have to pile up rather than to spread. But special conditions and special difficulties ought surely to be an additional stimulus to architectural originality.

THE list of papers to be read at the meetings of the Architectural Association during the ensuing session, which we print elsewhere, provides plenty of matter for discussion, and includes also one or two good practical subjects, such as "Farm Buildings" and "The Ventilation of Public Buildings" There is, however, we must confess, a larger amount of pure theory and less of the illustrative element, on the artistic side of architecture, than is usual in the programme of the Association. There are two papers on "Proportion," and two (the first two) which seem rather like the same subject essentially, viz., "The Modern Architect and his Art" and "The Prospects of Architecture." Perhaps some practical conclusions may be drawn from these theoretical discussions; that at least should be the object to be kept in view.

ANENT the recent Sanitary Congress we observe that no one has yet noticed the important influence which estate and house agents may have on sanitary progress. If such an agent understands the value of proper sanitation, he will always urge on a client who desires to dispose of house property to have it put into good sanitary repair, and he is almost certain, if this be done, to obtain a purchaser or tenant with much greater rapidity and frequently of a much better character. The man who cares to have his drains in good order is almost certain to keep the rest of the house in proper condition, whereas the man who is careless about the general condition of his house will probably be careless about the condition of his drains. If house agents were alive to the importance of this, a gradual but wide-spread influence would be brought to bear on house sanitation. But any agent who does not think his positive duty lies in this direction has at any rate a clear duty cast on him of a negative character, and that is not to recommend houses as being up to the mark in a sanitary point of view when they are quite the reverse. We have before us, for example, an advertisement of a country house, issued by a very high-class firm, in which it is stated that "the drainage and water supply are excellent." A very superficial inspection of the house in question showed that a cesspool was immediately beneath the front door, that it had no overflow and no ventilation, and also that the soil-pipe was unventilated. If any one had taken the house on the strength of this representation, it is clear that an action would have been maintainable by him for a false representation if he had suffered any damage in consequence of it. And undoubtedly, on the strength of this assertion by a high-class firm, there are numbers of persons who would have taken the house without more inquiry, or without a thought of altering the sanitary arrangements. If, on the other hand, the firm had at once pointed out the state of things to the owner, it would, no doubt, have been remedied as soon as possible. It would not be easy to find a more striking example of the possibility of improving sanitary arrangements through the influence of estate agents, or, on the other hand, of an unwarrantable assertion likely to throw persons off their guard.

IT appears that the Disused Burial Grounds Act, which was passed at the close of last session of Parliament at the instance of Lord Brabazon and the Metropolitan Playground, &c., Association, is found to be practically inoperative, in consequence of the numerous exceptions which it was found desirable to introduce in order to secure the passage of the Bill. The operation of the Act is limited to burial grounds which have been closed by order of Council, and graveyards which are the property of Dissenting bodies and private persons are exempted from its provisions. It is these latter which are most in danger from the action of the speculative builder, and it is a matter for regret that no check has been imposed to prevent the absorption of these valuable open spaces.

IN the keen competition which now exists between the various steamship companies crossing the Atlantic, every endeavour is being made to render the vessels as attractive as possible. A complete alteration of the arrangement of accommodation on shipboard, and the introduction of several new features, have been made by Messrs. Allan Brothers in their twin screw steamship *Richmond Hill* (4,225 tons), which has been built for them by Messrs. Henry Murray & Co., of Dumbarton. The most noticeable feature here is the abolition of the forecastle, the crew and enginemen being accommodated in the after-part of the vessel, while the whole of the midship is occupied by the saloon cabins and officers' quarters. The saloon, measuring 30 ft. by 25 ft., is furnished and decorated in a manner quite different from that formerly in vogue, the ancient crimson velvet and heavy gold mouldings being banished. This saloon has all the appearance of a modern dining-room, furnished in the Queen Anne style. The walls are lined with walnut, with carved panels, and between the port lights a series of large hand-painted tiles, illustrative of Shakspeare's plays, are introduced. In place of a close stove an open tile fireplace, with handsome walnut chimneypiece, is introduced, and the ceiling is finely carved and moulded. The upholstery-work of the saloon and cabins is old gold-embossed plush. The cabins, to carry forty-two saloon passengers, are all fitted on the cot system, thus avoiding the unpleasant upper berth. The ladies' cabin is placed well forward, and has separate bath-rooms, lavatories, &c., connected with it.

THE Metropolitan District Railway Company have just announced that they have diminished the number of the trains to Windsor to five in the day, as the traffic has not been remunerative. It is equally notorious that the branch of the Metropolitan Railway to Harrow, which will soon be extended to Pinner, is a loss to the general undertaking. It is quite certain that when the Metropolitan Railways

get beyond a certain short distance from their central traffic, for the present, and for a long time to come, they cannot successfully compete with companies like the London and North-Western and the Great Western railways. Persons who wish to go to or from Windsor wish to go with as little delay as possible, and no man will voluntarily travel by a line which stops at every station between Earl's Court and Windsor. Persons who travel between termini at any appreciable distance will go in the system of that company whose trains travel with the most expedition. A passenger from Harrow to Euston can by many of the North-Western trains run into Euston with only a single stoppage, at Willesden, whereas between Baker-street and Harrow there are six stations. The trunk lines to which we have alluded, having four lines of rails, can always run fast and slow trains contemporaneously, but the metropolitan companies can scarcely accommodate fast and slow traffic, or serve terminal and intermediate stations to the satisfaction of all travellers. It appears, therefore, that the experiment tried by the District Railway of running to Windsor was in any case destined to certain failure, and that the like fate awaits similar undertakings.

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WE have noticed what is probably one of the earliest references to the use of indiarubber for the removal of pencil-marks from paper in a note to the introduction of a treatise on perspective by Dr. Priestley, published in 1770. The author remarks, at the conclusion of the preface, "Since this work was printed off, I have seen a substance excellently adapted to the purpose of wiping from paper the marks of a black-lead pencil. It must, therefore, be of singular use to those who practise drawing. It is sold by Mr. Nairne, mathematical instrument-maker, opposite the Royal Exchange. He sells a cubical piece of about half an inch for 3s.; and he says it will last several years."

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A PASSING visit to Coventry suggests a note in regard to a place the architectural interest of which is known to many, though not to so many as one could wish. There may be two opinions upon the beauty of St. Michael's Church, which, though a wonderful example of Perpendicular style, and somewhat impressive by its vastness, is so full of windows as to suggest the idea of an ecclesiastical conservatory. There is a monument in it to a "glazier," and we can readily believe that he may have expressed a wish to be buried within a fabric where so much of his time was probably spent, and that not unprofitably. Holy Trinity Church, which stands so close to St. Michael's that by telephonic agency one service and one sermon might do for both congregations, is, to our mind, a more pleasing edifice than its bigger neighbour, and, since its restoration by Sir Gilbert Scott, a more practically convenient church. Its pulpit, which projects from one of the piers which support the central lantern tower, is coeval with the pier itself, and, besides being a very striking feature, has the advantage of being so placed that a preacher with a fairly good voice is audible from it even in the choir and side-chapels. The lectern, too, is a fine piece of pre-Reformation work, and, if the eagle be not particularly aquiline in all respects, the metal is unusually subdued and pleasing in colour. In neither church has the zeal for restoration passed beyond its legitimate bounds, and, though the stained glass is chiefly modern, we cannot yet afford to condemn without measure the taste and execution of even twenty years ago. One unhappy and unique bit of modern barbarism in St. Michael's Church must be noticed. A new and elaborate font was erected there some ten or twenty years ago, and among the figures which stand within niches round its base is one which is supposed to represent "Infidelity." The figure holds in its hand, or clasps to its breast, a volume, on the outside of which are carved the words "Essays and Reviews." We are not aware whether the Bishop of Exeter or Professor Jowett ever preach within the walls of St. Michael's, but it is clear they have no right there.

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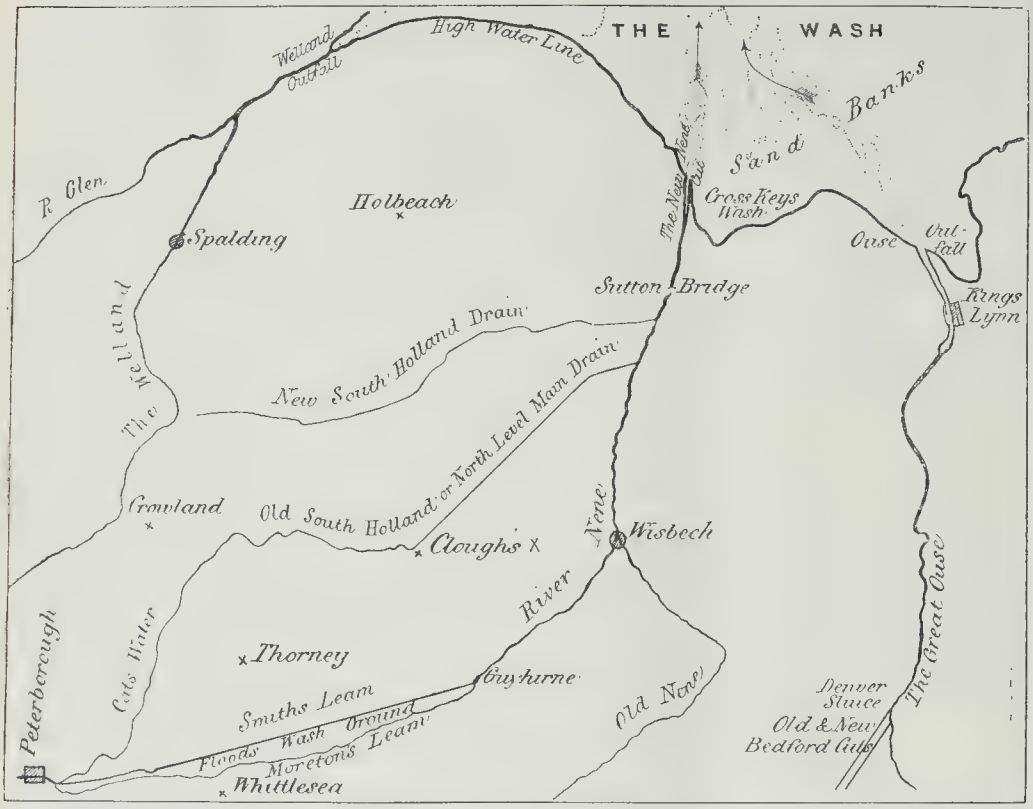
THERE is now on exhibition at the Architectural Museum a series of photographs taken on the recent excursion of the Architectural Association by Mr. John L. Robinson, architect, of Dublin. They are the work of an amateur, and are not put forward as specimens of photography; but, as records of buildings little visited, they are of great value. Photographs of show houses are generally to be obtained in the next town, but there are many small subjects which, though entirely neglected by the ordinary photographer as not appealing to his customers, are of considerable interest to the architect. The advantage, therefore, of this series, taken by an architect, and including many buildings not visible to the general public, is obvious. They show at a glance the main characteristics of Suffolk work,—its flint panelling, its brickwork, its considerable lack of wrought stone, as well as its fine church roofs. There are 112 views altogether, and they embrace subjects from every place visited on the excursion. The series is headed by the beautiful Abbey Gate at Bury, which was built to overawe the turbulent townsfolk. The Abbot's Bridge follows; and those who are concerned may find in these photographs some help towards determining the exact use to which that structure was really put. Then we have the great gateway where Abbot Sampson was received on his first entry as abbot; the solemn roof over the nave at Mildenhall; the fine porch at Woolpit, handsome in design, but coarse in detail; a great many of Lavenham Church and Long Melford, among which not the least interesting is the purely technical view of the base of the church outside, showing the bold panelling, in which the mullet of the De Veres plays so important a part. There are also the wonderful Spring pew in the same church, and some excellent views of the south porch and south side. Hengrave Hall, one of the first unfortified houses built in England, and the red brick and picturesque mansions of Rushbrooke, Kentwell, and Coldham are also among the series. Thanks are due to Mr. Robinson for the care and trouble he has bestowed upon this very interesting work.

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IT is curious, in fact, to observe, as we may at the Photographic Society's Exhibition now open at the Water-Colour Society's rooms, how completely "your photographer" neglects architecture as a rule. Of the nearly 600 plates exhibited by the Society, not one represents an architectural subject properly so called; there are a few commonplace street views, and that is all. Yet there is no subject for which photography is more eminently suited than the reproduction of architectural detail. In the Photographic Exhibition, taken generally, there is doubtless much good technical achievement; yet how dull is the interest excited by these microscopically perfect reproductions of form and detail in nature, as compared with that aroused by the imperfect works usually exhibited in the same room. In the one case we place between us and nature a chemical machine; in the other case, a sensitive human mind and hands. In a certain way the balance is in favour of the human agency, even in regard to verisimilitude. The instantaneous photographs of breaking waves and sea-spray, for instance, do not, somehow, look like sea. A painter would convey the idea of motion; modern photography, by its very perfection of instantaneous imprint, loses the motion, and gives us a rigid mass thrust permanently up into the air. The effect is curiously seen in a photograph of an express train, taken in the 300th part of a second. The train appears to be standing still. A photograph of lightning, which is shown, still retains the idea of motion: lightning is too quick even for the photographer. The scientific value of photography is finely shown in some photographs of magnified objects, sections of parts of plants and insects; but in regard to the representation of natural scenery the failures of the painter are worth more than the successes of the photographer, even apart from the question of colour.

## THE VAGARIES OF A WATERWAY.

THE River Nene, though by no means occupying a foremost rank amongst English rivers, whether as regards length, volume, or navigable facilities, yet possesses peculiarities of history, as well as of existing condition, which are in no small degree notable and interesting. The valley of the Nene in old times offered the shortest cut of all from the eastern seaboard into the very heart of England, and colonists and invaders from the earliest Roman era down to the final irruption of the conquering Normans made free and frequent use of it over many turbulent centuries, whether by boating on the bosom of the stream itself, or by following the bridle-paths to be found on either bank. Rising towards the south-west corner of Northamptonshire, in the immediate neighbourhood of the field of Naseby Fight, the Nene after being reinforced by a number of springs affects the eastern water-shed, passing in its north-easterly course the county town of Northampton, Wellingborough, Thrapston, Oundle, Peterborough, and Wisbech, the lower and more notable, though much the shorter part of its track, being through the fen and marsh border lands of Cambridgeshire and Lincolnshire. The Nene above Peterborough is now pretty much, as to course and windings, what it has been always, even back to the most remote notings of history or tradition; at Peterborough it enters the great fen country, and in doing so exchanges a comparatively free and joyous sylvan life for one of infinite makeshift, harassment, and trouble. This is the inevitable fate of all streams which incontinently wander upon such a vast, flat, and dreary domain as that represented by the great Bedford and bordering levels. Formerly the immense flat through which the rivers Welland, Nene, and Great Ouse had to drag their weary maze-like lower courses, ere the final refuge of the sea might be reached, was under no order to speak of; river waters made passage across with the utmost irregularity and difficulty, and as for foot or bridle path there was none. So recently as 1820 the fen country, now scored in all directions by railways and embanked drove roads, offered no feasible passage at all to Norfolk travellers bound north or north-west, these being invariably reduced to the necessity of a great southern detour, if they did not relish embarking on the open sea with a view to a landing in North Lincolnshire or the Humber. These fen expanses were in the old time essentially chaotic in their conditions, demoralising every thing with which they came in contact, and especially acting most detrimentally on the tempers and dispositions of the unhappy rivers which wandered thither. The old abbots and monks of Crowland, Peterborough, and Ely early set themselves to some mitigation of the evils of the chaos reigning within view of their several monastic battlements. What little draining there was in those days came in for execution under their direction; the water-courses were annually "waded," as it was termed, that is, the weeds were cut and removed to some limited extent, and thereby the incessant choking up of the sluggish channels in some measure avoided. Towards the close of the fifteenth century, the monks of the Isle of Ely became so exasperated at the loose and vagrant habits, and occasionally riotous and destructive conduct, of the river Nene in its lower reaches, that they set determinedly to work, and from Peterborough, in a straight line seawards, cut an artificial channel, to which the unruly stream was for a long time thereafter somewhat strictly confined. Monkish attentions of this kind were not always well requited. It was up the sprawling course of the Nene, in their Viking boats, that in 870 the Northmen were carried to the pillage of Peterborough monastery, the burning of the Saxon church, and the wholesale murder of unoffending Abbot Hedda and all his monks. Hereward the Wake, the "last of the English," at a later era, by means of his knowledge of fen navigation, and to avenge himself on the new race of French abbots and friars, steered his marauding cousins from across the North Sea right up to Peterborough Ferry, and delivered over the monkish colony on Nene bank a second time to the rude shrift of these picturesque robbers. Still, notwithstanding the occasional infliction of "unkindest cuts" of this nature, the old monks remained solicitous for the keeping open of the navigation and the




*Map of the Main Drainage of the Fen Country (as now existing).*

maintenance of as free a course as possible for the outflow of the dangerous flood waters. Whatever may have been their sacerdotal shortcomings, they were persistent and not unenlightened drainers at least; and it was clearly noticed, after the suppression of the monasteries and the dispersion of the monks from the great fen settlements of Peterborough, Isle of Ely, and Crowland, that the Nene and its brethren gradually reverted to former disreputable habits in all their intensity, and ultimately reduced the great level to the condition of a vast watery waste, utterly useless, even if not positively pestilential.

Anciently, the natural outfall of the waters of the Nene was situated a short distance to the east of the present artificial cut. But the Nene had all along a suicidal propensity to choke itself up at its mouth and elsewhere, by means of accumulated weeds and mud brought down in suspension, and now and again for a season its so-called natural outfall would become practically disused. This meant packed-up floods for the unlucky fen expanses inland, until such time as the pressure of necessity worked out some new outfall for the ill-regulated stream. Sometimes this would be effected at a point close to the old mouth thus rendered inoperative for a time; but oftener, so it appears, the river was sadly put to it for relief, and was made to search far and near, not only north and south, but back inland as well, before some kind of tolerable makeshift of an outlet could be hit upon at all. Oftener than once in its history, and sometimes for great consecutive periods, the Nene has been obliged to the great Ouse in the matter of a passage out to sea for its sorely wandered waters. At other times it is found holding to the left, and borrowing outfall from the Welland. Indeed, the former irregularities of these rivers of the great fen region appear to us almost past belief. The River Nene has, perhaps, been the greatest of the three sinners, but if truth be spoken it is kept fairly well in countenance by the scarcely less eccentric pranks of both the Welland and the Ouse. These rivers, also, were addicted to a periodical choking up of their mouths, and then it would come to pass that they, also, had to turn back on search, and borrow or steal that accommodation failing which the up-country rains must soon transform the great East Midland level into an immense lagoon. The Ouse at times fell out by the mouth of the Nene, thus to some extent squaring the current account so long subsisting between the two waterways. The Welland also, after having utterly choked up its own proper outfall, was periodically fain to cast about southward, and beg the necessary succour from its neighbour the Nene. It does not appear, however, that the three fen rivers at any epoch ever made exclusive use of any one outfall simultaneously, but the peculiarities named sufficiently account for the discrepancies observable on the old maps, hardly any two of which, it is often remarked, agree in precise manner of outfall. The neglect consequent upon the suppression of the monasteries had in its effects reached a climax by the close of the sixteenth century, and ultimately resulted in the Government of the day according some attention to the degraded condition of the fen country. In the year 1618 Sir Clement Edmond and Commissioner Atkyns made independent surveys, and severally reported to the Privy Council on the subject. Atkyns describes the Nene at Peterborough as "a goodly fair river, 200 ft. broad and 16 ft. or 20 ft. deep." A little below Peterborough, he says, it spread out into many branches, one stretching northward, by way of Crowland, to the Welland, but, on account of that river being partly choked at the time, not receiving any very great encouragement there. "This," he says, "for want of an outfall below Spalding, cometh in a most slow course by Thorney, thrusting in his head at every ditch, and his main body falleth to Noman's Land nigh Croyland, and there runneth back by Southeæ, along by Clows Cross Head, and so to Wisbeach, with but little better success than at Spalding." After describing the wanderings of the various branch streams to the south, chief of which he shows as finding long-deferred deliverance at King's Lynn by the Ouse mouth after most dreary pilgrimage, the Commissioner continues, —"The waters of this river [that is, the Nene] be those which at this day most annoy the body of the fenns; for now that Wisbeach outfall is by mere negligence overthrown, it is apparent that that water, which is within four miles of the outfall at Wisbeach, ought never to return nor offend the country, though now, through defect of Wisbeach river, it turneth away and takes its course where it may, and much of it passeth about fifty miles before it can recover an outlet, drowning yearly by the way many thousand acres."

The earliest mention concerning the curious habits and conditions of the river Nene and the other waterways, which, by the laws of gravitation, are in their lower courses brought upon the great flat, is to be sought for amongst monastic archives only. The State at first did not regard the subject as coming within its province; and it was not until the reign of Elizabeth that the powers of Parliament were conspicuously invoked for the better governance of the fen rivers. About the middle of the fifteenth century the Nene below Peterborough, as already mentioned, had arrived at such a pitch of bad behaviour as to arouse the monastic authorities to vigorous action. Bishop Moreton of Ely headed and directed the movement, and towards the year 1485 the works resolved upon were completed, and in satisfactory operation. This was, undoubtedly, a courageous effort of civil engineering for that age. The new cut, "Moreton's Leam," as it is called to this day, commenced at Peterborough and extended in a comparatively straight line to Wisbech. Nene waters, which previously by

means of innumerable paltry branches, meandered aimlessly and hopelessly untold distances over the larger area of the great level, were by Bishop Moreton's contrivance, sped swiftly on in one powerful stream in the direction of the desired goal, and thereby both navigation and drainage raised to a degree of order and excellence never dreamed of before. The high bank on the south side of this cut kept the fenland to the south comparatively dry, and even now when Moreton's Leam is almost disused as a watercourse through gradual choking of weeds and silting up of channel, its south bank is still regarded as the barrier which, during the times of flood water, keeps the "washes" within moderate bounds, and holds the sunk lands to the south comparatively scatheless. In the 13th of Elizabeth the condition of the fen rivers was brought under the notice of Parliament, and in that year an Act was passed with a view to scouring the Welland from Stamford to the sea for the restoration of the navigation. Six years subsequently the Commissioners of Sewers sat at Peterborough; but it was not until the year 1600 that the General Drainage Act was passed. James I. encouraged the movement and brought from Holland Cornelius Vermuyden, the great water-drainage engineer of the time. James himself became an "undertaker" for the reclamation of the fenland from the thrall of the wandered river water, as did also his son Charles I.: but it was under a national contract with the Earl of Bedford, concluded 13th of January, 1630, and afterwards known as "Lynn Law," that really serious operations were commenced. The earl, as the owner of a vast marshy acreage on the banks of the Nene, was a chief sufferer from the vagaries of that stream. His contract embraced a wider area, however; and, if under the operations of his engineer Vermuyden, he could contrive to confine the rivers Nene and Ouse within bounds, so as permanently to free from intermittent flood-water a certain large expanse of the fen region, his recompense was to be a free grant of 95,000 acres of the land so reclaimed. Huge works were entered upon. The Ouse was furnished with a capacious and quite straight cut from Earith to Denver, christened the Bedford river, while the Nene, as the chief seat of the disease, received attention in the shape of numerous relieving cuts both to north and south of its main stream. A great stone sluice was erected at a place below Wisbech, called the Horseshoe, to hold the tides out of Moreton's Leam (then the main stream of the river), and another sluice at Stanground, a mile and a half below Peterborough, to shut the waters out of the old course of the Nene, and confine them to Bishop Moreton's Cut; the latter at the same time having its banks heightened on each side, and for the time thoroughly made good from Peterborough right down to Wisbech. Yet so formidable a task was the subjugation of this watercourse to prove, that, as recorded by Wells the voluminous historian of the fens, the river subsequently made light of its elaborate straight-jacketings; the curators for a time lost faith in the ultimate result of the warfare, and all these costly works were suffered to fall into decay.

In the year 1637 the Corporation of the Fens received formal charter licence from Charles, but for a time nothing followed. The Great Level Drainage Act passed in 1649, and then the Nene was again taken in hand under the direction of Sir Cornelius Vermuyden. Its banks below Peterborough were raised to a height of 8 ft., and extended at the bottom to a width of 70 ft. Moreton's Leam, a work of great service in its day, had by this time gone the way of most of the Nene channels, having, through the inevitable propensity of the river and negligence combined, become stifled with growth of weeds and gathering of mud deposits out of all efficient usefulness, whether as a navigable course or drain conduit. A new and straighter cut was now made, first called Hill's Cut, but now known as Smith's Leam, and still upheld as the main channel of the waterway. The north bank of this new cut was made of massive construction, and it has generally proved efficacious in keeping the overflow out of the fens on that side, while the considerable space left between the new Leam and the still maintained South Bank of the old or Moreton's Leam, afforded the necessary wash area for the restricted bedding of the flood-water in times of continued rainfall along the upper course of the river. The works thus executed were excellent in conception, and from this period may be dated the first tangible approach to an appreciable taming-down of water so long destructively unruly. The upper or orderly part of the Nene above Peterborough had received no great share of attention while the lower struggle was going on, but in the time of Queen Anne an effort was made to perfect the navigation from Peterborough to Northampton, though with but small measure of success. This was renewed subsequently, and the canalised upper Nene for about half a century was made lively by a tolerably brisk traffic, though the railways have since almost entirely extinguished that.

Besides the evils of weeds' growth and silting of mud and sand, the moles, if unwatched, are apt to work havoc on such embankment works as those which restrain the Nene within limits in its course over the fens. The spread of these animals has to be kept within bounds, and accordingly the banksmen in the employment of the Fen Corporation are under obligation to wage unceasing warfare on them. The outfall below Wisbech suffered severely from these and concurrent causes, and necessitated from time to time reformatory works more or less thorough-going. Kinderley's Cut, debouching into the Crosskeys Wash, formed one of those executed last century, but it was reserved to a comparatively recent period to construct such a permanent series of outfall works as are now to be found at the mouth of this river. The Act empowering these works is dated October 27, 1829. Operations were confided to Sir Edward Banks and Mr. John Rennie, and within a year or two thereafter were brought to completion, with the result that Nene navigation and drainage were found placed upon a footing of efficiency far in excess of anything previously attained. Wisbech, in subsequent years, became a seaport of importance and promise; and although of late the progress of the place has suffered a check through the operation of various causes, it has not, as the port of Nene-mouth waters, entirely lost faith in its future. Docks on a large scale, for the accommodation of steamers and sailing vessels of size, in addition to those already made at Sutton Bridge, are deemed by many as essential for the future advancement of the place, and even by some as absolutely necessary if the port is not to be permitted to become wholly decayed; but during last session the promoters failed to convince Parliament of the desirability of works of the kind, and an ambitious, and at one time rather promising, Bill was thrown out accordingly. Whatever may be the future of Wisbech, the river which serves it, and which so long troubled sorely the whole of that region, is not likely to be held much to blame. Its works are now permanently consolidated, and while, as a main artery of the fen drainage, its functions are performed fully to satisfaction, its navigable qualities and capacities depend upon nothing more serious than the requisite care in dredging, and in watching and guarding against the formation of shoal-banks in the neighbourhood of the outer mouth.

## THE SANITARY CONGRESS AT DUBLIN.

From the very practical address delivered last week at the Dublin Congress of the Sanitary Institute of Great Britain by Sir Robert Rawlinson we append some passages for which we had no space last week.* After dealing with the question of sewage disposal, Sir Robert referred to other things essential to the health of towns. He said,—

"Public baths, washhouses, disinfecting apparatus, mortuaries, abattoirs, and a scavenging department are all necessary. Public baths, washhouses, and disinfecting apparatus should be as near the population for whose uses they are intended as may be practicable. They should be plain in appearance, inexpensive, and fitted up with efficient apparatus. If 20,000*l.* has to be expended in any town, it will be wiser to construct ten separate establishments placed where they are most wanted, rather than to erect one or two imposing-looking buildings to which the poor will not go,—one reason being that they are too distant. Examples of the utter breakdown of grand and costly baths and washhouses may be given. The people for whom they were intended would not use them, and so the money they cost was wasted. Disinfecting chambers should be attached to such wash-house establishments, but isolated; that is, infected clothing should be received and washed apart. To stamp out contagious disease, burning or disinfection of infected bedding and clothing should be prompt. It will be the cheapest process to disinfect, wash, cleanse, and restore the articles to the poor owners free of cost rather than retard the process by using compulsion and demanding payment; as, in this case there will be secretiveness and opposition; in the other case, ready compliance and thankfulness. Mortuaries and ambulance conveyances are an absolute necessity in towns, and should be a part of every establishment. Public abattoirs, situate in open spaces, well drained and ventilated, are necessary. Private slaughter-houses ought not to be permitted. A fire establishment is necessary; and in towns having a population exceeding 100,000 there may be several stations having electric communication with the head establishment. The scavengers' department I consider a prime necessity. All forms of scavenging should be under the absolute control of the municipality. There should be no private scavenging. To require householders at any time to scavenge their own premises is a remnant of barbarism, as when it is so left it never has been done, nor ever will be done. Scavenging should be at short intervals, and every spadeful of refuse should be cleared from the streets daily, and taken to some depôt. Such of the refuse as will burn should be burned, and other forms of refuse should be harmlessly disposed of outside the town or city. It will be a mistake to retain any refuse which is liable, by keeping, to become offensive, in the hope of selling it to make a supposed profit, as it is not the business of a scavenger to sell refuse, but to produce cleanness. In seaport towns, if refuse cannot otherwise be disposed of, it may be sent to be sunk at sea in hopper barges. Hospitals have been much discussed in recent years, and there have been great improvements, both in their construction and management; but with improvement there has been much extravagance. The prime purpose of a hospital should be to afford temporary shelter to the poor and injured; and that hospital relief should be of practical use to the greatest numbers the buildings should be cheap in construction, and the administration economical. It must surely be gross extravagance to build grand palace-like hospitals costing from 1,000*l.* up to 2,500*l.* per bed on which to treat a sick or injured man who never earned half the amount of his bed's rental when well; to make matters worse these extravagantly costly hospitals are not always found to be wholesome. A hospital to be of the greatest use should be on a dry site, well ventilated, out in the open country. The construction should be cheap, the space large, the means for ventilation abundant. Warming by hot-water or steam may be admissible, but warming by heated air transmitted through flues never, as it is not wholesome. Open fires and open windows will be best, and in summer verandahs for patients will be of great advantage. There are new hospitals near Berlin where the beds, with the patients, are moved into the open air on fine days throughout the summer. Sheds of wood, which could be burned at ten or twelve years' interval, would give the best results, and, if saving life is the prime use of any hospital, would be most economical. In such hospitals, in surgical cases, the greatest bungler could not kill; whilst in some of the grand town hospitals the most expert surgeons cannot save. This has been said by an eminent physician. I do not attempt in this address to enter at any length into the details of the reduction of disease by sanitary works and regulations. Sir James Paget, in his recent address before his Royal Highness the Prince of Wales, at the opening of the Health Exhibition at South Kensington, gave chapter and verse, setting forth great money savings by prevention of cases of sickness and premature deaths. Such saving is undoubtable. In all ranks of life, from the royal family to the poorest household, it has been shown by Mr. Edwin Chadwick, C.B., the father of modern sanitary science, that there has within the last twenty years been on the entire population a reduction of some 20 per 1,000 in cases of sickness, and of 2 per 1,000 in deaths. In the Army and Navy the saving is from 17 in each 1,000 to at present 8½ to each 1,000. In the British army in India from 69 per 1,000 down to 20 per

* See p. 453, *ante*.

1,000, and it is hoped further reductions may be accomplished. In looking over the advances made in sanitary science, it must never be forgotten that to undertake and perfect good works is one thing, but that to maintain them good is the main thing. It must also be remembered that sewers, drains, and waterworks are only means to an end,—they are only good so long as they are sound, clean, and cared for. Again, the most complete works of sewering and water-supply may leave untouched the slums and room tenements; and these places may remain nests of contagious disease, out of which stalk the grim forms of typhoid and cholera. There are towns in England where sewers and drains have been formed and a good water-supply established, but where scavenging and single-room tenement-inspection and cleansing have been shamefully neglected. The first should be done; the latter not left undone. This question of sanitary improvement is an all-round question; it embraces the entire nation, as no rank or station is exempt from disease. Fever strikes down the highest in the land as the most lowly. A nation may be wealthy, and yet be unhealthy. Richly endowed colleges may impart learning to the select few, but in town-slums vicious habits are much more profusely engendered, leading to vice and crime. In the world there is no value but in human life, and human life has the greatest value when healthy and moral. It is the aim of the members of this Congress to induce improvement, to show statesmen and the public generally that the only safety will be in assisting to remove causes which lead to sickness, incapacity, and premature death. The strength and glory of a nation is not in standing armies and ironclad fleets, but in the health, well-being, and contentment of the people."

On the second day of the Congress,

Dr. Grimshaw, Registrar-General for Ireland, read a paper entitled "Statistical Measures of the Health of Communities," in the course of which he said,—"I am glad to say that the old sanitary, or unsanitary, maxim, 'that a dense population has a high death-rate,' is becoming less true every day, as it has been proved by the operations of artisans' dwellings companies and others who have undertaken to provide dwellings for the working classes, that with reasonable precautions very dense populations can enjoy very good health and have very low death-rates. The natural inference has been drawn that the principal zymotics, or infectious diseases (as they are popularly called), contribute largely to this high death-rate in dense populations. This influence, however, cannot be very potent, and, indeed, Liverpool is the only instance where it is well marked. It would appear that more can be done by re-arranging and redistributing the dense populations within existing areas than by making futile attempts to diminish density."

Mr. Edgar Flynn, Surgeon to St. Michael's Hospital, Kingstown, read a paper on "The Administration of the Public Health Act in Ireland with regard to the Duties of Officers of Health." He said that, having held the appointment of medical officer of health in a district comprising a wide area in England for nearly six years, and having had considerable experience of the working of the English Public Health Act, he had been particularly impressed since his return to Ireland, two years ago, with the manner in which the sanitary laws appear to be carried out in Ireland. The working of the Public Health Act in Ireland, he continued, has in a great majority of districts well-nigh become a dead letter. One of the main causes of the slow progress of sanitary reform in Ireland is that there are no local boards or combination of districts, the boards of guardians are the sanitary authorities for the Irish rural districts; and, though it cannot possibly be stated that they are, as a general rule, opposed to sanitary reform, yet they are never anxious to move in any measure of sanitary work that will cause any outlay, and are deep in their expressions of gratitude to their medical officers of health for not troubling them with verbose reports, which may involve them in a heavy, and, in their opinion, useless expenditure, for sewage, water, or other works; and so year after year the Public Health Act is systematically evaded.

In the course of the discussion which followed the reading of this paper,

Mr. H. H. Collins, District Surveyor for the Eastern Division of the City of London, spoke, and attributed the small success of the Public Health Acts to the dense ignorance and apathy of the population in regard to sanitary matters. He advocated the compulsory enforcement of the Public Health Acts.

Dr. Alfred Carpenter, Dr. Cameron, Mr. R. O'B. Furlong, and Surgeon-General de Renzy having spoken,

The Chairman (Sir R. Rawlinson) commented on the fact that in Ireland the engineering officer attached to the Local Government Board had no staff, and that it has no medical staff whatever. In these respects it differed from the English Local Government Board. All applications for sanitary works came before him as Engineering Inspector of the Local Government Board, and he assured them the extravagance of some of them was so appalling that he looked over them with heart-ache. If that kind of work were proposed in Ireland, it would amount to confiscation. In Ireland they must begin with the most economical work. He had seen waterworks erected in parts of England, by which the poorest person could have as much pure water as he wished, all the year round, at the cost of 9d. per quarter.

Dr. De Chaumont insisted upon the necessity of the medical officers of health being independent of the local bodies.

At the afternoon sitting, Dr. Grimshaw presiding,

Mr. Edward Spencer, M.A., read a paper on "The Homes of the Working Classes," in which he said:—"The greatest bar to the improvement of the homes of the working classes in Dublin is the present anomalous conduct of the valuation of property. This affects not only the provision of such dwellings, but the improvement of every class of buildings. Passing to the homes of the working classes, and selecting at random seven tenement houses in various parts of the city, and seven improved dwellings, the valuation of each being the same, viz., 9*l.*, or 63*l.* for all, I find the annual rental of the old houses to be 322*l.*, of the new 118*l.* That is to say, the proprietors of the tenemental dwellings contribute 10 per cent of their income to the rates, while the owners of the new dwellings pay 27 per cent. of their income to the rates. This inequality presses on the very class we are supposed to be benefiting, as the following facts will show. I have investigated the present and former rents paid by 427 of the tenants of the Dublin Artisans' Dwellings Company, and find the present rent to average 5s. 3d. per week, the former rent 4s. 3d. Dividing these gross rents into the two items of 'rent' and 'taxes,' and applying the proportion of taxes to rent given above, it will be seen that the 'rent' of the new dwelling is 3s. 10d., and taxes 1s. 5d.; while the 'rent' of the tenemental dwelling is 3s. 10d. and taxes 5d.; it will be, therefore, seen that the extra price which the tenant pays for the improved accommodation is made up entirely of increased taxation. If a revaluation were ordered, and the expense provided for (which can only be done by legislation), the effect would be, as far as Dublin is concerned, unequal and unjust. The valuation must be made according to unions or baronies; and the boundaries of these areas are not conterminous with those of the municipal district. The result would be that if the city were revalued the new valuation would be much out of proportion with the existing valuations of the portions of the North and South Dublin Unions that are outside the city. The number of tenement houses in Dublin is being constantly increased by the conversion of single dwellings; and diminished by natural decay, demolition, or by being closed for want of sanitary accommodation. Accommodation has been within a comparatively brief period provided, or is being provided, for 1,816 of the artisan and labouring class, and for 800 of a slightly superior class; in all, 2,616 families, representing about 16,000 persons.

In the course of the discussion which ensued,

Mr. Parke Neville, City Engineer, said that one of the greatest obstacles to improvement was the fabulous prices which were obtained by owners for their premises where new streets were to be made. This had been exemplified in the case of the new street called Tara-street, where the awards had been, he believed, excessive. He believed that some sort of summary law should be introduced to deal with the subject.

Surgeon-Major J. Wycliffe Jones, in medical charge of her Majesty's troops at Naas, then read a paper upon "The Insanitary State of Small Irish Towns." In the course of it he said,—"I will endeavour to describe a small court of dwellings very recently visited. The entrance is in a narrow lane of cabins, and this opens to the main street of the town. Picture then a horrible little courtyard, some 50 ft. by 28 ft., almost completely enclosed by small dwellings; the ash-pits, pigstyes, and backyards of the front row of hovels forming the only prospect possible for those inside the court. The entire block of building does not occupy, to the best of my judgment, nearly one rood of land; nay, indeed, the one-sixth of an acre. Upon this site are built thirteen simply frightful dens; all have damp or clay floors, pools of green and black water lie all around, black typhoid mud and festering manure in abundance. Some fifty-five to sixty souls live in this court, and many pigs are kept. I measured several of the houses, and append a few results. No. 1 house, 5·7 by 14·2 by 6·9 = cubic feet less than 588; four souls live here. No. 2, 15·7 by 12 by 9·6 = cubic feet less than 1,800; five souls resident. No. 3, 15·7 by 10·8 by 9·6 = cubic feet less than 1,500, and eight souls resident. In the first about 100 cubic feet of foul damp air could be enjoyed, in the second about 300, if no lodgers came for the night; in the third about 142. For the worst description of dwelling 1s. to 1s. 6d. per week is paid, but 2s. 6d., 2s. 8d., and 3s. is very commonly demanded even for cabins, which can, with truth, be described as "unfit for human habitation." A very wide field of observation, both in Europe and in India, has not furnished me with any parallel to all this.

Sir R. Rawlinson said that he had come across in the course of his inspection parallel cases in Great Britain to those which were mentioned in this paper. The condition of affairs in England and Scotland, he was sorry to say, was not very different to that of Ireland.

On the third day, the Congress divided itself into two sections, the proceedings in both being carried on simultaneously. The more popularly interesting was that of "Sanitary Science and Preventive Medicine." The principal paper, and the one which gave rise to the most interesting discussion, was that of Mr. Robert O'Brien Furlong on "The Objects and Work of Ladies' Sanitary Associations." Mr. H. H. Collins, of London, expressed surprise that the health of the people of Dublin was so good, considering the "miserable lairs" in which the people were housed. Dr. Cameron contrasted house accommodation in Dublin with that in London, very much to the disadvantage of Dublin. Mr. J. Byrne Power read a paper on the health of Kingstown.

In the second section, Mr. Cotton, C.E., read a paper on the operation of the Public Health (Ireland) Act. He favoured the shorter term of forty years rather than that of fifty years for the repayment of loans, and said that although many of the works executed by means of the loans granted in the period of distress in 1880 and 1881 presented a minimum of utility, yet on the whole they had effected a vast amount of good.

A banquet was held at the Shelbourne Hotel in the evening. Sir Robert Rawlinson presided, and the Lord Lieutenant, in responding to the toast of his health, delivered an interesting speech, and one thoroughly germane to the occasion.

The work of the Congress was brought to a close on the 3rd inst., when

Dr. Charles A. Cameron read a paper dealing in great detail with the "Water Supplies to Irish Towns."

Professor Hull, F.R.S., followed with a paper on the "Supply of Pure Water to Country Residences," in which he stated outbreaks of typhoid and other zymotic fevers in villages and country houses might be traced to an impure water supply. Where cholera was prevalent, contaminated water was the prime cause of attack. It was to be regretted that Ireland was not so favourably circumstanced for local water supply from deep wells as England.

Mr. G. J. Symons, F.R.S., read a paper on "The Rainfall of Ireland," in the course of which he detailed the history of the observation of rainfall in Ireland. The rainfall in Dublin was probably about 30 in. Most places within about sixty Irish miles of the south or west coast had upwards of 40 in. of rain per annum, and the central, east, and north-east of Ireland have between 30 in. and 40 in., Dublin being almost, if not absolutely, the driest place in Ireland.

The Rev. M. H. Close, A.M., read a paper on

the "Geology of the Neighbourhood of Dublin as affecting its Sanitary Conditions."

Mr. John P. Griffith, M. Inst. C.E., read a paper discussing the most advantageous position for the outfall of a main drainage system for Dublin, so as to accomplish the purification of the river Liffey by discharging the sewage beyond the limits of the harbour. Having examined the different schemes proposed, he submitted that to insure successful results the whole drainage districts surrounding Dublin Bay, including Dalkey, Kingstown, Monkstown, Blackrock, Pembroke, Rathmines, Kilmainham, Drumcondra, Clontarf, and the city of Dublin, should be dealt with by a joint main drainage Board, and that the whole of the sewage should be pumped, so as to have a constant discharge at the outfall, thereby requiring no storage, and that the outfall should be at Drumlech Point, Howth. He contended that the proposed outfall at the North Bull would necessitate larger storage accommodation and costly appliances for removing all solid matter from the sewage, inasmuch as neap tides would bring large quantities of the sewage on to Clontarf strand, and also injure the harbour bar.

A long discussion followed.

Sir Robert Rawlinson remarked that Mr. Griffith, though most competent to deal with this question, was a representative of the Port and Docks Board, and might accordingly take a view quite different from persons examining the question solely from the public point of view.

Mr. Parke Neville, City Engineer, argued in support of his own scheme for bringing the discharge to the end of the North Bull-wall. Ample experiments had shown that the set of the tides would carry the discharged sewage away from the bar without leaving any deposit either on Clontarf strand or on the bar.

Professor De Chaumont, a member of the Commission for inquiring into the Condition of the Thames, unhesitatingly declared that the discharge of crude sewage into a river should not be permitted under any circumstances.

Replying to Mr. Cotton,

Mr. Griffith said he understood the cost of the Drumleck scheme over the North Bull scheme, if no reservoirs were used in connexion with the latter, would be about 50,000*l*.

The four succeeding papers related to kindred subjects,—(1) "On House-drainage in connexion with Town Sewers," by Mr. J. B. Nicholls, C.E. In all cases the work of connecting should, he urged, be under the control and supervision of a thoroughly-qualified person paid by the local authority. The Local Government Board would do well to insist that the house-drainage and connexions should be made to form part of the whole scheme of sewerage. (2) "On Domestic Drainage in Dublin," by Mr. W. Kaye Parry, Engineer to the Dublin Sanitary Association." (3) "Practical Sanitary Lessons derived from Inspections," by Mr. William Maguire, who said that house-drainage in Dublin generally was extremely defective. Out of more than 1,000 dwelling-houses inspected, from noblemen's mansions to six-roomed cottages, only twenty could be truthfully certified free from danger to the health of the residents. (4) "On Defects in House Sanitation in and around Dublin," by Mr. P. F. Comber.

A long discussion followed, in the course of which Mr. Parke Neville, City Engineer, said he thought the dangers in Dublin had been much exaggerated. When he became engineer to the Corporation the drains were almost entirely the old-fashioned square pattern, and when he proposed the use of 6-inch pipes the people almost rose in rebellion, and 9-inch were employed as a compromise. It was impossible for him to oversee the laying of all the drains, and to prevent workmen scamping their work.

In the evening Dr. Alfred Carpenter delivered a lecture on "Education by Proverb in Sanitary Work."

On Saturday last excursions were made to the Vartry Waterworks and to the Railway Works at Inchicore.

It has been decided to hold next year's Congress of the Institute at Leicester.

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**The Nineteenth Century Art Society.**—Monday next, October 13th, has been appointed for the receiving day for the works of art intended for the Autumn Exhibition of the "Nineteenth Century Art Society," at the Conduit-street galleries.

## STOVES AND GRATES AT THE HEALTH EXHIBITION.

THE whole of the East Arcade is given up to the exhibition of grates, stoves, kitcheners, ranges, boilers, &c., for domestic use, as well as other apparatus for heating and warming, and appliances for smoke-abatement. Many of the exhibits are shown in action, and as the warmth imparted by them to the corridor is more agreeable at the present time than it was a few weeks ago, visitors are more likely to spend a little time in their examination. We have been unable to find many novelties in this section of the exhibition, most of the best exhibits having been shown either at the Smoke Abatement Exhibition, or in one or more of the Building Exhibitions.

Commencing at the south end of the Arcade, near the main entrance, we notice that Messrs. Barnard, Bishop, & Barnard, of Norwich, have a very attractive display of their specialities in slow combustion and other stoves and grates, set off with all the advantages that costly and elaborate mantelpieces and over-mantels, with tiled hearths and splays, can give them. The central feature of the stand is a carved mantelpiece in wainscot oak with bevelled mirrors; this, with the fire-basket, and-irons, &c., has been designed by Mr. J. B. Pearce, architect, of Norwich, for Mr. Samuel Hoare, of Cromer.

Stand 577 is occupied by the Coalbrookdale Company, who exhibit cast-iron grates, over-mantels, and other of their specialities, including the "Kyrle" grate for burning anthracite coal; a patent under-fed grate, the "Holland," for burning, smokelessly, bituminous coal; a patent grate by Dr. Moore, combining both the foregoing advantages; and the "Escoutille" grate, with hoppers or scuttles for coals on either side of the fire. Another grate well worth notice shown at this stand is Dr. Pridgin Teale's "Economic" grate, of which we have heard good accounts from more than one source. Some additional fireplaces are shown by these exhibitors in Class XX., in Mr. Taylor Smith's suite of apartments in the south enclosure (entrance from Main Gallery, Queen's Gate), and the patent grates referred to are duplicated in action in a building in the grounds contiguous to the Water Companies' Pavilion. The Company also exhibit their patent kitchen ranges and Smith's "Unique" range, and a circular-fronted kitchener. Altogether this Company fully maintains its position.

Stand 578 is occupied by Messrs. Mappin & Webb with their "new patent smoke-consuming slow combustion grates," with the details of which we are not acquainted. They are shown with chimney-pieces and over-mantels, brass fenders and fire-iron, tile hearths, and all the usual accessories.

Messrs. Yates, Haywood, & Co., of Rotherham (Stand 579), are exhibitors of cast-iron chimney-pieces and over-mantels, fire-irons, fenders, and cooking ranges.

Messrs. Steel & Garland (Stand 581), of Holborn-viaduct and Sheffield, exhibit their "Wharncliffe" grates and slow-combustion grates, together with a variety of chimney-pieces and over-mantels, — one of satin wood and another of ebonised wood inlaid with bronze. These exhibitors also show a stove which, they claim, gives a smokeless fire in an open grate. It is on Dr. Siemens's principle, having a gilled-bottom grate, a directing-plate, and a gas-bar (behind the bottom bar). Air passes through the gilled-bottom grate, and thence is directed by the directing-plate past the gas-bar, so promoting combustion on the regenerative principle.

At Stand 582 Messrs. Herring & Son, of Chertsey, exhibit a very good kitchener, and the "Brookwood" warming and ventilating grates.

Messrs. S. Belham & Co., of Buckingham Palace-road (Stand 584), exhibit a chimney-piece with a very large over-mantel, ornamented with panels in Rust's vitreous mosaic. It would be well-suited for the end of a large room, although the fireplace itself looks too small. Whatever might be the effect on the combustion of the fire, the *tout ensemble* would, we think, be improved by the removal of the marble and mosaic spandrels and the enlargement of the fireplace-opening. Messrs. Belham's grates are on the slow-combustion principle. The same exhibitors show an ornamental terminal for chimneys.

Stand 585 is occupied by Messrs. Starkie, Gardner, & Co., who exhibit wrought-iron coal-cases, cressets, fire-irons, basket-grates, &c.

Messrs. Alexander Boyd & Sons, of New Bond-street (Stand 587), are exhibitors of fresh warm-air grates, by which cold air is admitted at the back of the grate, warmed, and passed into the room. A tiled pedestal-stove, with linen-airer, shown by the same exhibitors, appears to be a good and useful thing.

At Stand 593 Mr. William Peck Taylor shows his patent terra-cotta wind-guard for preventing down-draught in chimneys; it is far preferable to most of the zinc contrivances intended to effect the same end.

Mr. James Smith, of Liverpool, shows (Stand 594) a grate which claims to be smokeless and capable of being maintained at a cost of less than 2d. per day.

The Carron Company (Stand 595), of Upper Thames-street, make a very good display of serviceable stoves and ranges, including the "Beeton" portable kitchener or range, which is self-setting and appears to be well adapted for use in workmen's cottages and artisans' dwellings. It is made in various sizes, and should be looked at by visitors interested.

Stand 596 is occupied by Messrs. Newton, Chambers, & Co., of Sheffield and Great George-street, who exhibit their "Thorncliffe" ranges in various forms and sizes. We have on previous occasions spoken favourably of these ranges.

Messrs. Thomas Waller & Co., Stand 596, exhibit a cooking-range with oven and boiler, constructed to burn either gas or coal. They also show a patent steam-chest and a grilling stove of good arrangement.

The exhibits of Messrs. W. Neilson & Co. (Stand 598), of Glasgow, are characterised by excellence of finish. Amongst them may be mentioned the "*Sine qua non*" range.

Messrs. Rosser & Russell (Stand 599), of Hammersmith, exhibit hot-water and steam-heating apparatus for warming buildings, together with a large cooking-range, and a number of boilers for gas as well as for other fuel.

Stand 600 is occupied by Mr. J. B. Colbran, of Holborn, who exhibits Dow's patent close and open fire cooking ranges.

Mr. H. Thompson, of Canonbury (Stand 601) shows a stove which appears to possess some merit as a smoke-consumer.

Mr. Richard Crittall (Stand 602) exhibits steam-cooking apparatus for use in large establishments and public institutions.

Messrs. Dean & Son, of Oxford (Stand 603), exhibit the Oxford "heat-utiliser,"—a stove with a hollow back, apparently, from which tubes project into the room on either side.

The Wilson Engineering Company (Stand 604), of High Holborn, exhibit the Wilson cooking-ranges in various forms.

Stand 605 is occupied by Messrs. A. J. West & Co. with gas-stoves; while the next stand (606) is occupied by the General Gas Heating and Lighting Apparatus Company, who exhibit various gas-stoves for cooking and heating purposes, most of them being of Leoni's patent construction.

Col. H. Stuart Wortley (Stand 607) has an exhibit which will claim the attention of visitors. He shows a variety of small stoves suited for various purposes, economical in use, and requiring little or no attention. Among the stoves shown are the "Sick-room" stove, the "Nursery" stove, the "Working-man's" stove, and the "Greenhouse" stove.

Messrs. Doulton & Co. (Stand 608), are exhibitors of majolica and other stoves for the warming of halls and other interiors. They are clean and bright in appearance, need little attention, and are economical in use.

Messrs. T. Potter & Sons (Stand 609), of South Molton-street, exhibit, among other things, their Thermhydric grate (H. Saxon Snell's patent). This stove has been used in several large public institutions, and with much satisfaction. We have on previous occasions spoken with approval of it, and its merits were acknowledged in the report of the judges of the Smoke Abatement Exhibition.

Messrs. Clements, Jeakes, & Co. (Stand 611), of Great Russell-street, have on view a large roasting-range in the old style, with roasting-jack in action, carrying four vertical "dangles" or revolving hangers for joints, with motions right and left for four horizontal spits upon which a whole sheep or baron of beef could be cooked. The chimney-piece and jack are

similar to those erected by the firm at Pembroke College, Cambridge, under the direction of Mr. G. Gilbert Scott.

Stand 612 is occupied by Messrs. Crabtree Bros., of Leeds, who show their patent kitcheners.

Messrs. H. Chappell & Co. (Stand 615), Fulham-road, exhibit a smokeless close-fire kitchener, burning coke with the assistance of gas, on the principle suggested by the late Sir William Siemens.

At Stand 617 Messrs. E. Siddaway & Sons, of West Bromwich, exhibit gas-heating and cooking stoves.

At Stand 618 Messrs. Whyte & Bradford, of Bo'ness, N.B., exhibit the "Hotspur" smokeless cooking range. It has a revolving fire-basket, and appears to have other points which entitle it to the attention of visitors.

We must reserve notice of the remainder of the exhibits in this Arcade for a future article.

## ARCHITECTURAL ASSOCIATION.

The following is the Syllabus of Papers for the Session 1884-5 :—

1884.

*Oct.* 24.—Address from the President.

*Nov.* 7.—"The Modern Architect and his Art," by J. D. Sedding.

*Nov.* 21.—"The Prospects of Architecture," by G. Aitchison, B.A., A.R.A.

*Dec.* 5.—"Some Features of Japanese Architecture and Ornament," by Dr. Dresser, Ph.D., F.L.S.

*Dec.* 19.—"The Ante-chamber To-day and Yesterday in French and English Plans," by W. H. White.

1885.

*Jan.* 2.—"Proportion and Style," by L. A. Shuffrey.

*Jan.* 16.—"The Ventilation of Public Buildings," by F. R. Farrow.

*Jan.* 30.—A Discussion upon the Paper entitled "English Architecture Thirty Years' hence," read by Professor Kerr at the Conference of the R.I.B.A., 1884.

*Feb.* 6.—"Farm Buildings," by A. Young.

*Feb.* 20.—Paper (subject to be announced), by H. A. Gribble.

*March* 6.—Paper (subject to be announced), by J. Slater, B.A.

*March* 20.—"Proportion in Architecture, especially as exemplified in the Works of the Greeks," by F. C. Penrose, M.A.

*April* 9.—Members' *Soirée.*

*April* 24.—"A Prism for Architecture," by Prof. T. Roger Smith.

*May* 8.—"The Treatment of Angles and enclosing Lines," by J. H. Ince.

## COMPETITIONS.

*St. Pancras Mortuary.*—Mr. H. H. Bridgman writes :—"I beg to forward you copy of a letter I have this day received from the Vestry Clerk of St. Pancras on the above matter, my object being to let competitors (some of whom have complained of the delay in deciding the competition) see that the cause of the delay appears to have been unavoidable, as, since the competition took place, a Bill has been introduced into Parliament, and become law, forbidding the interference with the burial-grounds of the metropolis, as was proposed by the Vestry, for building purposes. Another site will therefore have to be found, and I have no doubt if the complaints referred to had reached the Vestry an explanation would have been given to this effect."

[Copy.]
Vestry Hall, Pancras-road,
October 3rd, 1884.

Dear Sir,—A Committee of the Vestry have reduced the number of designs sent for erection of Mortuary and Coroner's Court to six.

Your design is one of the six, and I am directed to inform you that some delay may probably elapse before the Vestry can decide which of the plans they will adopt, inasmuch as difficulties have arisen as regards a site.

If you have no objection to this your plans will be kept until the final award has been made,—Yours faithfully,

T. Eccleston Gibb,
Vestry Clerk.

H. H. Bridgman, Esq.

*Baptist Church, Newcastle-on-Tyne.*—The old church in Bewick-street having been bought by the River Tyne Commissioners, a new site for more extensive buildings, to accommodate an aggregate of 1,500 persons, has been secured. Invitations were recently issued to eight architects, who have submitted plans in competition. The first premium, of 50*l.*, has been awarded to Mr. J. Cubitt, of London, who will be employed to carry out the works; the second, of 25*l.*, is awarded to Messrs. Clark & Moscrop, of Darlington; and the third, of 15*l.*, to Messrs. Thompson & Dunn, Newcastle-on-Tyne.

## Illustrations.

### DESIGN FOR ADMIRALTY AND WAR OFFICES.

BY MESSRS. HALL AND POWELL.

We give this week the view towards Whitehall of this design, and the two principal plans as usual. As to the general wants of the design we expressed ourselves sufficiently in our general critique on the competition at the time the drawings were exhibited. The Whitehall front is the richer and more effective of the two, and has, therefore, been selected for illustration. We append the following extracts from the architects' "report" :—

"The buildings are so disposed, and the staircases so arranged, that they can conveniently be erected in blocks at intervals.

Our aim throughout has been to preserve extreme simplicity of arrangement in the plan, and an avoidance of any irregular lines of corridors beyond what is rendered absolutely unavoidable from the nature of the site.

A leading feature in our design is thought to be the system of double corridors that is adopted almost throughout the entire building, and we believe it to be the only one in so vast a building that will enable the main arteries of communication to be properly lighted and ventilated.

It may be thought to involve a certain prodigality in space occupied by building, but it is submitted that is of small moment when compared with the result obtained, and the arrangement lends itself to a very convenient situation for such neutral purposes as waiting-rooms, interview-rooms, lavatories, and latrines, which occupy the space between the corridors that is not required for areas for light, and which are in common use by the occupants of the rooms on either side.

The upper part of all the corridors not being required to be of the height of the rooms, is made use of as a channel for heating and ventilating pipes, electric and telephonic wires, and speaking-tubes, all of which will be more fully alluded to further on.

Glazed screens and doors divide the several lengths of corridors, into sections, as necessary respectively for the subdivision of departments.

All the principal staircases have spacious well-holes, and are lighted by lantern lights from the top, thereby facilitating the ventilation of the building. The most important stairs are those on either side of the central halls in each department, affording light to them through arched openings on the several floors.

It should be observed the internal angles of the buildings are utilised for staircases, which being lighted from the top render these points, usually dark and useless, as light as other parts of the buildings.

The efficient window lighting of the several rooms or corridors is a point to which we have given much attention, and our aim has been to distribute the light equally over all, and to obtain for all rooms direct external lighting. As has been before pointed out, the corridors, waiting-rooms, interview-rooms, lavatories, and latrines are chiefly lighted by windows looking into the open courts or areas between the corridors.

The buildings would have been constructed of brick, faced with brown hard Portland stone, as being the best known material to withstand the effect of the London atmosphere, and the basement of the several fronts, and the large quadrangle carried up in grey Aberdeen granite in rusticated courses drafted at the arrises. At the bases of the principal external piers of the angle towers, &c., bronze castings are introduced, intended to contain the effigies in high relief of those distinguished in the services of the respective Departments. The areas for light and the internal corridors in the basement would be faced with white glazed bricks, in order to reflect as much light as possible. The internal corridors are proposed to be lined with coloured tiles or bricks, having a dado with border, and the space above to have a lighter colour.

Our chief aim in the preparation of this design, and in the matured reproduction that it has undergone, has been simplicity of parts and similarity and breadth of treatment in the several façades. Ornament has been kept subservient to utility, and proportion has been relied on rather than embellishments for the effect that it has been sought to produce.

A simple type of Italian architecture has been adopted as most appropriate for the situation and surroundings of the building."

*Key to References on Plans.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
B 1. Director of Artillery.
B 2. ,, Supplies.
B 3. ,, Contracts.
B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
C 1. ,, ,, ,,
C 2. ,, ,, ,,
C 3. ,, ,, ,,
C 4. ,, ,, ,,
D. Finance Department.
D 1. Finance Department.
D 2. Auditors.
E. Military Department.
E 1. Military Secretary.
E 2. Adjutant-General and Quartermaster-General.
E 3. Intelligence Department.
E 4. Deputy Adjutant-General R.A.
E 5. Deputy Aajutant-General R.E.
E 6. Army Medical Department.
E 7. Military Education Department.
E 8. Commissary-General's Department.
E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
F 1. Army Purchase Commission.
F 2. Judge Advocate General.
F 3. Pay Office, Commissariat and Transport and Ordnance Store Corps.
F 4. Pay Office. Army Hospital Corps.
F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
A 1. Board-room Suite.
A 2. Military Branch.
A 3. Intelligence Branch.
A 4. Naval Branch.
A 5. Civil Branch.
A 6. Legal Branch.
A 7. Registry Branch.
A 8. Record Office Branch.
A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
E 1. Director of Naval Construction.
E 2. Engineer-in-Chief.
E 3. Director of Naval Ordnance.
E 4. Store Branch.
E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant General's Department.
F 1. First Division.
F 2. Second Division.
F 3. Third Division.
F 4. Fourth Division.
F 5. Fifth Division.
F 6. Sixth Division.
F 7. Greenwich Hospital Division.
F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

## LYCH GATE.

The lych-gate in our illustration is designed by Mr. W. Rickwood, and was intended for presentation by Mr. George Mence Smith to the old church of Bexley, Kent, the contract of Mr. R. Avard, of Maidstone, at 170*l.*, having been accepted, and the greater portion of the work has been performed. The material employed is oak and wainscot, standing on a foundation of Kentish rag filled in with split flints. Encaustic tile paving has been employed, and brindled tile roofing. It appears that circumstances led to an abandonment of the original destination of the gateway, and it is now, we understand, to be erected at Erith.

## PULPIT IN WROUGHT IRON.

This pulpit, which has been executed for St. Saviour's Church, Warwick-street, Paddington, was designed by Mr. F. B. Wade, and executed by Messrs. A. Newman & Co. It is an interesting example of a somewhat novel application of wrought-iron work. The only portion which in style does not seem quite to harmonise with the idea of wrought-iron work is the succession of brackets under the top rail of the pulpit. These are rather formal and stiff in outline. The panels seem very suitable and effective. Of the generally excellent artistic character of the work done under Mr. Newman's direction we have before spoken.

## ST. LEONARD'S CHURCH, MIDDLETON.

We gave last week Mr. Leeson's perspective view of this interesting little church, and we now give his plan and measured drawings of details. These include, as will be seen, some very interesting and pretty bits of detail in woodwork.



NEW LYCH GATE, BEXLEY OLD CHURCH

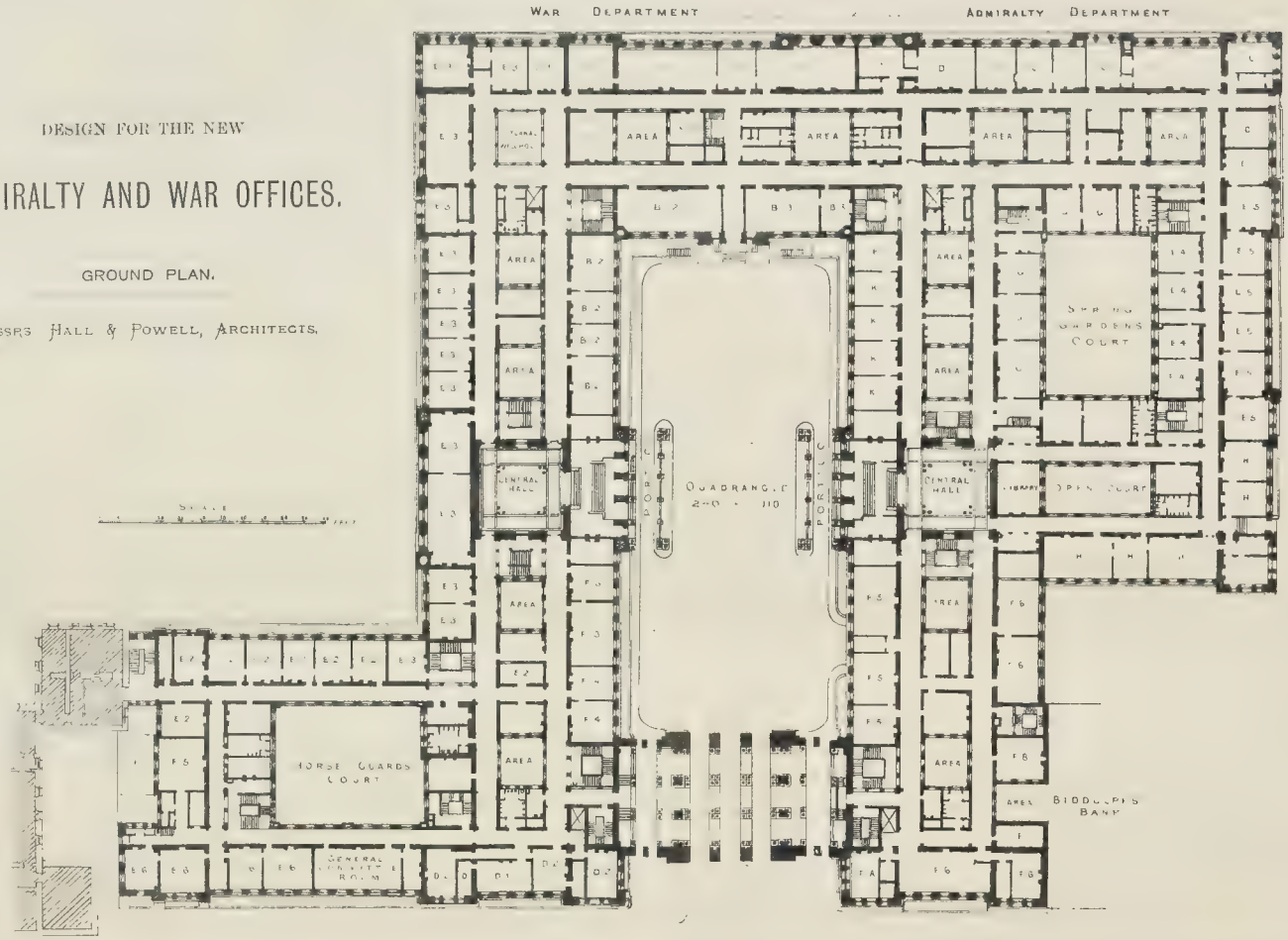
Mr. Wm. Rickwood, Architect.

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

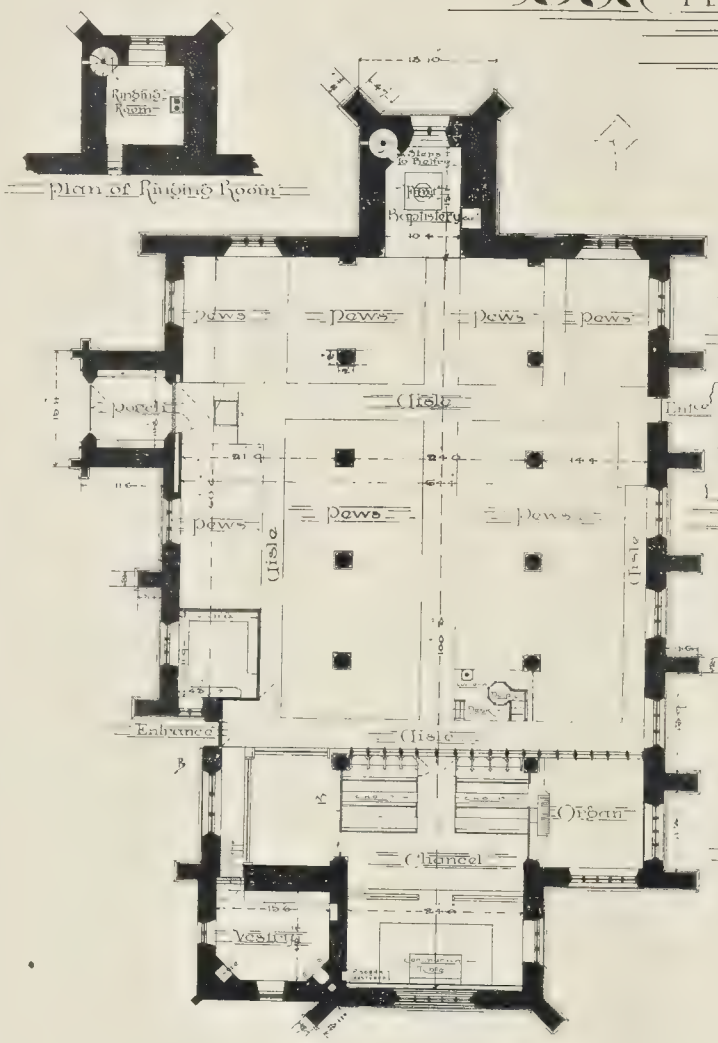
GROUND PLAN.

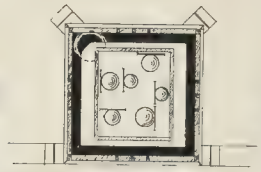
MESSRS HALL & POWELL, ARCHITECTS.

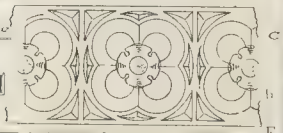


# Church of St Le

## Lanc









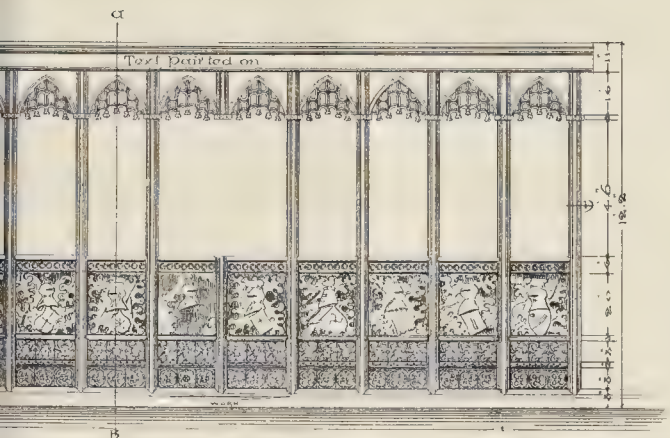




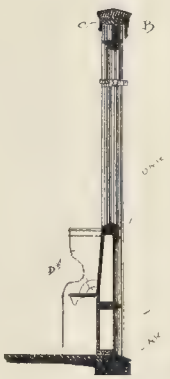
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# rd, Middleton

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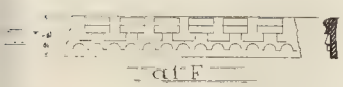

Elevation of Chancel Screen, to Church



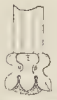

Section AB



Plan thro CD

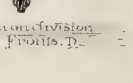


at F



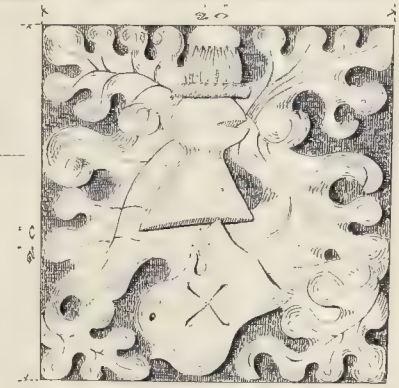
at G

Section

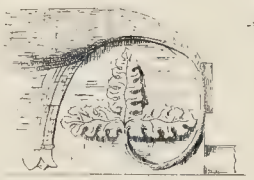





at H




Panel, E



Seats Raised, Miserere

*Measured and Drawn by Mr. E. W. Leeson, Oldham.*



DESIGN FOR NEW ADM

By Messr



LTY AND WAR OFFICES.

& Powell.

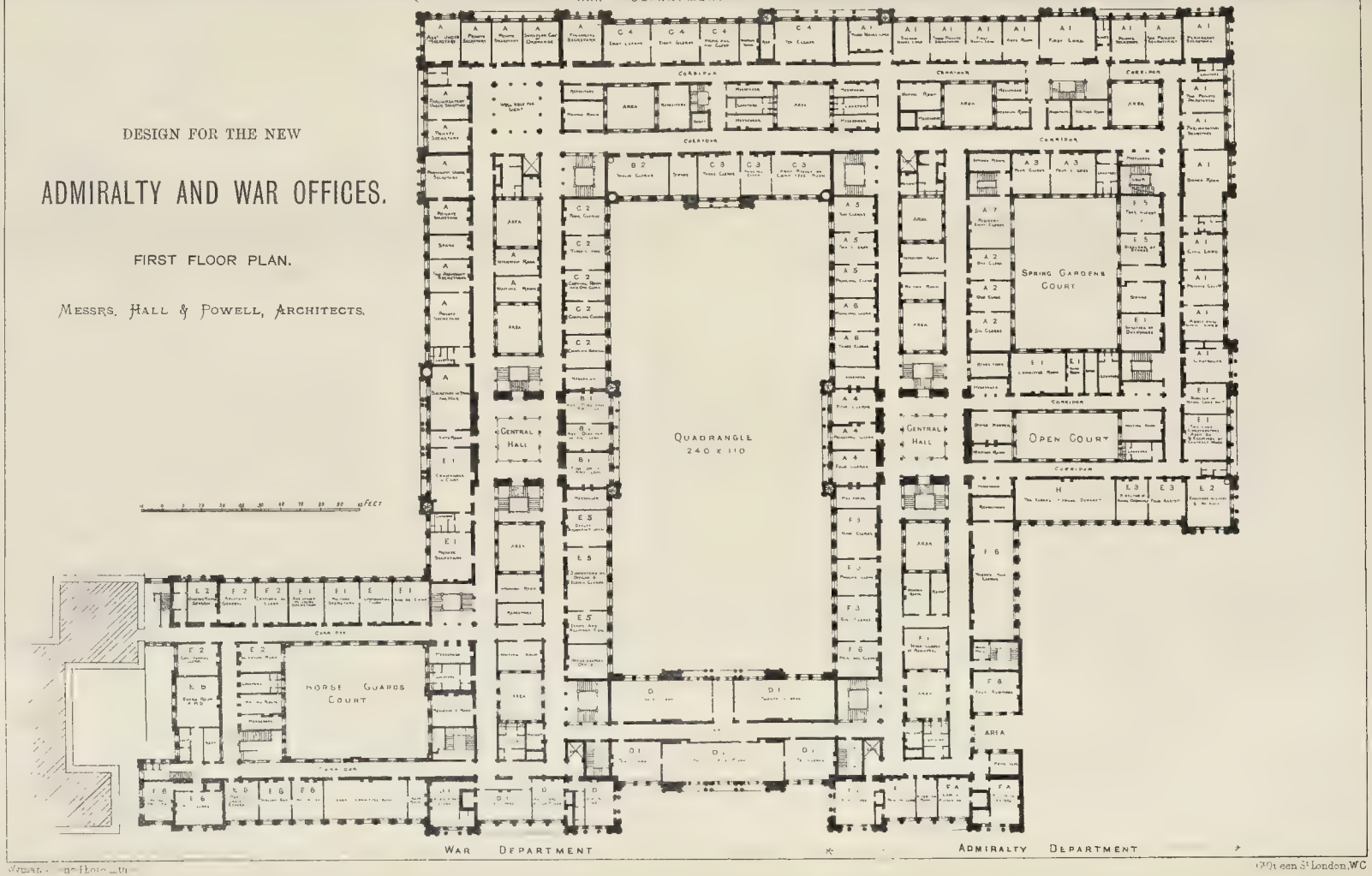
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DESIGN FOR THE NEW

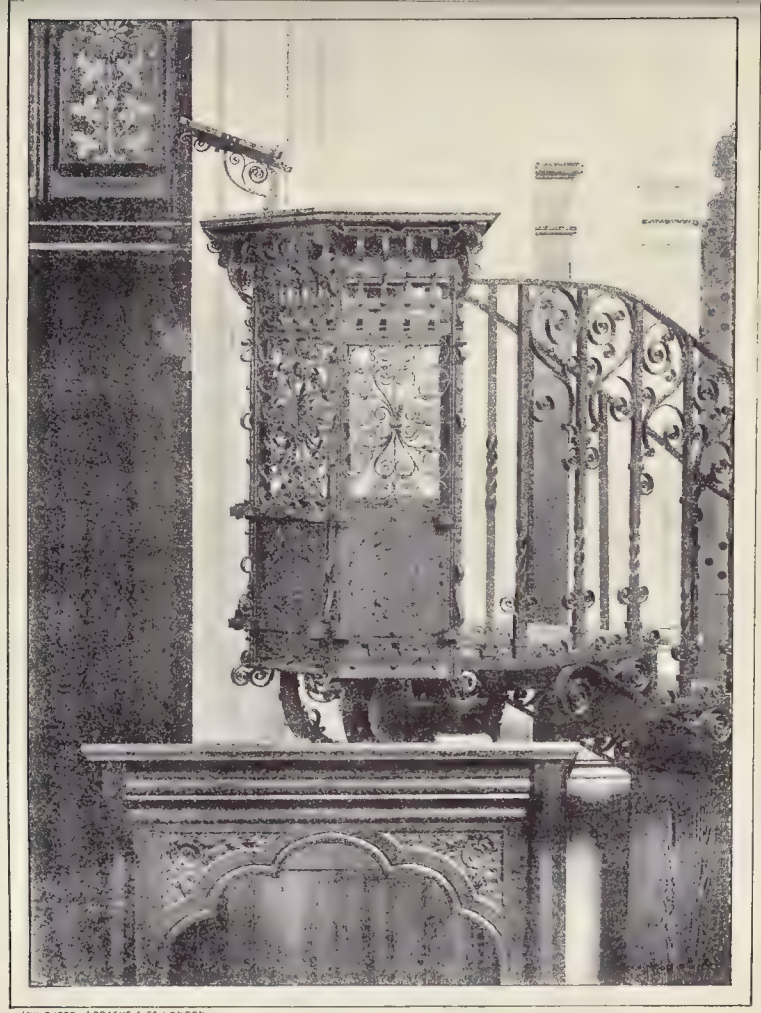
# ADMIRALTY AND WAR OFFICES.

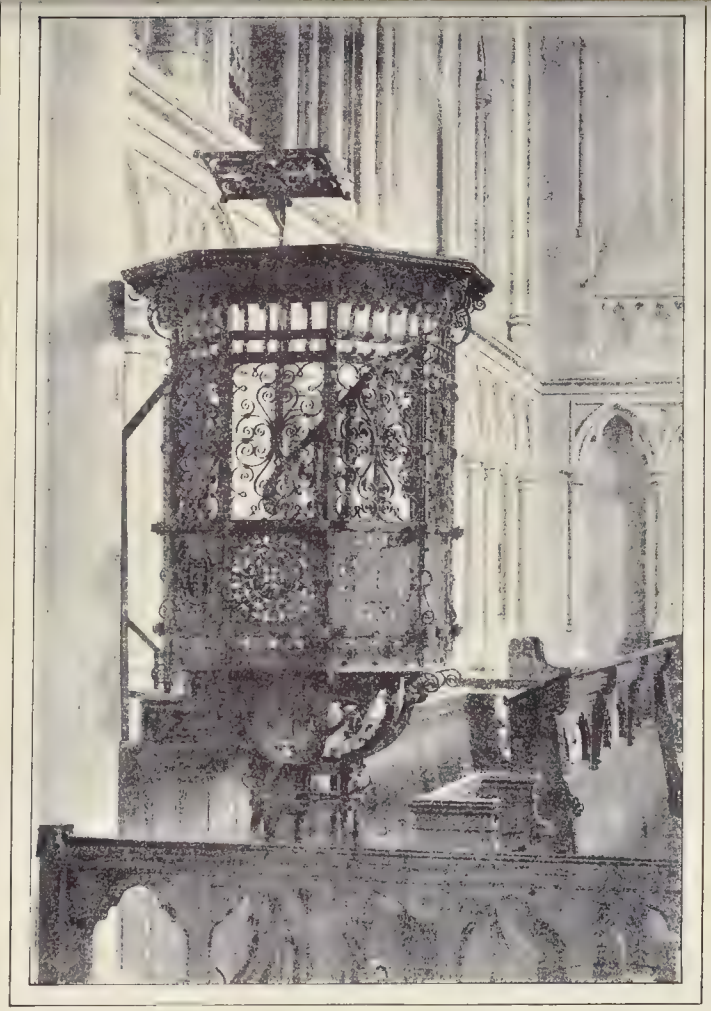
FIRST FLOOR PLAN.

MESSRS. HALL & POWELL, ARCHITECTS.




Queen St London WC





INK PHOTO SPRAGUE & Cº LONDON

PULPIT, ST. SAVIOUR'S CHURCH, PADDINGTON.

Mr. F. B. Wade, A.R.I.B.A., Architect.

## THE WALL AS AN ARCHITECTURAL FEATURE.

Professor Roger Smith gave an interesting introductory lecture on this subject to the architectural students at University College, on Friday, the 3rd inst., of which the following remarks formed a portion :—

The preparation for building a wall is, as every one knows, to find or make a foundation. A bad foundation is literally, as well as in a figure of speech, at the bottom of most of the failures that occur in walls. When a good foundation is secured, the success of the wall is rendered possible. What is a good foundation? The best is one that is perfectly immovable and incompressible, such as rock. The house built upon a rock is the one safe to stand. Next to this, and only one degree less good, is the foundation which may yield or compress slightly under a load, but will do so with perfect uniformity. Soft, irregular, shifting foundations and those exposed to the action of water, frost, and air, are among the most notoriously bad ones. The ordinary London foundation is clay, in some cases mixed with loam or sand. In building on it great care is necessary; the foundation must be carried so far below the surface that frost will not penetrate to it. To secure this in the London climate you should go 4 ft. deep, and even more. The surface round the building should also be protected so as to prevent the percolation of water. The weights of the different parts of the wall should be as nearly uniform as possible, and they should not be extreme. Four tons per foot superficial is quite enough. It has become a practice of late years to form a kind of artificial rock of concrete upon the foundations of earth or clay, composed of small stones and lime or cement. This concrete, which hardens into an incompressible slab, admirably spreads and distributes the weight, and is of great use in preventing disaster. In the case of very bad foundations enormous quantities of concrete are often employed, and with success. The base of the wall, like the concrete, is below the level of the ground. It is, to some extent, a modern improvement, or, at least, it hangs on to the modern notion of building thin walls. In the Middle Ages, when walls were immensely thick, it was not very often customary to build them with spreading footings; now it is usual, and a most useful custom it is. Walls in London are required by law to be twice as wide at the bottom of the footings as they are themselves. Of all the properties a wall can possess I think stability is the most noteworthy. Of old this was sought in great thickness. The Romans first showed that constructive skill would enable men to build walls thinner than had been customary, and yet stable. Our modern walls are vastly thinner than those of the Romans; but then there are few modern buildings for which we expect, or could desire, a durability like that of ancient Roman work. Good materials, good putting together, and strong cement, with some amount of protection from weather, are what we must rely upon for the preservation of our walls. Homogeneousness, or the use of materials all of one sort, would seem at first sight to be essential to the construction of a good wall; and yet, though many ancient walls like those of Munich, and, I believe, those of Athens, were practically homogeneous, the walls cleverly put together by the Romans of three or four different sorts of materials have proved, some of them, to be all but indestructible. Uprightness is essential to stability, and to look safe a wall must be obviously upright, though a tapering form, like the pylon of an Egyptian temple, also looks strong, and really is so. Length was the ancient way of giving importance and dignity to walls; height is the comparatively modern way. In the early ages of the world, and in the ruder stages of the development of modern nations, it is extent that is relied upon where an effect is to be produced. The greatest of the temples of Egypt, for example, the temple of Ramse, with its dependencies, extended over about 2,000 ft., or more than the third of a mile. The rude stone avenues of prehistoric origin to be met with at the spot of the same name in Brittany, extend over about a mile and a third of country; and, as another example of a different kind, I may recall to you the Roman wall which stretched right across the north of England. As the power of building, and skill in the production of architectural effect increased in any nation, height was more sought after than extent; but it was, with a few exceptions, reserved for Christian and modern architecture to attempt with success buildings in which height is the main feature. Straight lines and right angles seem to have been almost the only rule in very ancient work, such as the Egyptian and the Assyrian. The Greeks first introduced curved walls in their theatres. The Romans continued and extended their use, and introduced polygonal shapes, all of which have obtained ever since. Coloured materials are to be met with at all periods of the world's history; but as their use always has reference to the architectural effect of the wall, we will postpone them to the second part of the lecture. Having now looked a little at our wall, let us try to look into it as far as we can, and perhaps an architect can look further into a stone wall than some other people, notwithstanding the old proverb. What, then, are walls made of? You may lay it down as a general rule that a wall must be made of something that lies ready to hand. In many cases the fact that the material of which some small or ornate object is to be made comes from far is a point in its favour. We prefer Italian marbles to Devonshire, or to the serpentine of Cornwall, not because they are always more beautiful (for they are not), but because they are Italian. But for wall building so much and such heavy stuff is wanted that it never does to bring it far. Accordingly, in localities where nothing else is to be had, walls are built of earth. In Devonshire, for example, cottages, barns, and the walls of gardens and orchards are commonly of earth, and they are warm, solid, and, if well taken care of, durable; but moisture must not be allowed to get into the heart of them, or they will soon crumble. Next to earth is a material not, so far as I am aware, known in England, but once in use in the East, sun-dried bricks. Vitruvius says that the walls of Babylon were built with sun-dried bricks laid in bitumen; and it is supposed that they were largely used in Assyria and Babylonia, and that some of the shapeless mounds which now mark the site of ancient structures consist of a mass of what was once sun-dried bricks. Next, of course, we should come to brick, the material only too familiar to the London eye, and the refuge of builders throughout the world and of every age who, like the London builder, were not so fortunate as to have stone within reach. In Egypt and many parts of Italy there are remains of brickwork of great antiquity, and in Lombardy, North Germany, France, Belgium, and our own country brick has been extensively used, and is in use at the present day. Bricks were not always of the sizes and shapes we are familiar with. The Romans made them flat, more like our tiles, and in many European countries they have been used considerably smaller. The size is a good deal influenced by the weight. An English brick can be held and managed by an artisan with one hand. If it were much larger or much heavier it would take two hands, or even two men, as were probably employed on the Roman bricks. The most refined kind of brick is called terra cotta. It is of the nature of brick, but bears the same kind of relation to it that marble does to stone or silver to pewter. Terra cotta is, in theory at any rate, the most appropriate ornamental substance to employ with brickwork, and though there are some practical difficulties in the way of using it, when these are overcome it is an admirable material. The best and most desirable material for wall building is, however, stone. Every sort of stone that is in the least degree deserving the name of stone has been made use of for the purpose of wall building,—from flints, which are some of them as inconvenient in shape for the mason's use as potatoes would be, up to the hardest granite, the finest and truest freestone from our many excellent limestone and sandstone quarries, or the beautiful and precious marbles of Greece and Italy. There are stone walls in Greece and in the Etruscan plain, which have come down to us from remote antiquity, made of large polygonal stones unwrought,—or but slightly wrought,—and coarsely fitted together without mortar. There are others in Egypt of the finest polished granite with joints so close and true that the edge of a sheet of paper cannot be got between the blocks; but as remarkable in its way as these specimens of consummate handicraft is the construction of the Roman walls which were often made of small stones, such as we make macadamised roads of, set in a tenacious mortar which has hardened till it is as strong as the stone itself, and steadied at intervals by the introduction of a bond-course of flat bricks or large stones. With this mode of construction, which could be carried out anywhere, the Romans built vast works, the ruins of which remain all over Europe. There is quite as much to learn about stone as about brick; in fact, a great deal more, as, for example, how to select stone, for, owing to the ease with which many sorts of stone are acted upon by the weather, there are many precautions to be taken in the selection or use of material. I will just name the three cardinal ones, which are these :—First, select for use stone from a quarry, and from a bed in that quarry which experience has shown to be durable. Secondly, let that stone lie in the building in the same way as it lay in the quarry, or, as masons would say, bedwise. Thirdly and lastly, take such precautions as will insure that no moisture gets into the inside of your wall, or into the heart of the stones that compose it. The materials I have named all of them require to be held together by some sort of cement if the wall is to be durable and weather-tight. Lime is at the bottom of all the cements in general use, and its faculty of hardening after being calcined and slaked, and, as it hardens, of adhering to the surface of the stones or bricks with which it is in contact, is invaluable. Mortar is made of quicklime and sand. Cements and hydraulic limes are compounds (natural or artificial) of lime and other substances, chiefly alumina, which enables it to set harder, and under water, and more rapidly than in its unmixed state. I need hardly point out that where the heart of a wall is of many rough stones laid with much mortar (a substance more or less impressible), while the face is formed of few well-dressed and squared stones laid with little mortar, there must be great risk of the two parts of the wall behaving differently the one from the other when weight comes upon it. This happened in much of the work of the builders during the eleventh and twelfth centuries in England,—the period of the Norman style. Professor Willis has gone so far as to say that if a Norman tower has not fallen, that circumstance throws great doubts upon its being Norman. Certainly an immense number of them have fallen, and as an example of failure, happily anticipated before there was a fall, I may remind you of Peterborough, where the core of the Norman piers carrying the great central tower has crumbled, and the piers have arched, and have been taken down within the past year. Different from the practice of building composite walls is another which I will only just mention, that of building hollow walls as a protection against damp. We have by no means exhausted the list of materials for walls if only your patience will hold out. A modern material which I will just name, but not dwell on, is concrete, excellent if well looked after, dangerous otherwise; cheap if used in large quantities, and where there are few features or irregularities, but far from cheap in small or intricate buildings; very strong, very durable, and sometimes valuable where nature yields few materials for walls of another sort. Timber has been used time out of mind for the walls of houses, and even churches and dignified buildings, in the spots where it is plentiful. There is evidence that timber buildings were in use in Assyria, Egypt, and Lycia, from the curious fact that ancient remains of stone or marble are actually cut into shapes that imitate timber; indeed, the whole system of architectural treatment in use in Greece is a kind of petrification of timber construction. The countries of Europe where timber buildings are now mostly to be met with are Sweden, Norway, Russia, and Switzerland. They are in many ways excellent. A timber wall is by no means a bad protection against weather; but it is liable to catch fire, and so is quite unfit for use in cities. Many railway stations in England, however, are built of timber, and any one of these will serve to illustrate a cheap way of building timber walls. In Sweden whole logs, halved at the angles, are used, and a wall far more solid, durable, and weather-tight can be obtained. The same method is followed in Russia,—and you may see a good specimen at the Health Exhibition in the Russian house at the back of the dairies. Timber framing filled in with plastering or with brickwork in the spaces, called usually half-timbered work, is an excellent material for walls if done with the solidity and liberal use of strong timbers that was common in England in the sixteenth and seventeenth centuries. In Lancashire and Cheshire, in Worcestershire and Gloucester, in Kent and Surrey, and in other

parts of England you may find many fair half-timbered walls, and even here and there one still lingers in London or the outskirts. We have in these later days taken to build our walls of glass, as at Sydenham, and of corrugated iron, as in many temporary rooms and churches, and each has its uses. The newest material for wall construction in England (though not, I believe, new in China and Japan) is paper. At the Health Exhibition a very serviceable little cottage walled and roofed with paper may be found. It is known as the Willesden Cottage, and I think I may say from some little experience of it that its walls are by no means the worst within which I have been sheltered in my lifetime. We will now leave the construction of walls and turn to their treatment as an important factor in architecture. A wall, as we look at it, ought to have three parts: its base, which, though below ground, ought to be represented by some description of plinth or base-moulding; its body; and its top, which may be a coping to throw off water, or may be the overhanging eaves of the roof which it carries. These, then, are infinitely varied, but they are generally all to be seen in any wall that is architecturally satisfactory to the eye. The different ways of dealing with a wall as an architectural feature may perhaps be grouped as follows:—

I. Emphasising construction.
II. Masking construction.
III. Varying the outline or plan of the wall.
IV. Enriching the surface of the wall.
V. Colour.

Of the method of emphasising construction, which is our first division, a very ancient and obvious one is to use large stones. This was a favourite plan with the Egyptians, and the Greeks, especially in archaic times. Great stones were used in the Pelasgic walls, large remains of which still exist in Greece and in the Etruscan plain in Italy. These stones were usually polygonal, very carefully fitted together, built up without mortar, and they impress the spectator very much by the appearance of savage strength which they present. Stones of very large size occur in Greece and in Egypt, and in Syria stones remarkable for their dimensions and for the way in which their outline is marked round with a broad, round mark.

Another mode of emphasising construction, which the Jews seem to have taken a pride in, is the employment of large corner stones. When a wall is built of small or loose materials, it is not easy to make the corner strong; in fact, in parts of England the towers, which would otherwise be square, are round, because there is little else but flint to build with, and with flints you cannot make a square corner. It is usual, on account of this tendency, to weakness, to fortify the corner by building it of larger stones or better than others; and the Jews seem to have attached some semi-superstitious importance to the top stone at the corner of a building,—perhaps a more really appropriate place for a famous stone than our foundation-stone, which rarely, if ever, is part of the foundation. These stones at the corners come up again in Roman work, and still more frequently in the styles derived from Roman. The famous long and short stones at the corners of Saxon buildings, the well-marked quoins of Gothic ones of all ages, and the carefully-wrought, rusticated, and raised quoins of Renaissance buildings, all go upon the principle of marking construction. In simple and homely structures, built of materials with a fine surface on good colour, any method of marking the structure of a wall is successful. In Cumberland and Westmoreland, where many varieties of stone, rich in colour, are met with, the walls of humble churches, or even cottages, are sometimes quite a sight to see and admire from their beautiful and varied tints, especially if a method of walling be adopted which allows the natural cleavage of the stone to be seen without any tooling. Another and an opposite mode of emphasising treatment, if not construction, consists in exaggerating the squaring and dressing given to stone, and bringing it to a surface of the utmost smoothness. In the later part of the Gothic period, and in much of the Renaissance architecture which followed it, the whole surface is rubbed, and no trace of the tool is left. The same completeness of workmanship was also to be met with in Greece and in Egypt, and wherever we encounter it the spectator seems to be made sensible of the immense pains and care that have been lavished by the builders upon their wall; and to a less extent the same effect is produced by the selection of materials with a fine texture of surface and a good colour, like choice bricks. A wall consists of stones and joints, and one way of marking the construction is to make the joints more conspicuous than they naturally would be. We have seen that in ancient Jewish masonry a drift or breadth of finely-tooled work surrounds the margin of the stone. In some Greek work we meet with a severe square sinking at the joint, and in Roman work with a more strongly-marked channel. In the revived Roman, which we know as Renaissance, this accentuation of the joints of stone is practised often with great frequency; and the refined mason's work, to which we have given the absurdly inappropriate name of rustication, is one of the sources of great beauty of many Italian palaces and houses. There are many other ways of emphasising construction to which I have not time specifically to allude, but may say generally that any treatment of a wall which makes its materials or its construction evident almost invariably adds a natural and, so to speak, a spontaneous grace to buildings.

## THE INTERNATIONAL FORESTRY EXHIBITION, EDINBURGH.

CONCLUDING NOTICE.

It has been arranged that the Exhibition is to be closed this Saturday, October 11th, and a committee has been formed to consider what can be done with regard to the formation of a museum and school of forestry. It is gratifying to know that the undertaking has proved a success, and that the committee will have a surplus in hand; but in regard to this exhibition, as in so many similar affairs, it is found that dissatisfaction exists as to the awards of the jurors. A meeting of exhibitors has been held, when it was moved by Mr. Taylor, of Taylor Brothers, Sheffield:—

"That, seeing the glaring inconsistencies of the awards as published, we, as practical men, consider that such adjudications cannot have emanated from competent jurors, who should have been appointed under rule 11 of the regulations; or otherwise their original decision must have been altered, after being submitted to the Executive Committee. We therefore demand that the committee appointed from this meeting have access to the original reports of the jurors."

The successful operation of an art such as forestry depends upon the application of principles borrowed from a wide range of sciences, and the classification of the theoretical branch of the study must of necessity be a matter of difficulty. To exhibit the scientific basis of such an art is hardly possible except in the form of diagrams, maps, and unattractive tables of statistics. The field of study is a wide one, embracing geology, meteorology, botany, vegetable pathology, vegetable physiology (especially in regard to the cultivation of healthy trees), fungology, entomology, and zoology, so far as they bear upon tree-life and disease. It also involves the application of mechanics and chemistry to the obtaining, preservation, and manufacture of timber and other forest produce. It will be seen that there is ample scope and range for those who desire seriously to study the subject, and it will be readily understood that in the few notices we have been enabled to give of the Exhibition we could only glance shortly over the wide field of view, and may inadvertently have laid ourselves equally open to animadversion with the jurors to whom was entrusted the awarding of prizes. Although strongly tempted to do so, we have not been allured by the artistic exhibits into following a congenial subject. The furniture shown was especially attractive, ranging from the simple work of the cabinet-maker to the most elaborate productions of the carver; and we are given to understand that the number of such articles sent for exhibition would have been much greater but for the delay in issuing the prospectus caused by the difficulty of procuring a site for the Exhibition building. The application of timber to building requirements has not been shown to the extent it might have been. The various modes of roof-construction and laying flooring, the fitting up of window-sashes, doors, &c., with mouldings applied or cut on the solid, might all have been shown in an interesting and instructive manner. Mr. G. C. Douglas, of Edinburgh, has indeed done good service in this direction by exhibiting specimens of lath imported from Russia, consisting of quartered tree or billetwood, split in lath three-sixteenths of an inch thick, and ready for placing on walls and ceilings to receive plaster. The lath shown is of excellent quality and of unusual length, being 8 ft. long, and yet split so clean as to appear as if it had been planed. It is displayed in the form of a neat harbour, having a circular-headed doorway and domed roof made ready to receive a coating of plaster or cement. But the coach-builder has been in advance of the house-carpenter, and Messrs. John Hislop & Son, of Haddington and Edinburgh, show the art of vehicular construction in various stages in an admirable manner, with several appliances for ventilating the interior of carriages, keeping them water-tight, and easy as regards motion. The vehicles are constructed both of home and foreign timber, and are remarkably light and elegant, and yet strong and serviceable. We must not overlook "The Manitoba Farm," where is shown a complete farm-steading on a small scale, such as many an emigrant to this rapidly-growing colony would be delighted to have at his disposal. The department of machinery in motion deserves more attention than we have been able to bestow upon it. The largest exhibitors are Messrs. John McDonall & Sons, Johnstone, near Glasgow; and Thos. Robertson & Son, of London. Robey & Co., of Lincoln; Sagar & Co., of Halifax; and others, show admirable machines for cutting up and working wood into the forms required. This exhibition is the forerunner of one to be opened in the metropolis, which will doubtless be upon a larger scale, but which may benefit from hints derived from it.

## LECTURES ON ARCHITECTURE AT THE CRYSTAL PALACE.

On Wednesday last, Mr. G. Richards Julian, A.R.I.B.A., delivered the first of his course of six lectures on "Styles of Architecture, and their Relation to the Art of Landscape Gardening," in the Lecture-room at the Crystal Palace. The lecturer, after acknowledging the courtesy of the Council of the Royal Institute of British Architects in lending him a selection from the collection of lecture diagrams in the library at Conduit-street, said that to design the simplest architectural decoration, it is necessary to be acquainted with the characteristic forms and proportions, and the details of moulding and of ornament proper to the style with which such decoration is to harmonise, and the only satisfactory mode of preparation for such a work is a study of those forms and details. The works of the great artists of the past are our inheritance, and an attempt to ignore them must arise either from presumption or from idleness. To gain the power to design well a balustrade or a summer-house, there is no more a royal road than there is to the planning of a cathedral or of a palace. On the subject of architectural styles, the lecturer pointed out that one style did not cease suddenly and a new one spring up complete and, as it were, ready-made, but that between each there was a period of transition, when the marks of one were slowly fading and the characteristics of the next becoming more prominent,—a process most probably unnoticed by those who were creating the new style, and only evident to their posterity, who are able to look back over the ages, and trace the rise and fall of different modes and forms in design and building. Having given a rapid sketch of the history of European architecture, from its rise in Greece until the present time, the lecturer proceeded to point out in detail the distinctive features of the Doric, Ionic, and Corinthian orders, the peculiarities of Greek mouldings, and the forms of Greek ornament. After describing the celebrated hanging gardens of Babylon, and quoting the account given by Pausanias of the public garden at Athens, he referred the students to the several casts and reproductions of Greek architecture and ornament to be found in the Crystal Palace.

**Hull General Infirmary.**—This building is about to be enlarged by the addition of two wings and the erection of an out-patients' department, and the first stones of these new buildings were laid by the Duke and Duchess of Edinburgh on the 1st inst. The architects are Messrs. H. Saxon Snell & Son, of London, and the builders of the portion now being executed are Messrs. Jackson & Son, of Hull. The cost of the whole work will, when completed, amount to 25,000*l*.

## RECENT PATENTS.

2,045, Improved Apparatus for Opening and Closing all the Latches or Bolts of a Door simultaneously. John Lowley and James Harold, Battersea. 6d.

The object of this invention is to provide a secure fastening for doors, while at the same time they can be opened with ease in cases of fire or other such emergency. The latches or bolts are fixed in series, and are operated upon in opening and closing by one and the same operation, a weighted rod, *e*, carrying latches and bolts, which extends from end to end of the door. Fig. 1 is a perspective view of

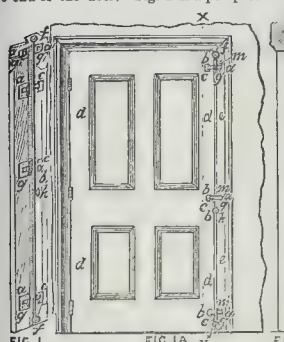


FIG. 1. FIG. 1A FIG. 2

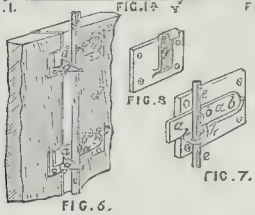


FIG. 8 FIG. 7. FIG. 6.

part of a door fitted with the improved latches; and fig. 2 a vertical section of the same part. Fig. 1a is a view in front elevation. The device as fitted to two doors is shown in elevations and section, figs. 3, 4, and 5. The latches shown in parallel perspective, fig. 6, are similar to those shown also in figs. 1 and 2. Figs. 7, 8, and 9 show modified forms of latches

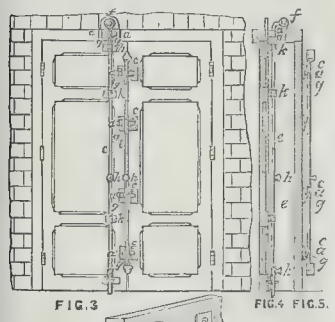


FIG. 3 FIG. 4 FIG. 5.



FIG. 9

with special devices in catches and loops, which may be adapted to this invention. The inventors, in describing their drawings, refer to the lettering as follows: *aa* are the latches and bolts, *ccc* are the metal plates to which the latches or bolts *a* are pivoted at *b*. These plates are attached, by screws for example, to the door *d*, and metal plates may be sunk flush with the surface of the door, or otherwise arranged. The rods marked *e* are for operating the latches or bolts *a*, and are weighted at top and bottom as indicated by the letter *f* in most of the figures. The object of weighting the rods is to give them a downward tendency, and thus to keep the latches and bolts *a* in the loops or catches *gg*, which may be made of any convenient form or shape according to the position in which they are to be placed, or as fancy or taste may dictate. The several arrangements shown in the different figures are applicable to different portions, and for single or double doors respectively. Thus, when a latch is applied to the top of a door, the kind used is such as is marked *a* in the diagrams, figs. 1 and 3. This latch, which is fixed to the rod *e* on the descent of the rod, falls into the loops, and securely fastens the door. They may be used either alone or in conjunction with other dropping latches. The arrangement, when used together as shown in fig. 1, is most suitable for single doors. For double or margin doors the arrangement shown in fig. 3 is regarded as the best. When the bolts are in position, and the door secured, to unfasten the door it is only necessary to lift the rod *e* by the knob *h* into position shown by the dotted lines *m*; this rod being connected with each of the latches, they are all raised to one time, and the door can be opened. To close the door again, and fasten it, it is only necessary to raise the weighted rod, and bringing the door to its closed position release the same, when all the latches fall into the loops. The arrangement for double doors is equally convenient, and is worked in the same way. These fastenings are particularly applicable to those doors which are required to be opened quickly in cases of emergency, while at the same time the fastenings are very secure. They are meant mainly for churches, chapels, and other public places and warehouses, and for doors to dwelling-houses. It is also suggested that they are applicable to railway-carriage doors.

7,305, Improved Fire and Water Proof Material for Roofing, Sheathing, &c. Com. by Messrs. D. A. Brown & Brigham, Boston and Worcester, U.S.A. To David Hunter Brandon, London and Paris.

This invention is for a suitable material for roofing sheathing and such like purposes, when a fire and water proof material is desired, and it consists essentially in a material composed of asbestos, moulded or formed into boards or sheets treated in succession with silicate of soda and chloride of calcium. The figures represent the material fixed to a building on sides and roof. Fig. 1 shows the building; fig. 2 is a section taken through part of the roof at *x*; fig. 3 shows another section through

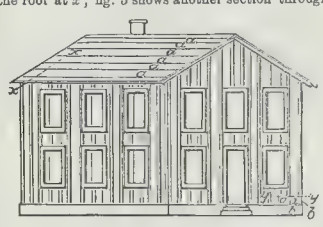


FIG. 1.



FIG. 3.

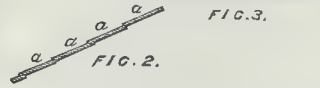


FIG. 2.

the side at *y*. In adapting the ordinary asbestos board or paper made in the usual manner to the purposes of fireproof roofing, it is treated by applying the silicate of soda with a brush, and afterwards chloride of calcium, these two liquids saturating the surface of the board or paper, and forming a surface upon it which is practically fire and water proof, the silicate of soda and the chloride of calcium preferably entering the joints in the roof or sides between contiguous pieces of asbestos board or paper. The fire and water proof material may be composed of narrow boards as at *a*, having their edges suitably overlapped, as shown at fig. 2, or the edges of the material may be abutted more closely, and be covered by a batten. *b*, as shown in fig. 3, and the parts may be nailed or screwed to the frame of the building in the usual manner, or the edges may be overlapped as usual in clap-boarding and shingling. The improved material may be shaped to resemble shingles or boards. The strength of the silicate of soda is usually reduced to about half its commercial strength, as it then better penetrates the paper and incorporates itself with the asbestos, but the chloride of calcium is used preferably of standard strength, and should be applied when the silicate of soda is partially dried.

9,246, Improvements in the Process of Etching or Engraving Marble and Granite. Frederick Walter Coons, St. Louis, U.S.A.

The stone is first faced off. It is then coated with a mixture composed of white dammar varnish two parts, and spirits of turpentine one part. When the mixture becomes so dry as not to adhere to the fingers, the whole surface to be engraved is covered with lead foil that is pressed down upon the varnish. Then draw the design on the lead, and cut out with a needle previously placed in a holder the parts of the lead-foil over the parts of the stone to be recessed. After having removed the foil where the face is to be etched, the edges of the foil are rubbed down. Then the whole face is cleaned with spirits of turpentine to remove all the varnish from the places from which the lead-foil has been removed. The turpentine is then cleaned off with fine sawdust; and next, all oil or other grease is removed with a brush and whiting. The face to be etched or engraved being horizontal, a sufficient quantity of chemically pure nitric acid is poured on to cover the whole surface and allowed to remain on a shorter or longer time according to the depth it is desired to eat into the stone. Then drain off the acid, wash with clean water, remove the foil, and clean off all the varnish with spirits of turpentine, and then dry with sawdust.

### APPLICATIONS FOR LETTERS PATENT.

*Sept.* 26. — 12,816, J. Stephens, Stonehouse, Gloucester, Construction of Heating Apparatus. — 12,818, J. Tucker, Walthamstow, Automatic Measuring and Registering Tap.—12,821, T. Robinson, Bristol, Water Meters.—12,857, D. Nicoll, London, Movable Huts, Sheds, Plant-houses, and other like Structures.

*Sept.* 27.—12,868, J. Linkleter and T. Linkleter, Tynemouth, Ladders.—12,872, W. H. Ratcliffe, Birmingham, Wrenches.—12,875, W. J. Stokes, London, Sash-fastener.—12,880, G. Trice, London, Lock Protector.—12,881, J. Menzies, London, Cutting and Shaping Stone.—12,886, E. B. Ellington, London, Jointing High-pressure Pipes. — 12,888, W. B. Smith, London, Bricks for Building.—12,901, J. Budd, London, Imparting to Glass the Appearance of Marble or other Stone.

*Sept.* 29.—12,907, E. Smith, Birmingham, Opening and Closing Windows.—12,921, A. Whincop, London, Water Waste-preventing Cistern.—12,935, A. M. Clark, London, Auger Bits. Com. by W. McDinitt and C. H. Irwin, United States.—12,936, T. Christy, London, Heating Pipes.—12,937, V. D. de Michele, London, Cement-testing Machine.—12,946, T. Palmer, London, Brickmaking and Pressing Machinery.

*Sept.* 30. — 12,965, W. H. Vivian, Llanelly, Straight Pipe Cistern.—12,973, H. K. Bromhead, London, Kitchen Ranges and Stoves.—13,006, T. Thorley and A. J. Thorley, London, Preventing Down-draughts in Chimneys.

*Oct.* 1.—13,016, A. G. Browning, Llanelly, Flushing Water-closets.—13,017, F. W. Wilcox, Sunderland, Ventilating Dwellings, &c.—13,021, A. MacMillan, Glasgow, Door Springs.—13,024, W. Hassell, London, Joints for Water, Gas, and other Pipes.—13,022, B. Knight and J. Durant, London, Pulley-frames for Sliding Chandeliers. — 13,053, W. H. Lindsey, London, Girders for Fireproof Structures.

*Oct.* 2.—13,076, F. W. Primrose and J. Mellows, London, Supports for Workmen on Glazed Roofs of Buildings.—13,083, S. Coombs, London, Door-springs.—13,089, R. Hodges and J. Archer, London, Sash-fastenings.—13,095, W. K. Brock, Boscastle, Cornwall, Building Sanitary Houses and Bungalows.—13,098, M. Stevenson, H. T. Stevenson, and T. J. Moyns, London, Cutting Wood.—13,112, T. S. Worthington, London, Producing Imitations of Wood and Marble on Painted and other Surfaces.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

703, J. B. McCallum, Blackburn, Water-closets and Apparatus for Controlling the Supply of Water to Cisterns.—11,660, H. H. Lake, London, Coating or Covering Wood or other Surfaces. Com. by J. Brown, United States.—11,703, J. N. Peake, London, Fastening or Securing Tiles to Walls or other like Surfaces.—11,795, J. A. Keetch, Bristol, Driving Potters' Wheels.—11,958, G. E. Smart, London, Toolstock or Brace.—12,098, W. Sargent, London, Water Waste-preventer.—12,297, S. Chatwood, London, Construction of Strong Rooms and Safes.—12,383, J. Sewell, London, Glass Roofing.—12,575, J. S. W. Edmunds, Birmingham, Sash-fasteners.—11,919, W. H. Blackwell, Manchester, Window-sashes.—11,990, R. C. Jones and J. W. Cunningham, London, Sash-fasteners. — 12,405, H. S. Cregeen and E. J. Thomas, Bromley, Sewer and Drain Pipe.—12,438, R. H. Fraser and J. Halley, Glasgow, Wood Paving for Floors, Walls, and other Surfaces.—12,466, F. W. Hoffman, London, Sawing Machinery.—12,494, A. Gerken, London, Heating and Ventilating.—12,515, C. J. Heaton, London, Opening and Closing Windows.—12,578, J. Ashworth, Hyde, Window-sash Fasteners.—12,644, R. Adams, London, Springs for Doors.—12,653, F. M. Lyte, London, Anti-fouling Paints for Submerged Structures.—12,683, E. W. Lyne, London, Improvements in Closets.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

38, W. Henman, Birmingham, Sanitary Traps.—7,739, A. Purkess, Andover, Earth-closet Apparatus.—11,745, A. D. B. Douglas, London, Improvement in Joints for the Plates of Safes and Strong-rooms.—2,427, J Davies, Clifton, Manchester, Kilns for Bricks, Tiles, &c.—7,960, W. L. Gregg, Philadelphia, U.S.A., Brick Machines.

**The Society of Architects.**—This society held its opening meeting in a room at Exeter Hall on Tuesday last, when the President, "Colonel" Ellison, delivered an address. Judging from the list of members which we have seen, the title of the society would seem to be rather a misnomer.

## THE SCHOOL BOARD FOR LONDON.

This Board reassembled on Thursday afternoon, when the usual annual statement by the Chairman, Mr. Edward North Buxton, was read. It appears that the Board have now under their charge 367 Board Schools, accommodating 328,683 children. Of these, 289 schools, accommodating 302,674 children, are new permanent schools built by the Board. One of the passages in Mr. Buxton's address was as follows, -

"In the Works Department the planning of the schools has been to some extent affected by the general adoption of large, in preference to small, schools. This change, which was recommended for the sake of greater economy of administration, enables us, in many cases, to provide a central hall for each department. Special rooms for drawing; accommodation for the centres for cookery instruction, and for the central classes of pupil teachers, though they are only needed in a few of the schools, are supplied with the least disturbance of arrangements in schools of the largest size. The tendency towards the employment of adults in substitution for pupil teachers also requires some modification in the planning. A certain number of square class-rooms, accommodating a larger number than are entrusted to a pupil teacher, are thus a feature of our newer schools. A better concentration of the class is thus secured, and left-hand lighting for the whole room is rendered more generally possible. In other respects, minor improvements suggested by experience are adopted from time to time. At the instance of the Chairman of the Works Committee, whose connexion with measures for arresting disease in London is well known, special attention has been paid to the sanitary condition of our schools, and it may be safely said that this is now as well considered and as complete as in a first-rate hospital. At a time when dangerous epidemics threaten the metropolis, I feel that this will be satisfactory to the public mind. In some of our schools considerations of expense and contracted sites have compelled us to provide playgrounds on the roof. It is worthy of note that the winning school in the drill competition this year was confined for its practice to an airy but limited space of this kind."

## THE SOUTHWARK AND VAUXHALL WATER COMPANY'S NEW WORKS AT STREATHAM.

In addition to their existing works in connexion with the supply of water from the Thames, the Southwark and Vauxhall Company are constructing new works at Streatham for obtaining a further supply from the numerous springs in that locality. They have purchased, for the purposes of the undertaking, about four acres of land on what is known as the Manor Park estate, situated between Streatham and Tooting, which is at present being laid out for building upon. On a portion of the land so acquired a deep well has for some time past been in progress of sinking. The well is 10 ft. in diameter. The first contract was taken by Mr. W. Webster, who completed it about six months ago. Since that time the company have taken the further sinking of the well into their own hands, and the works have been carried forward by the company's workmen, under the superintendence of Mr. J. W. Restler, C.E., the company's engineer. Some two or three weeks since a depth of about 260 ft. was attained, and it was intended to go down through the chalk to a further depth of 90 ft., but in consequence of the abundant and apparently inexhaustible supply of water met with it has for the present been deemed unnecessary to proceed further down through the chalk. During the last three weeks incessant pumping has been necessary in order to keep down the water. The engines have raised about 1,500,000 gallons of water every twelve hours, notwithstanding which the well registers a depth of 180 ft. of water. The engines and pumps have been constructed at the company's works, the pump being the invention of their engineer. The works include the erection of a lofty water-tower and the construction of a capacious storage reservoir.

Meanwhile, the inhabitants of Tooting and the neighbourhood are up in arms against the action of the company. There are several springs, and upwards of 120 artesian wells, in the locality, from which Tooting and Mitcham are principally supplied with water, without any necessity for having recourse to the water companies. It is alleged that within a few days after the pumping at the company's new well commenced the supply from these springs and artesian wells ceased, causing the inhabitants serious inconvenience. On Monday night a crowded meeting of the owners and occupiers of property in Tooting was held in the Vestry-hall, when it was stated that upwards of 500 houses had been deprived of water since the pumping commenced, and that several breweries and other works, which had for several years past been supplied from their wells, were now deprived of water. A committee was formed with a view of ascertaining the rights of the inhabitants on the question, and whether the Southwark and Vauxhall Company could legally deprive them of water and afterwards charge them for its supply. The matter is causing much agitation, and is not unlikely to occupy the attention of the law courts.

## DECORATION OF ST. PAUL'S.

Sir,—In his rejoinder to my remarks on his first letter to your columns on the dome of St. Paul's, Mr. W. Cave Thomas concludes by asserting that "it is the duty of Englishmen, of the citizens of London, and of artists, to respect the name and works of Sir James Thornhill." How Mr. Thomas can reconcile this ultra-conservative claim on behalf of Thornhill's monochromes with his own special programme for their destruction, viz., by translating them into colour, by over-painting, and the use of gold fields, of which Thornhill never dreamed, is wholly beyond my comprehension. Thornhill, if he could speak at this juncture, would surely cry, "Save me from my friends!"

As against the proposal to efface Thornhill's work, in favour of one or other of the designs now before the dean and chapter, Mr. Thomas asks, "Did the great Italian masters lend themselves to the effacement of the puerile works of the early painters and sculptors?" The reply to this challenge is, obviously, that while it is difficult to cite an instance where a painter destroyed a predecessor's work by speciously altering its colour-effect by over-painting, it is easy enough to give instances where painters and architects destroyed outright works of former epochs, to make clear way for their own. Not needlessly to take up your space, Mr. Thomas will perhaps be content with my brevity in instancing, as a pertinent case in point, the effacement of Perugino's "Assumption of the Virgin," to make way for Michelangelo's "Last Judgment."

John R. Clayton.

## SEWER VENTILATION.

Sir,—Referring to your "Note" in the *Builder* of the 27th ult. on the ventilation of sewers, I cannot understand how eminent authorities can advocate for the proper ventilation of sewers, "gratings in the road, and as many as possible,"* as the best means of effecting it. Why not open the sewers at the top with gratings all along the street? The danger would be no greater, and ventilation would be complete.

The proposed shafts, in my opinion, cannot be made to work effectually (even if they are prevented from subsidence of brickwork, or faulty workmanship, from being absolutely dangerous) without an efficient supply of fresh air; and it will be found sooner or later to be necessary to pump such into the sewers by artificial means.

The sewers will have to be more effectually flushed, especially when the fall is slight, and this applies to the majority of sewers; and the best means of effecting this is by tubes at the top laid on to a bountiful supply of water turned on when necessary, and the deposits thereby effectually disposed of.

K. C. J.

## SURVEYORSHIP OF THE PARISH OF CHELSEA.

Sir, -This important and responsible post has recently been advertised as vacant in the *Builder* and other papers. The words usually added to advertisements of this class, "Canvassing either directly or indirectly will disqualify a candidate," have, no doubt accidentally, been omitted. May I suggest that any who may attempt to obtain an advantage over their fellow candidates by canvassing may have their testimonials returned?

Fair Play.

## ZINC ROOFS.

Sir,—In your review of Mr. Fletcher's "Text-book" [p. 443, *ante*], you state correctly that it is better to specify the weight per foot super. as well as the gauge. We believe that the gauge since 1875 has been alike for all qualities.

What is meant by "No. 13 for flats and No. 12 for gutters"?

Nothing less than No. 15 (equal to the old No. 14) should be used for roofs; and gutters should be thicker, of course, say No. 16.

The Vieille Montagne Company do not stamp anything below No. 14 as suitable for roofs.

Every sheet rolled by them is stamped with their mark and the gauge.

J. & J. S. Edmeston.

* Those words were not used in our note.

## "ARCHITECTS' AND CONTRACTORS' HANDBOOK."

Sir,—You were good enough some few months ago to notice the "Architects' and Contractors' Handbook," and to offer some suggestions as to classification, of which I propose to avail myself in the forthcoming issue.

May I be allowed, through your columns, to ask architects, manufacturers, and others, for particulars of any materials, inventions, and appliances not included in the last edition, as it is my desire that the book may contain as much information as possible, and be of real value for reference by architects and contractors?

J. Douglass Mathews,
Editor of the "*Architects' and Contractors' Handbook*."

11, *Dowgate hill, London, E.C.*

## CHURCH BUILDING NEWS.

*Asthall (Oxon.).*—The parish church of St. Nicholas was re-opened on the 6th inst., after complete restoration, the cost of the works to nave and aisle having been borne by Mrs. Collier in remembrance of her husband, the late Mr. John Collier (who was architect and surveyor to the Salters' Company), and that for the chancel by Eton College. New open-timbered roofs have been substituted for the flat ones, the original pitch being indicated on the gables and tower, the chancel being ceiled under the collar in octagonal form, with moulded intersecting ribs and carved bosses. The walls have been rebuilt where absolutely necessary, and the windows and stone dressings most carefully renewed where decayed, and the floors have been laid with Gregory's wood-block flooring. A memorial of stained glass has been inserted in the east window of Bateman's Chapel, and a restoration of the old north window has been well executed by Hardman. An oak screen has been fitted to the tower arch, forming an enclosure which will be used as a vestry. A new pulpit has been well carved in oak by Frith, of Gloucester, on a base of Milton and Forest of Dean stone, as also a reading-desk to correspond with the latter, being the gift of Mrs. Bateman. The Vicar has given an oak lectern and altar, with altar space. The works have been carried out by Mr. Alfred Groves, of Milton-under-Wychwood, Chipping-Norton, from the designs of the architect, Mr. Charles W. Merrin (of the firm of Messrs. Collier & Merrin), 23, Rood-lane, London, at a cost of about 1,100*l.*

*Knighton-on-Teme (Worcestershire).*—It has been thought desirable to restore the old Norman church, which is in a rapid state of decay. The seats and pulpit are to be in English oak, the latter richly carved. Messrs. Weaver & Adye, of Devizes and Bradford-on-Avon, Wilts, are the architects, and Mr. George Moore, builder, of Trowbridge, has been entrusted with the work.

*London.*—During the past few weeks what are described by the *City Press* as "considerable improvements" have been made in the interior of the parish church of St. Sepulchre, Holborn Viaduct. These were completed on the 12th ult. Two lobbies have been added, one upon the north and another on the south entrance doorway from the porch. They have been designed so as to accord with the ancient architecture of the tower and vestibule, as rebuilt in 1450 by Sir John Popham. They are constructed entirely of oak panelling, the upper portions being formed of richly-carved open tracery, filled with plate glass, and large and elaborately-carved cornices. The doors are made to swing both ways, so desirable in the event of a panic arising at any time, giving at at once direct exit from the church. The lobbies have been erected by Mr. John Emery, of the Gray's Inn Joinery Works, Theobalds-road, W.C. The architect is Mr. Arthur Billing, of Tooley-street.

*Whitwood Mere, Castleford.*—The Potteries Mission Church here will consist of nave, chancel, vestry (with heating-chamber under), and porch, and is to be constructed of brick, with pressed facings, and stone dressings externally and internally, with open-timbered roof of pitch-pine, having hammer-beam principals, moulded purlins, and battlemented cornice. The roof is to be covered with boards, roof-felting, and Welsh slating. A flèche will serve the double purpose of bell-turret and foul-air extractor. The chancel arch is to be formed in three orders of brick, with moulded stopped angles, and the windows glazed with cathedral glass in leaded lights. The heating is to be performed by means of hot water. The church

will seat 250 persons. The architects are Messrs. Perkin & Bulmer, of Leeds.

*Bromsgrove* (*Worcestershire*).—The Bishop of Worcester has consecrated the new church for the ecclesiastical district of Finstall, which is part of the parish of Stoke Prior. The new church has been built to supersede the old church, which has become inadequate for the accommodation of the congregation, and, like the old building, is dedicated to St. Godwald. It has been erected upon an elevated site at Rigby, near Bromsgrove Railway Station, from the design of Mr. John Cotton, architect, of Bromsgrove and Birmingham, and at present consists of nave, south transept, and chancel, but is capable of extension by the addition of north transept, organ-chamber, and vestry, and a tower and steeple can also be added at some future time. The building is faced with axe-dressed local sandstone, and lined inside with buff pressed bricks tuck-pointed in red mortar. Box-ground Bath stone is used for external dressings. In style it is of the Early Decorated type. The church has an open-timbered roof covered with purple tiles. Encaustic tiles are used in sanctuary and transept. There are sittings for 214 adults and twenty-six children, and for twenty-two choristers. The cost of the building has been nearly 2,000*l*., Messrs. Brazier & Weaver, Bromsgrove, being the builders.

*Camberwell*.—A new church dedicated to St. Michael and All Angels has just been erected in Camberwell, and it is to be consecrated by the Bishop of Rochester in the course of a few days. Although the church is situated in the parish of Camberwell, it is in connexion with the neighbouring church of St. John the Divine, Vassal-road, Kennington. The church and schools in connexion are situate in Toulon-street, off Wyndham-road, extending eastward to Sultan-street, in which is the principal entrance to the church, although the main elevation, and also the entrance to the schools, is in Toulon-street. The frontage of the block in this street is upwards of 100 ft. in length, and Gothic in character. It is faced with red Suffolk brick and concrete stone windows and dressings. The church, the interior dimensions of which are 66 ft. in length and 28 ft. in width, forms one unbroken oblong area, without being divided into nave and aisles as in most churches. At the west end there is an organ and choir gallery, under which is the vestry, the chancel being at the east end. The church will seat a congregation of about 400 persons. The two schools forming portions of the block, one for boys and the other for girls, are each 66 ft. in length and 22 ft. in width, containing almost as large an area as the church. The boys' school is on the ground-floor, and the girls' school above. Mr. F. W. Hunt, of Upper Baker-street, is the architect, and Mr. F. Buchan, of Camberwell, is the contractor. Mr. Hockey is clerk of the works, and Mr. Double the foreman. The cost of the buildings will be about 5,000*l*.

*Leith*.—St. John's Parish Church, Leith, has been re-opened, after being re-decorated and painted, the rather dismal appearance of the interior having been changed into one of lightness and cheerfulness. The end wall required to be treated as a suitable background for the pulpit, and this has been done by combining the two large windows with a band running round the outside of each, and on the inner side as far down as the spring of the arch, and there joining horizontally, leaving a square space below, the upper part of which shows a rich arrangement of borders and bands, enclosing a ribbon, with the text, "We praise Thee, O Lord our God." Below this is stencilled a tapestry pattern in the later Gothic style, in gold colour on brown, against which the new pulpit stands out in good relief. The new pulpit is by Mr. Jno. C. Hay, architect; while the decorations have been designed and executed by Messrs. Geo. Bobie & Son, 23, George-street, Edinburgh.

*Whiston*.—At the harvest thanksgiving at Whiston church, near Rotherham, on the 25th ult., the new font-cover which the Earl of Effingham has just presented to the church was unveiled. It has been especially designed by Mr. John Oldrid Scott, by whom the general restoration of the fabric was carried out. The new cover is spiral, and of a slight ogee outline, taking at the base the octagonal form of the bowl. The lower parts are richly moulded and embattled, whilst every cant above exhibits much tracing and carved work. The cover has been made by Mr. Harry Hems, of Exeter.

*Finchley*.—The committee for building the new Church of St. Paul at Finchley selected nine architects in June last to send in competitive designs by the 20th of August, Prof. Roger Smith being appointed professional assessor. He selected three designs, from among which that by Mr. John Ladds, under the motto "Faith," was finally selected, and the architect has been commissioned to proceed with the work. The church is to be faced with Kentish rag stone, with Bath stone dressings, and will seat 632 persons. The architect's estimate of the cost was 5,850*l*., and Professor Smith reported that he considered it could be carried out for 5,500*l*. If so, it is a rather rare and all the more creditable example of an architect's competition estimate being above the actual amount required.

## DISSENTING CHURCH-BUILDING NEWS.

*Loughton*.—A new Baptist chapel and school were opened on the 15th ult. at Loughton, Bucks. The building is in the Italian style, and is built of red brick with white brick mouldings and dressings from the Hathern Station Brick Company. It has an open-timbered roof. All the woodwork is of red deal, stained and varnished. The architect was Mr. H. H. Dyer, of Northampton, and the builder Mr. R. Hickman, of the same town.

*Richmond* (*Yorks*.).—A new Congregational church at Richmond was opened on the 18th ult. The cost of the new building has been about 1,522*l*. The architects are Messrs. Clark & Moscrop, of Darlington. The mason and general building work was let to Mr. W. Shaw, Richmond; joiner's work, Mr. Harwood, Manfield; plumbing, Mr. C. Fryer, Richmond; painting, Mr. Johnson Stephenson, Richmond. The buildings comprise church and chancel, recess for organ, with present accommodation for 250 persons, deacons' and ministers' vestries, school for 150 children, lobbies, and the usual out-buildings. Provision is made for an end gallery, which will give further accommodation for 80 sittings. Externally the building is of local stone in regular courses, freestone dressings being largely introduced. The roofs are covered with Westmoreland green slates. At the south-west angle there is an octagonal tower with slated spire. The buildings are Gothic in style.

# The Student's Column.

## ON THE CONSTRUCTION OF FLOORS.

II.

WE have hitherto considered floors from the *carpenter's* point of view, which includes only the substructure of the floor; it is the business of the *joiner* to lay upon the timbers the boards which render the floor complete for persons to walk upon; and the methods he employs we now proceed to describe. Boarded floors are made of long narrow slabs of wood, to which the terms *planks*, *deals*, or *battens*, are given according to the widths used. Thus, *planks* are boards 11 in. wide, *deals* are 9 in., and *battens* vary from 3 in. to 7 in. in width. The thickness varies from 1 in. to 3 in., those used for ordinary floors being from 1 in. to 1¼ in. thick; 7 in. is the usual width of floor boards, as the wider they are the more liable they are to shrink and leave a space between the boards, and also to warp and become hollow in the middle.

The cheapest kind of floor is that which is termed a *folding-floor*; this is laid by placing together on the joists four boards of equal length, and forcing them down so as to squeeze them tightly into a certain space; four others are then laid by their side, but so as to *break joint* with the other four, and so on. A better kind of floor is that termed the *straight-joint* floor, in which the boards are of unequal length, and all *break joint* with each other, so that no two *heading-joints* come side by side. The boards are laid closely together and tightened up with a floor-cramp. The *heading-joints*, where two ends of boards meet, are splayed so as to lap one over the other, or a groove is cut in each, and a *tongue* of wood or iron inserted. Floor boards are fastened down to the joists by means of nails called *floor-brads*, which are usually driven through from the top of the boards; where, however, the thickness of the boards admits of it, it is better to drive the brads obliquely at the edge of the boards, so that no nails are seen on the surface; this is termed *edge-nailing*.

*Tongued-floors*, form the best kind of flooring, the boards having a groove cut in each edge, into which a *tongue* of iron or hard wood is driven, which holds the boards firmly together, and also prevents dust from passing between the edges of the boards. A cheap kind of tongued floor is made by cutting a *tenon* on one edge of each board and a *groove* on the other edge, so that one fits into the other as they are laid, and the trouble of inserting the tongues is saved.

*Dowelled-floors* have the boards made with holes cut in the edges into which pegs of hard wood or iron, called *dowels*, are tightly driven. The boards are held down to the joists by floor-brads as above described. This makes a very excellent floor, but the method is now but little used.

*Wood-block* flooring consists of short pieces or blocks of wood 1 ft. 6 in. long, 3 in. by 3 in., which are laid crosswise, or herring-bone fashion, on the joists; this is employed for school-room floors, and others where there is heavy wear and tear.

*Parquetry* floors and others of a superior description of wood are not laid immediately on the top of the joists, but a deal floor is first nailed to the joists, and the finishing floor laid upon it, the edges being tongued.

When there are openings in a floor, such as is required to be made round the hearth of a fireplace, it is usual to finish it with a *margin* or narrow frame of wood which is *mitred* at the angles; against this the ends of the floor-board are made to abut, and an even joint can be made.

In order to prevent sounds from passing from one floor to another, it is a good plan to lay felt or list upon the top of the joists before nailing down the floor boards.

*Stone* or *tiled* floors are sometimes required to be laid on timber in the upper stories of a building; these are formed with 2½ in. or 3 in. *stone flags* cut in lengths of 3 ft., and laid across from binder to binder without the intervention of joists; the width of the binders being not less than 6 in., so as to allow sufficient bed for the flags. Since the flags weigh about one-third of a cwt. to each square foot, the load on the beams is considerably more than that of a wood floor, and they must be made somewhat stronger. By floating a thin layer of cement on the top of the flags, ornamented tiles or marble flooring can be laid. If *asphalte* or *tile paving* be used for the upper stories of a building, stone flags must first be laid on the joists or binders as above described, then a thin coating of fine concrete, and the asphalte poured thereon. The thickness of asphalte for flooring is about ½ in. It is usual to sprinkle fine sand over the surface before it hardens. If tiles are to be used, a thin coat of cement is laid over the stone paving or concrete, and the tiles bedded and jointed in cement.

Having described the methods employed in practical building of arranging the timbers for carrying floors, we now proceed to consider the strains to which those timbers are subjected, their power of resistance as ascertained by experiment, and the scantlings that it is necessary to give them in order to combine the maximum strength with the minimum load upon the supports. In order to do this we must first lay before our readers the theoretical principles upon which the strength of materials is determined.

When a horizontal beam is supported at the two ends and loaded in the middle or any other point with a heavy concentrated weight, or by a weight distributed uniformly over its entire length, the effect upon it is to produce a certain amount of *deflexion*, or bending from the horizontal position; the underside being curved downwards or convex, and the upper one hollowed out or concave. The amount of deflexion is found at first to increase nearly in proportion to the load put upon the beam, but, after a time, the deflexion increases in a greater ratio than the load, until the resistance of the material is at length overcome and fracture ensues. In a beam of uniform strength and of homogeneous material, the place of fracture will be at the middle point between the points of support; but, if one part is weaker than another, as is often the case at a knot in a piece of timber, fracture will generally take place at the weakest point, the actual strength of a beam being only the strength of the

weakest part, however strong it may be elsewhere.

There are two kinds of resistance which a loaded beam offers to the strain put upon it; one is the resistance to bending or flexure, which is termed *stiffness*; the other is the resistance to fracture, which is called the *strength* of the beam. The laws which regulate these two qualities are very different, and a beam may have great *stiffness* and very little *strength*; that is to say, a beam may bend very little under a heavy load, but fracture may take place very suddenly; this is the case with most crystalline substances and what are commonly termed *brittle* materials. On the other hand, we may have a beam that bends sensibly under a very moderate load, and yet its resistance to fracture is so great that it is almost impossible to break it; this is often the case with non-crystalline or fibrous materials, which possess a great degree of what is commonly termed *toughness*.

The laws of the resistance of beams to flexure and fracture have been investigated theoretically by writers on the strength of materials, and as they agree very closely with the results of numerous experiments, we may consider that the truth of them is sufficiently proved for all practical purposes. The law of the *strength* of a beam supported at its two ends and loaded in the middle is that the resistance to fracture is directly proportional to the square of the depth, and inversely as the length of the beam. If the load is uniformly distributed over the whole length of the beam the resistance to fracture is doubled, or the beam will bear twice as great a load when distributed as it will when all collected at the centre before fracture takes place.

The law of the *stiffness* of a beam is that the resistance to flexure is proportional to the cube of the depth, and inversely as the cube of the length. If the load is uniformly distributed, the deflection is to that when the same load is all at the middle, in the proportion of 5 to 8, or the resistance in the former case is eight-fifths of what it is in the latter. Both stiffness and strength are directly proportional to the breadth of the beam. Now as in practical building it is never required to load a floor-beam with a weight at all approaching that which would produce fracture, while it is absolutely necessary that the amount of flexure should be all but imperceptible, it is evident that we may generally leave out of consideration the question of the *strength* of a beam, and confine our attention to the property of *stiffness*, especially as it has been laid down by Tredgold that a floor-beam ought never to be loaded by any weight that will produce a greater deflection in the middle than one-fortieth of an inch to every foot of its length. It is by this rule that we shall be guided in calculating the scantlings of various beams required in the construction of floors.

We have seen that when a horizontal beam is strained by a load at the centre, the under-side becomes convex and the upper one concave, or the fibres at the bottom are stretched or extended, while those at the top are compressed or shortened, and a little consideration will make it clear that the fibres nearest the bottom are more extended, while those at the top are more compressed than those near the middle of the beam's depth. Hence it appears that the fibres near the middle of the beam have very little strain upon them, and add very little to the strength or stiffness of the beam; in fact, they only serve to connect together the upper and lower fibres which really do the effective work. It is by taking advantage of this principle that we are enabled to construct a stronger beam with the same amount of material in the manner described in our former article, and there shown by fig. 6 (page 475, *ante*).

By comparing the theoretical deductions with the results obtained by direct experiment, and adopting the principle stated above, that the deflection of any floor-beam must never exceed one-fortieth of an inch for every foot of length, we obtain the following rule for calculating the depth of a fir joist of given breadth and length. Take three times the cube of the length of bearing (in feet), and divide it by four times the breadth (in inches), and we obtain the cube of the depth in inches, for ordinary floors. For warehouse-floors the cube of the depth should be at least three times as much as that which the above rule gives.

For example, let the bearing be 15 ft. and the breadth 2 in., then the cube of 15 is 3,375, three times which is 10,125, and this, divided by four times 2, or 8, gives 1,266 as the cube of the depth, the cube root of which is nearly 11 in. for the depth of the joists of an ordinary floor. For a warehouse floor we have three times 1,266, or 3,798, as the cube of the depth, the cube root of which is about 15¾; or the depth of joist for a warehouse-floor should be about half as much again as that for an ordinary floor, where the breadth and length are the same.

In a similar way we can obtain a rule for finding the depth of the fir *binders* of a double floor, supposing them to be placed 6 ft. apart: Take four and half times the cube of the length (in feet), and divide it by the breadth (in inches), and we obtain the cube of the depth for ordinary floors; and for warehouse floors take three times the above for the cube of the depth, or else 1½ time the depth with the same breadth. For example, let the length be 10 ft., and the breadth 6 in., then 4½ times the cube of 10 is 4,500, which, divided by 6, gives 750 for the cube of the depth in ordinary floors, or the depth should be 9⅛ in. For a warehouse the cube of the depth will be 3 times 750 or 2,250, or the depth of 13¼ in.; it might, however, be better to increase the breadth to 9 in., when the cube of the depth will be 1,500, which gives 11½ in. for the depth: this will require rather more timber, but saves nearly 2 in. in the depth.

## Miscellanea.

**Putney's Patent "Nail-less" Solid Wood Flooring.** — Visitors to the International Health Exhibition, especially those who are connected with building operations, should make a point of calling at the office of Mr. Samuel Putney, a little to the west of the dairies on the south side of the great corridor devoted to food exhibits. Here (as well as at Baltic Wharf, Paddington, and at his other establishments) Mr. Putney is exhibiting his so-called "nail-less" solid wood flooring. (It is not nail-less, but the heads of the nails do not come near the surface of the floor). The grooved joints are made of different sections to suit the character of various woods. For instance, it has been practically ascertained that one section is the best for flooring prepared from yellow deal, having no acute angles touching the surface, which, in the softer woods, could be easily damaged, while another section is preferable for oak, teak, walnut, pitch-pine, or other hard woods. One good feature about this method of flooring is that it is absolutely essential that the wood from which it is prepared should be thoroughly well seasoned, of the very best quality, and in narrow widths (not exceeding 5 in.). Among the advantages claimed for this method of flooring are the following, viz.:—(1). Cheapness and saving of labour combined with good appearance and durability. (Only one-fourth of the usual quantity of nails required in laying). (2). Air-tight and dust-proof joints (no loose tongues), thus effectually preventing draughts and the penetration of foul gases and unhealthy odours. (3). Nail-less surface (the nails being driven through the patent joints). The floor, presenting a surface of excellent appearance, is suitable for polishing, having no indentations for secreting dirt.

**Metallisation of Wood.**—By Rubennick's process the wood is steeped in a bath of caustic alkali for two or three days, according to its degree of permeability, at a temperature between 164° and 197° F. It is then placed in a second bath of hydro-sulphate of calcium, to which a concentrated solution of sulphur is added after twenty-four or thirty-six hours. The third bath is one of acetate of lead, at a temperature of from 95° to 122° F., and in this the wood remains from thirty to fifty hours. After a complete drying, it becomes susceptible of a very fine polish, especially if the surface be rubbed with a piece of lead, tin, or zinc, finishing up with a burnisher of glass or porcelain. After all this treatment the wood looks like a metallic mirror, and is entirely unaffected by moisture.

**Congregational School for the Education of the Sons of Ministers, Caterham.** This building has now been completed, and the building was to be opened this Friday, the 10th inst. A view of the building, and a plan of it, appeared in the *Builder* for Dec. 8, 1883. Mr. E. C. Robins is the architect.

**Bronze Alloys for Engineering Purposes.**—At a meeting of the Society of Engineers, held on Monday evening last, at the Westminster Town-hall, Mr. Jabez Church, past-president, in the chair, a paper was read by Mr. Perry F. Nursey, vice-president, on "Modern Bronze Alloys for Engineering Purposes." The author commenced by a reference to the age of bronze, and pointed out that, considering the variety of new bronzes there now were, and the extent to which they were used,—superseding in some cases even iron and steel,—the present might be considered as a revival of that age. As the stone age was sub-divided into the old and the newer, so he would designate the present as the newer bronze age. He then briefly referred to the bronzes of the ancients, observing that modern analyses of many of the bronze coins made in different countries and at periods extending over several centuries B.C., brought to light a remarkably close analogy in the proportions of the ingredients. The author then touched on the composition of French bronzes, after which he described the varieties of phosphor bronze (which was invented by Dr. Künzel, of Blazewitz, Dresden, in 1873) and their applications. He then described silicium bronze, which was invented by M. Weiller, of Angoulême, in 1882, and which is especially applicable and is largely used in the manufacture of telegraph wire, on account of its high conductivity. The author then described the manganese bronze, which was invented by Mr. P. M. Parsons, in 1876, and Delta metal, in which iron and copper were successfully and chemically combined by Mr. A. Dick, in 1883. These, the author explained, were the modern bronzes of what he called the primary series, and which were largely used for all kinds of engineering purposes, from a spanner to a screw propeller, and from a boiler tube to a piece of artillery. He then entered upon the consideration of those modern bronzes, which he observed formed a secondary series, in the sense that several of them were more or less but modifications, combinations, or adaptations of those of the primary series. This secondary series includes Otto's phosphor copper; Cockshott's phosphor manganese bronze; Kühne's phosphor lead bronze; Billington's phosphor-tin for bronze-making; Webster's aluminium bronze; and Wiggin's silveroid and cobalt bronze, which were all described, and their special attributes pointed out by Mr. Nursey.

**Modern Mummies.**—A subject which has important bearings on the vexed question of cremation was broached at the recent meeting of the Social Science Congress, in a paper by Mr. Thomas Bayley, of Birmingham. In spite of much that has been said and written to the contrary, the practice of burning the dead must, in our opinion, and as we have stated elsewhere, lack the sanction of law so long as it does not afford a further guarantee than that required in cases of burial that death has not resulted from foul play. The paper alluded to recognises this difficulty, and proposes a plan by which it may be met. It is the following. The bodies, loosely but completely enveloped in cotton-wool, and placed within air-tight cases, are exposed, in a subterranean gallery lined with cement, to the action of cold air, which is chemically dried, and purified from putrefactive bacteria. After a time dry air at a higher temperature is used in the same way. The result is mummification, the integument remaining white. Bodies which have undergone this process may, it seems, be kept for an indefinite period without evidence of change, if protected from damp; may, if required, be submitted to examination by analysis or otherwise in an adjoining cool and dry mortuary-chamber; may be cremated or otherwise disposed of. Mr. Bayley's plan has considerable merit on the ground of its philosophical ingenuity.—*Lancet*.

**Inner Circle Railway.**—The Metropolitan and District Companies having completed the working arrangements, the Inner Circle Railway and its extensions to Whitechapel, with the five new stations, viz., Cannon-street, Eastcheap, Mark-lane, Aldgate East, and St. Mary, Whitechapel, were opened for public traffic on Monday last. By means of the completion of these railways, the two companies are also enabled to run through trains over the East London Line (of which they are part lessees) to New Cross, there interchanging traffic with the entire systems of the Brighton and South-Eastern Railways.

**Deleterious Dyes.** — The crusade against aniline dyes has, after a long interval, been energetically revived. It is a notorious fact that in green wall-papers, in articles of clothing (gloves, stockings, and fabrics used for feminine dress and ornament), and in confectionery, aniline is used. Several years ago many obscure cases of arsenical poisoning were traced to arsenite of copper. At that time this compound was largely used as a pigment, particularly for the fancy patterns of foliage in the ordinary cheap bed-room papers. In the process of manufacture the colour was laid on so thickly that it represented nothing less than a mass of solid arsenic, which, under the influence of warmth, was diffused in particles through the room, and breathed by the occupants. Many children, as was afterwards discovered, died from inhaling the poisonous odours. It would seem that lately the objectionable poison,—no longer in the colour of green, against which nearly everybody is on his guard, but in various other tints,—has been re-employed. We are told on high authority that in these cases the poisonous effects arise from the imperfect removal of arsenic, which is used, not as in itself a pigment, but as a re-agent in the course of manufacture. Many sensible people, in view of this, are suggesting a return to the pre-aniline stage of manufacture. But the remedy is not to be found in the prohibition of aniline dyes; it lies in the hands of the purchaser of fabrics deleteriously charged with them. The detection of arsenic, as most persons are aware, is one of the simplest processes in elementary analytical chemistry, and at a trifling outlay any chemist will conduct an analysis.—*British Trade Journal.*

**The Acton Sewage Scheme.**—The Acton Local Board have decided to adopt the A B C system of treating the sewage in connexion with their drainage scheme, which has been planned by Sir Joseph Bazalgette (Engineer to the Metropolitan Board of Works), with the assistance of Mr. Lailey, the Surveyor to the Acton Local Board. A part of the scheme is the laying of a 5-ft. effluent sewer through the parish of Chiswick to the side of the Thames, into which will flow the effluent water. The Chiswick Board, however, have decided to oppose the laying of this sewer on the ground that it is unnecessarily wide, and that its construction will cause needless damage to some of the streets; but the reply of the neighbouring Board is that this width is required to hold the effluent sewage during the back flow of the tides, which it was expected will be considerable at the proposed outflow. It is probable that the dispute will necessitate a Local Government Board inquiry. The general impression in Chiswick evidently is that the Acton Board are proposing to construct this large effluent sewer in view of the prospect of an arrangement being come to with the Metropolitan Board of Works to pay a portion of the cost of its construction, on condition that the Board be allowed to divert the storm-water of Stamford Brook into it, and so relieve the sewage works in the East of London of a considerable volume of water, which increases considerably the pumping expenses of the Metropolitan Board of Works.

**A New Screw-driver.** — What is claimed to be an improved screw-driver has been patented by the head of an American firm. The screw-driver consists of three parts,—the handle, the bit, and the points. The handle is made of polished rosewood, and is 7 in. in length, and finely finished. It has in it a receptable for the points not in use, which is furnished with a brass cover operated from the other side of the handle, a little pressure on a projecting button slightly raising the cover and permitting it to be easily turned in opening. A sprig in the interior of the handle draws the cover down and holds it snugly in place. The handle has also a socket or stock for the reception of the bit, which is secured by a screw. The bit is represented ready to be attached to the handle with one of the screw-driver points fastened to it, being firmly held in place by a screw. This screw can be readily operated by one of the points held in the fingers. These points, of which each screw-driver has six, are intended to be shown in this implement; the points can be turned obliquely to or at right angles with the bit, and the screw thus be successfully driven home; and, third, that the bit can be taken out of the handle and used in a brace.—*Science Monthly.*

**Portland Cement**, on emerging from the factory, is composed of an almost impalpable powder, mixed with coarser grains, which have but little adhesive quality. The necessity for fine grinding is shown by the fact that the portions that pass through a No. 176 sieve (which has 31,000 meshes to the square inch) have five times the adhesive strength of those that pass through a No. 103 sieve, which has only 10,600 meshes to the square inch. No. 176 is the finest that is made, and will prevent 45·6 of ordinary cement from passing through. Cohesion, it must be remembered, is not adhesion, its force being much greater by from three to ten times. The best test of Portland cement is its adhesive power, although this varies, according to whether the substance is stone, brick, slate, marble, or glass. The No. 176 sieve should prevent 45 per cent. of the cement from passing the sifted portion, which should have an adhesive power of 95 lb.; the unsifted, of 75 lb. per square inch.

**New Railway Station at Brimsdown.**—The Great Eastern Railway Company have just opened the new Brimsdown Station on the Cambridge line, midway between Ponder's End and Ordnance Factory. The station harmonises in style with the buildings on the adjoining Brimsdown estate.

**Science and Art Department.** — Mr. Stannus, the lecturer on "Applied Art" in the National Art-training Schools at South Kensington, will commence his course on "Elementary Art" on Monday, the 13th instant, at eleven a.m., and on "Advanced Art" on Tuesday, the 14th instant, at two p.m.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Crediton Water Supply | Committee | 35*l.* | Nov. 22nd | i. |
| Pier and Landing-stage, Ventnor | Ventnor Local Board | ..... | Dec. 8th | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Paving | Willesden Local Board | O. Claude Robson | October 14th | ii. |
| Repairing Tramways | St. Helen's Corporatn | G. J. C. Broom, Assoc. M.I.C.E. | October 15th | ii. |
| Masonry | Fulham Board of Wrks | *Official* | do. | ii. |
| Converting Houses into Shops, at Clapham | .... ..... | Thos. Spearing | do. | xviii. |
| Church of St. Agnes, Bristol | | W. W. Bethell | do. | xviii. |
| Warming | Malvrn Assembly-rms & Pleasure Grdns., Lim. | J. Johnson | October 16th | ii. |
| New Post-office, Victoria Docks | Commissnrs. of Works | *Official* | October 18th | ii. |
| Cast-Iron Pipes | Torquay Local Board | T. S. Weeks | October 20th | ii. |
| Sewers, Gullies, &c. | Commissionrs of Sewers | *Official* | October 21st | ii. |
| R ad Roller | Acton Local Board | ..... | do. | ii. |
| Tar Paving | | | | |
| Warehouse, Winchester | Not stated | Thos. Stopher | October 22nd | xviii. |
| Construction of Sewer | Leicester Corporation | J. Gordon, C.E. | October 23rd | xviii. |
| Steam-Engines, Boilers, &c. | Darlaston U. S. A. | E. Pritchard, M.I.C.E. | do. | ii. |
| Re-seating, &c., Parish Church, Lyme Regis | R. W. Hillman, Solicitr | Not stated | October 25th | ii. |
| Enlargement of Post-office, Yarmouth | Commissnrs. of Works | *Official* | October 27th | ii. |
| Stoneware Pipe Sewers | Swansea U. S. A. | R. H. Wyrill | October 29th | ii. |
| York Paving | Gravesend Corporation | *Official* | Nov. 1st | ii. |
| Public Baths, &c., Ealing | Local Board | Chas. Jones, C.E. | Nov. 3rd | ii. |
| Concrete, Brick, and Pipe Sewers, &c. | Romford R. S. A. | Brundell, Simmons, & Brundell | Nov. 4th | ii. |
| Alterations to Cottages, New Malden | ..... | J. R. Gover | Not stated | ii. |
| College and Hall, Hampstead | J. Haysman | Banister Fletcher | do. | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Borough Surveyor | Grimsby Town Council | October 18th | 200*l.* per annum | xvi. |
| Sanitary Inspector | Longton Town Council | October 27th | 100*l.* do. | xvi. |

### TENDERS.

For the rebuilding of the superstructure and the strengthening of Hammersmith-bridge, and also for the construction of a temporary bridge to be used during the execution of the works to the permanent structure, for the Metropolitan Board of Works. Sir Joseph Bazalgette, engineer:—

| | |
|---|---|
| J. Mowlem & Co. | £95,300 0 0 |
| W. Webster | 94,828 0 0 |
| G. Moss | 91,019 0 0 |
| T. W. Chester | 89,000 0 0 |
| T. Vernon & Co. | 88,783 0 0 |
| Dixon, Appleby, and Thorn* | 82,177 0 0 |

* Accepted.

For the erection of a School to provide accommodation for 1,200 children, on the site in Montem-street (Finsbury Division), for the School Board for London. Mr. E. R. Robson, architect:—

| | |
|---|---|
| W. Goodman | £17,983 0 0 |
| Patman & Fotheringham | 17,878 0 0 |
| Kirk & Randall | 17,774 0 0 |
| W. Downs | 17,707 0 0 |
| J. Grover | 17,338 0 0 |
| W. Shurmur | 16,560 0 0 |
| Stimpson & Co. | 16,524 0 0 |
| C. Wall | 16,429 0 0 |
| Priestley & Gurney | 16,398 0 0 |
| W. Bangs & Co. | 16,337 0 0 |
| W. T. Niblett | 16,299 0 0 |
| S. J. Jerrard | 16,107 0 0 |
| Wall Bros. | 15,994 0 0 |
| Atherton & Latta | 15,990 0 0 |

For alterations and repairs to Higher Mount, Galpin, Dartmouth, for Mr. W. H. Hawke. Mr. E. H. Back, architect, Dartmouth. Quantities by architect:—

| | |
|---|---|
| E. J. D. Henley, Dartmouth | £137 10 0 |
| Orlando Veale, Dartmouth | 137 10 0 |
| Vaisey & Son, Dartmouth | 135 0 0 |
| B. Williams, Dartmouth (accepted) | 127 0 0 |

For new departments to accommodate 910 girls and infants, in lieu of the present Girls' and Infants' Departments, on the site in Edward-street, Deptford, for the School Board for London. Mr. E. R. Robson, architect:—

| | |
|---|---|
| J. W. Hobbs | £11,400 0 0 |
| Turtle & Appleton | 11,094 0 0 |
| J. Grover | 10,567 0 0 |
| C. Cox | 10,558 0 0 |
| Stimpson & Co. | 10,535 0 0 |
| Scrivener & Co. | 10,530 0 0 |
| W. Downs | 10,434 0 0 |
| Wall Bros. | 10,362 0 0 |
| Atherton & Latta | 10,400 0 0 |
| W. Bangs & Co. | 10,340 0 0 |
| C. Wall | 10,330 0 0 |
| H. Hart | 10,300 0 0 |
| Lathey Bros. | 10,232 0 0 |
| W. Johnson | 10,182 0 0 |
| Kirk & Randall | 10,114 0 0 |
| S. J. Jerrard | 10,039 0 0 |
| W. Oldrey | 10,000 0 0 |
| J. Holloway* | 9,861 0 0 |

* Recommended by Works Committee for acceptance.

For Pontypridd Hall, shops, &c. Messrs. James Seward & Thomas, architects, Cardiff:—

| | |
|---|---|
| D. W. Meredith, Pontypridd | £6,891 8 10 |
| D. C. Jones & Co., Gloucester | 6,830 0 0 |
| John James & Co., Swansea | 6,165 0 0 |
| William Symonds, Cardiff | 6,100 0 0 |
| E. and T. Hatherly, Bristol | 5,924 0 0 |
| David Davies, Cardiff | 5,895 0 0 |
| William Seaton, Pontypridd* | 5,718 18 11 |

* Accepted.

For alterations at Chase Side, Southgate, for Dr. Vivian. Mr. Arthur W. Saville, architect. Quantities supplied:—

| | |
|---|---|
| Stevenson | £125 0 0 |
| Kerry | 125 0 0 |
| Royal | 123 0 0 |
| Newby | 99 0 0 |

For demolition of existing stables and re-erection on the site thereof of new stables, Gascoyne-street, Liverpool, for the Corporation of Liverpool. Mr. Clement Dunscombe, M.A., M Inst.C.E., City Engineer:—

| | | | |
|---|---|---|---|
| A | £3,981 | 0 | 11 |
| B | 4,813 | 17 | 6 |
| C | 4,690 | 0 | 0 |
| D | 4,550 | 0 | 0 |
| E | 4,549 | 0 | 0 |
| F | 4,449 | 0 | 0 |
| G | 4,149 | 0 | 0 |
| H | 4,275 | 0 | 0 |
| I | 4 248 | 0 | 0 |
| J (accepted) | 4,230 | 0 | 0 |

For roads and sewers on Ferme Park Estate, Hornsey. Messrs. E. E. Croucher & Co., Chancery-lane, surveyors:—

| | | | |
|---|---|---|---|
| Nowell & Robson | £6,029 | 0 | 0 |
| T. G. Dunmore | 4,993 | 0 | 0 |
| George Bell | 4,924 | 0 | 0 |
| James Pizzey | 4,860 | 0 | 0 |
| C. Killingback | 4,756 | 17 | 6 |
| Thomas Adams | 4,530 | 0 | 0 |

For new Sunday Schools adjoining the Wesleyan Chapel, East Molesey. Mr. Charles Bell, architect, New Broad-street. Quantities supplied by Mr. H. Lovegrove, Budge-row, Cannon-street, E.C.:—

| | | | |
|---|---|---|---|
| J. Holloway | £1,737 | 0 | 0 |
| J. H. Jones | 1,660 | 0 | 0 |
| Wheatley & Sons | 1,653 | 0 | 0 |
| Oldridge & Sons | 1,623 | 10 | 6 |
| Smith & Sons | 1,619 | 0 | 0 |
| J. Piller | 1,615 | 0 | 0 |
| Allen & Sons | 1,606 | 0 | 0 |
| F. Higgs | 1,520 | 0 | 0 |
| Bickenbotham | 1,490 | 0 | 0 |
| Potterton & Co. | 1,426 | 14 | 0 |

[The above amounts include the gallery.]

For rebuilding the Royal Standard Public-house, York-road, Battersea, for Messrs. Sansom and Ewington. Mr. H. I. Newton, architect, Queen Anne's-gate, Westminster. Quantities supplied:

*First Contract.*

| | | | |
|---|---|---|---|
| Hammond, Battersea | £3,100 | 0 | 0 |
| Richens & Mount, Battersea | 3,036 | 0 | 0 |
| Royal, Pen onville | 2,940 | 0 | 0 |
| Canning & Mullins, Newington | 2,840 | 0 | 0 |
| Steel Bros., Dalston | 2,698 | 0 | 0 |
| Spencer & Co., Knightrider-street | 2,650 | 0 | 0 |
| Lamble, Kentish Town | 2,535 | 0 | 0 |
| Godden, Brayanstone-square | 2,499 | 0 | 0 |
| H. Burman & Sons, Kennington* | 2,444 | 0 | 0 |

* Accepted.

For three houses on the Artillery Field Estate, Guildford, for Mr. J. Rose. Mr. A. B. Harding, architect:—

| | | | |
|---|---|---|---|
| Tribe & Robinson | £963 | 0 | 0 |
| T. Downes | 940 | 0 | 0 |
| Hill & Downes | 911 | 0 | 0 |
| G. & R. Smith | 880 | 0 | 0 |
| Banham | 787 | 0 | 0 |
| Carrington & Peto (accepted) | 738 | 0 | 0 |

For the erection of shop and dwelling-house, 74, Marylebone-lane, for Mr. John Spink. Mr. Alfred J. Hopkins, architect, 10, Berners street, London, W. Quantities supplied by Messrs. New & Son, 62, George-street, Portman-square:—

| | | | |
|---|---|---|---|
| W. H. Butcher | £1,275 | 0 | 0 |
| Adams | 1,047 | 0 | 0 |
| Tozer | 1,025 | 0 | 0 |
| Scott | 997 | 0 | 0 |
| Clark | 990 | 5 | 8 |
| Ashwell | 979 | 0 | 0 |

For rebuilding No. 11, Fore-street, City. Mr. John Slater, B.A., architect. Quantities by Mr. L. C. Riddett:—

| | | | |
|---|---|---|---|
| W. King & Son | £3,250 | 0 | 0 |
| Brown, Son, & Blomfield | 3,100 | 0 | 0 |
| E. Cook | 3,044 | 10 | 0 |
| G. S. S. Williams & Son | 2,943 | 0 | 0 |
| L. H. & R. Roberts | 2,928 | 0 | 0 |
| J. & J. Greenwood | 2,859 | 0 | 0 |
| E. Conder | 2,846 | 0 | 0 |
| W. Downs | 2,845 | 0 | 0 |
| Patman & Fotheringham | 2,773 | 0 | 0 |

[All amounts net after allowing for old materials.]

For erecting cottage at Coed Bell, Chislehurst, for Miss Amos. Messrs. Habershon & Fawckner, architects, Bloomsbury-square:—

| | | | |
|---|---|---|---|
| Hooper | £338 | 0 | 0 |
| Sperring | 335 | 0 | 0 |
| William Groom, Dulwich | 297 | 0 | 0 |

Accepted for new church, Alverston, near Bristol including tower. Mr. Henry Lloyd, architect, Bristol. Quantities supplied:

Stephens & Bastow, Bristol and London £3,176 0 0

For house and shop for Mr. Hardine, Plashet-lane, East Ham. Mr. Bethell, architect:—

| | | | |
|---|---|---|---|
| Bracknal | £445 | 0 | 0 |
| Baxter | 429 | 0 | 0 |
| Wyles | 424 | 0 | 0 |
| Parsons (accepted) | 350 | 0 | 0 |

Accepted for the carcase of detached house, St. John's-road, Eastbourne. Messrs William Reddall & Son, architects and surveyors, 10, South-street, Finsbury, and 86, Terminus-road, Eastbourne:—

| | | | |
|---|---|---|---|
| Dore & Son (lowest tender) | £1,423 | 0 | 0 |

[Highest tender, £1,800.]

For the erection of sailed linen room at the Lambeth Infirmary:—

| | | | |
|---|---|---|---|
| Chapman | £198 | 0 | 0 |
| Baxter | 129 | 0 | 0 |
| Parker | 129 | 0 | 0 |
| Robinson & Miler | 125 | 0 | 0 |
| Lathorn | 120 | 10 | 0 |
| Dickinson | 111 | 0 | 0 |
| Hayes | 111 | 0 | 0 |
| Smith | 110 | 0 | 0 |
| Aldridge & Jenvey | 103 | 10 | 0 |
| Cook | 103 | 0 | 0 |
| Lye | 82 | 0 | 0 |

For making-up Palace-road, Crouch End, for the Hornsey Local Board. Mr. T. de Courcy Meade, engineer and surveyor:—

| | | | |
|---|---|---|---|
| Dunmore, Crouch End | £762 | 0 | 0 |
| Brown, Upper Holloway | 683 | 10 | 0 |
| Pizzey, Hornsey | 584 | 10 | 0 |
| Jackson & Sons, Finsbury-park | 579 | 0 | 0 |
| McKenzie & Co., City | 575 | 0 | 0 |
| Walker, Holloway (accepted) | 416 | 16 | 8 |

For new sculpture studios in Vincent-square, Westminster, for Messrs. J. Whitehead & Sons. Mr. John Adams architect:—

| | | | |
|---|---|---|---|
| H. Beazley, Westminster | £685 | 0 | 0 |
| T. Bruusden & Co., Brentford | 625 | 0 | 0 |
| A. Carman, Richmond | 547 | 0 | 0 |
| T. Richards, Westminster | 536 | 0 | 0 |
| A. Garratt, Brixton | 535 | 0 | 0 |
| Gordon, Kell, & Smith, Chelsea* | 510 | 0 | 0 |

* Accepted.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

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A. H. B.—C. B. A.—"Stentor" (your suggestion is not likely to find favour at present, and it is too important a move even to suggest without careful consideration).—F. C. (shall appear).—J. M. (ditto).—J. R.—K. F. B.—E. L. H.—W. B. G. B.—M. B. M. N. (photographs received).—T. M.—D. & Co.—J. K. C. (tracings received).—J. H.—G. S.—E. I. B.—C. and H. (received).—T. & Co. (received).—E. J. W. (cannot reply to your letter, as you give no address).—A. Y.

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[Advt.

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N.B.—On View at HEALTH EXHIBITION (Eastern Gallery).

# The Builder.

VOL. XLVII. No. 2170. SATURDAY, OCTOBER 18, 1884.


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### *Further Evidence on Thames Pollution.*

A PARLIAMENTARY Return of great interest has just been published, containing copies of or extracts from correspondence which has passed between the Secretary of State for the Home Department on the one hand, the Metropolitan Board of Works, the authorities of the City of London, and others, on the other, as to the pollution of the River Thames by sewage. The correspondence commences, in January, 1882, by a representation made by the Town Clerk of London to the Secretary of State, to the effect that the Port of London Sanitary Committee of the Corporation, "guided by personal inspection, and the results of careful chemical analysis of the water of the Thames, urge upon the Government, under the provisions of the Metropolis Local Management Act of 1858, cap. 104, section 31," the extreme importance of taking steps towards "remedying that which must be admitted to be a great and growing evil."

The Home Office applying for further particulars, the Town Clerk encloses the Report of the Port Sanitary Committee, together with a letter to that body from the Medical Officer of the Port of London, containing the analysis of the water. "The worst specimen examined was the one taken at Barking on the 23rd of November, when the tide was running down, and which is reperted to contain one-fifth of its volume of sewage."

Upon this the Home Office call for reply from the Metropolitan Board of Works, whose clerk answers on April 4, "that the water of the Thames is not so pure as may be wished may be admitted without hesitation, but there are other sources of pollution than the Metropolitan Sewage outfalls, which would go far to account for the conditions which give rise to complaint." The Board go on to say that the statements with respect to the polluted condition of the river "are, if not totally unfounded, greatly exaggerated," and "wish to continue the investigations it is now making during the time when hot weather prevails." We need not follow the system of fencing of which the key-note is struck in the above letter. An old report, signed by Sir J. W. Bazalgette, and Messrs. Law and Chatterton, of April 15, 1878, in reply to Captain Calver's report of the preceding October to the Conservators of the Thames, is reproduced, together with a report of about the same date signed by Mr. T. W. Keates, Consulting Chemist to the Board; and one by Dr. Dupré, Chemist to the Medical Department of the Local Government Board.

It should be noticed, as a marked characteristic of the line of defence adopted by the Metropolitan Board of Works, that the last-named reporters say that their attention has been called to the quantity and character of the solid matter suspended in the river water. This limitation of the analysis to suspended matter, instead of total solids, was rendered possible by the error of the Thames Conservators, who attempted to prove a material silting up of the river, instead of taking the broad ground of the nuisance caused by the outfalls. The effect has been to give, as the outcome of chemical analysis, an average of 23·06 grains of suspended matter per gallon, while the analysis made for the Woolwich Board of Health by Mr. G. W. Wigner, F.C.S., on September, 1878, showed that the surface-water in Limehouse Reach contained 516 grains, or considerably more than one ounce in the gallon, of organic matter dissolved in the water. Mr. Wigner further points out that the samples analysed by Messrs. Keates & Dupré were taken when the river was in flood, and when a large discharge of upland water substituted pure for impure water throughout the whole course of the river. Whatever excuse there may have been for adducing Mr. Keates's report in reply to the charge of producing material obstructions to the river, there can be none for sending, in 1884, to the Home Secretary a statement so eminently calculated to mislead in the broader inquiry instituted by the Sanitary Port Authority.

On 22nd May, 1882, the Secretary to the Local Government Board writes to the Home Department to the effect that the condition of the Thames has been so often the subject of complaint that it is impossible to avoid an investigation, adding "the officers of the Metropolitan Board of Works have been persistent in the denial of the existence of any serious nuisance at the outfall," and for this reason the Board think it essential that the inquiry should not be postponed until a date when the Commission will not be able to satisfy themselves by personal observation of the effect produced by the outfall works during the hot weather. This part of the return concludes by a copy of the Royal Commission, headed by the distinguished name of Baron Bramwell, issued to inquire into and report upon the system under which sewage is discharged into the Thames by the Metropolitan Board of Works, dated 22nd June, 1882.

Of the first report of this Commission we spoke at the time of its appearance (vol. xlvi. p. 221). On the 14th of July last, the Secretary of State for the Home Department wrote to the chairman of the Metropolitan Board of Works, stating that in consequence of reports that he had received he had personally consulted Lord Bramwell, the chairman of the Commission, as to the state of the Thames, and had received from him a letter which he transcribes. "On Wednesday last," it runs, "five of the Sewage Commissioners, of whom I was one, went to examine the condition of the river. I do not like to use strong language, but, unless I do, I cannot adequately express my opinion. The river was in such a state as to be a disgrace and a scandal to the metropolis and civilisation. We went on it at Woolwich Dockyard. It was for its whole breadth black sewage, with a stench intolerable. We proceeded up the river, and traced the sewage nearly to Limehouse. Up to Greenwich it appeared unmixed sewage, then patches of natural water appeared, which increased till the sewage ended. The tide had then two hours to flow, and I cannot see why some sewage should not reach London Bridge, or nearly. We then went down the river, and again encountered the sewage till we got to Barking outfall, where the water was tolerably pure. The distance was ten miles of sewage, more or less."

The Home Secretary next calls attention to the fact that at the time when the Metropolitan Board obtained their powers to construct the main drainage, by the Act of 1855, it was understood that the sewage, if discharged at the present outfall, should be purified and deodorised. And he concludes that unless he is satisfied that ample and adequate means have been taken to abate the nuisance described in the police reports, and the letter of Lord Bramwell, it will be his duty to take action under the statute 20 & 21 Victoria, c. 104, s. 34.

On the 21st of July, the Chairman of the Metropolitan Board of Works replies that the experience of twenty years has shown that any injurious or offensive results of the discharge of the metropolitan sewage "only occur under the combined conditions of a reduced flow of water in the river, and a high temperature, such as existed during the latter part of June and the early part of the present month of July. These combined conditions occur, generally speaking, only at distant intervals, and prevail only for a short time." At the beginning of July, he continues, the estimated flow of the river at Teddington was only 400,000,000 gallons per day, or 50,000,000 more than the minimum flow. At the same time, the temperature in the shade has been as high as 86 degrees. Since the 10th of July, he adds (the day after Lord Bramwell's visit), "the whole of the sewage at both outfalls has been thoroughly dedorised, and care has, from the

first, been taken to flush the main sewers under the Board's control." Further, "furnaces and pans are now being erected, at which the Board itself will manufacture the deodorising material required."

A partial report of the visit of the Commissioners to the Thames is given by the Secretary of the Commission on July 23. On the 26th of July the Secretary to the Local Government Board points out that the letter of the Metropolitan Board of Works gives no definite information as to the means adopted by them for the deodorisation of the sewage at the outfalls, and offers to send one of their Engineering Inspectors to visit the spot. A communication is next printed from the East and West India Dock Company, complaining that no less than 400 tons of sewage enter their docks from the river at every tide, and that 37,300 tons of sewage mud have been removed from the docks within three months.

On the 2nd of August the Clerk to the Metropolitan Board of Works writes to the Home Department "to observe that the allegation which the Board contested, and the correctness of which it still denies, is that the river was generally in such a condition, owing to the sewage discharged into it, as to be offensive and injurious to health;" and concludes, "the complaint, so far as relates to the offensive smell arising from the latter, has been remedied." This cheering view, however, is not shared by the Secretary of State, who replies on the 5th of August that "the reports received from the police show that the state of the river, due to the sewage, has been by no means remedied by the measures recently adopted by the Metropolitan Board of Works, and that the enclosed report indicates that the state of things appears to have become worse in the last few days, showing that the scheme of deodorisation now in practice is not effectual for its purpose."

On the 7th of August the Secretary to the Commission writes to the Secretary of State, who has called for another report, to say that on the 30th of July the river was inspected by one of the Commissioners, and by several of them on the following day, and that "there did not seem to be any evidence of material improvement by the treatment of the sewage adopted by the Metropolitan Board . . . . A scum arising from chloride of lime was floating about in many places," resulting from a process "likely to be injurious to the river in other ways, and which can be only regarded as a temporary expedient to palliate a state of things that ought to have a more suitable permanent remedy." The Metropolitan Board, on the 9th of August, "much regrets to receive the expression of opinion," by the Secretary of State, "and the more so, because it conflicts with the results of the observations both of the Board's professional advisers and of Members of the Board themselves, a number of whom visited the neighbourhood of Woolwich last Saturday (a very warm day) and could detect no offensive smell from the water." The dispute is kept up in numerous short letters, and on the 18th of August the Secretary to the Commission writes that on the 14th of August the river was decidedly worse than before, but that on the 15th it had improved.

Daily reports from the superintendent of the Thames division of the Metropolitan Police are added, generally to the effect that there is no improvement. These reports would be of more value if they had stated the temperature. This we have taken the pains to ascertain, at a point higher in the Thames system than Woolwich, but which may serve as a comparative guide. On the 9th of August "the river water appears to be in as bad a condition as ever." The temperature on that day was 79·5°. On the following days the temperature was as follows:—Aug. 11, 79°; Aug. 12, 69·5°; Aug. 13, 63·8°; Aug. 14, 66°; Aug. 15, "no improvement," 69°; Aug. 16, 69°, "clearer and much better on the flood"; Aug. 18, 72°, "still further improvement"; Aug. 19, 68°, "slight improvement sustained"; Aug. 20, 65°, "still a steady improvement in the state of the river water, both in colour and smell." The series of thermometric readings is enough to show to what cause that improvement is due.

It only remains to speak of what is probably the most important of the sixty documents contained in the Parliamentary paper now under review. This is the report of Mr. John Thornhill Harrison, M. Inst. C.E., an inspector of the Local Government Board, to the president of that Board, under date of August 13th, 1884. Mr. Harrison states that he has examined the state of the river on seven occasions. To make his remarks the clearer he has prepared a sketch of the course of the Thames, on the scale of four miles to the inch, divided into five-mile lengths, above and below Crossness, from Teddington Lock to Southend, a total distance of 62·15 miles. He has added a table showing the volumes of water in each of these portions of the river, at both high and low water, of both springs and neaps, as well as the volumes of salt water in the same at springs. We must refer to the patient and lucid document itself for the details. The conclusion from this part of the investigation is "that at the present time there is a month's sewage from the metropolis oscilllating backwards and forwards between Greenhithe and Teddington."

Thus far Mr. Harrison only confirms the statements put forward in 1877 by the Conservators of the Thames, on the report of Captain Calver, R.N., F.R.S.,—statements which, as we have seen, are fully supported by the judicial testimony of Lord Bramwell. But the special value of Mr. Harrison's report lies here. He has not confined his observations to the floating island of sewage which has been steadily increasing in extent from the opening of the main outfalls to the present time. He has examined also the river above Bridge. He reports that "the water during high spring tides is polluted even up to Richmond; and it leaves a foul deposit on the banks of the river and on the towing-path. . . . . The Thames in its present condition can only be compared to a huge sewage-tank, which now for many months has not been cleaned out: it is notorious that under such circumstances the sludge, wherever it settles, becomes putrescent, and most offensive."

"The Metropolitan Board of Works," Mr. Harrison continues, "deny altogether that there is any deposit of sludge in the Thames from their sewage. I feel confident that this contention is no longer tenable." Here is the kernel of the whole matter. Relying on an Act of Parliament which Sir W. Harcourt, in his letter of the 14th of July, intimates to have been obtained under conditions hitherto unfulfilled, the Board of Works have, up to the present time, defied alike the Conservators of the Thames, the Port Sanitary Authority, the Local Government Board, the Home Office, and we may say the public sense of truth and of sanitary principle. It is tolerably clear that they are likely to resist any proceedings which the Home Secretary may institute under Section 34 of the Metropolis Management Amendment Act of 1848. And such is the effect of the neglect to institute proper control by the Acts of Parliament constituting the Metropolitan Board, that it is at least conceivable that the latter might continue to defy any interference short of that of Parliament, based on complaints as to the state of the Thames below London.

But the very object of calling the Board into existence was "to prevent the sewage of the Metropolis from passing into the Thames within the Metropolis." This object, according to the report of Mr. Harrison, has been entirely missed. If, therefore, the Home Office take the action that they indicate, in which they will be thoroughly supported by public opinion, it is on the facts now adduced by Mr. Harrison that their success will, we apprehend, depend.

Mr. Harrison states that between 17 tons and 18 tons of chloride of lime was used by the Metropolitan Board daily from the 10th to the 21st of July, at a cost of about 2,000*l.* per week. The imperfect action of this disinfectant has been pointed out. Mr. Dibdin, who has charge of the work, is now making manganate of soda at Crossness, and will shortly manufacture 20 tons a day. The cost of this is not stated; but on the 8th of August last Sir Charles Dilke stated in the House of Commons that the cost of permanganate of potash was about 130*l.* per ton. We thus obtain intimation of a cost ranging from 100,000*l.* to 675,000*l.* a year as likely to follow from the concentration of the refuse of 5,000,000 persons in one locality, for the purpose of turning it bodily into the river. It is only the more costly disinfectant that succeeds. And this is because the large dose of oxygen which it contains actually burns up that effete organic matter which is the source of the sewage poison. It deserves not only serious consideration, but the test of experiment, whether precipitation, followed by the actual combustion of this organic matter, which itself would supply the fuel, will not prove at once more certain and more cheap than the application of this costly chemical product. We recommend the study of this report to our readers.

## TURNING AND MECHANICAL MANIPULATION.*

FROM a literary point of view, the votaries of the art of turning have little cause to complain that justice has not been done to the lathe both as regards its history, construction, and manipulation; in fact, with the exception, perhaps, of the steam-engine, more has been written about it and the wonders it can accomplish, than upon any other branch of mechanical engineering.

The old books by Bergeron, Teubers, and others, are well known, and do infinite credit to the writers; but the subject has never been so exhaustively treated,—whether taken from a scientific or practical standpoint,—as by the Holtzapffels, father and son. The present volume, No. V. of a series of six, is by the son, John Jacob Holtzapffel, and is a continuation of the important work designed and begun by the father.

In the introduction the author deals briefly with the early history of turning, and says that probably the earliest record of what may be called ornamental turning is that described by Virgil, Bucol. Ecl. III., v. 36, translated by Dryden as,—

"Two bowls I have well turned, of beechen wood," &c.

He also quotes Pliny and other old writers; but we think that the antiquity of the lathe, not only in Europe, but in Asia and Africa, has already been proved to demonstration, and drawings of lathes used by the Kabyles and other African tribes many hundreds of years ago are still in existence.

In Section I. the Division Plate and Index are dealt with at length. In speaking of the cutting action of tools the author justly urges that to secure perfection in work every cut in every series of operations should be perfectly regular and equal in disposition and depth, and,—given a perfectly-constructed lathe,—this, with skilful attention and with ordinary materials to work on, can be obtained. With difficult materials, however, which vary in density,—such as stones or marbles containing in places shelly fossil deposit, which is often hard and crystalline,—it has been found a matter of extreme difficulty to obtain equal cuts, an ordinary straight tool often springing from or digging into the material. For this kind of work saucer-shaped revolving cutters of chilled cast-iron or steel can be used with advantage, as these roll over the material they are cutting. The dead contact is small, and the friction is, therefore, much reduced, and the cuts are much more regular than with a fixed tool.

The author now refers to the grinding of angular, straight, and curvilinear-edged tools, and gives much useful information thereon. We agree with the recommendation that tools with flat-cutting edges should be ground mechanically instead of by hand, as by fixing them in an indexed quadrant frame any desired cutting-angle may readily be obtained, and the

* "Turning and Mechanical Manipulation." Vol. V. "The Principles and Practice of Ornamental or Complex Turning." By John Jacob Holtzapffel, A.M.I.C.E. London: Holtzapffel & Co.

result is absolutely accurate. This is especially applicable to broad-faced tools.

In Section II. the author deals with form and ornament and materials, in a concise and able manner. Section III. treats on the different methods of chucking work,—we need hardly say a matter of very great importance to the ornamental turner, and one not always carefully done. Much useful information on this subject is to be found in vol. iv. of the author's work.

Chapter III. deals with slide-rests for ornamental turning and the application of fluting stops. Illustrations of a cradle, quadrant, and counting ratchet, designed by the author, are also given; for high-class complex turning these should be found extremely useful. To obviate the unevenness and uncertainty of the advance of the slide-rest and cutting-tool, when traversed by hand, Mr. Holtzapffel gives descriptions and illustrations of several kinds of automatic driving-gear, including a tangent-screw gear, in which the micrometer and worm-wheel are in one solid. Ashton's automatic driving-gear is also described; this gear carries its own fluting stops, which, as they determine the extent of the traverse, throw the tangent screw out of action. Further on, Ronald's curvilinear apparatus (contrived about 1830), which translates a rectilinear into a curved traverse, is noticed, and, as we read it, the author considers that this application of a guide principle contains the germ of all turning and carving machinery for the production of fac-similes.

We have no wish to deny Mr. Ronalds any honour to which he is justly entitled, but we think the author will find he is quite in error in ascribing to Mr. Ronalds the honour of being the introducer of the guide principle for the production of *fac-similes*, as previously to the present century Condamine describes in his work how a lathe may be made to turn irregular figures by means of tracers moved over the surface of models, and we have before us illustrations of two machines constructed by the great engineer Watt, in the year 1809, for the production of *fac-similes* of carving, or sculpture in marble, alabaster, or wood. These machines are still in existence, together with samples of busts and bas-reliefs produced by them, and are to be seen in the "Watt Room" at the residence of Mr. George Tangye, Heathfield Hall, near Birmingham. As the matter is of some interest, we give a short description of these machines. Of the two machines constructed, one was designed for reproducing of the same size as the original, and the other for making a copy of a reduced size.

The first machine Watt called an "Eidograph," and it consisted, firstly, of an ordinary lathe with treadle and fly-wheel, to supply the motive power; and, secondly, of two tall uprights, about 7 ft. high, carrying at the top a slide on a strong horizontal bar, the slide being capable of motion horizontally either at a slow or quick speed.

Then, hinged to this slide is a light square frame of metal, and, at the outer edge of this another light square frame of metal is hinged, so that the lower end of such frame is capable of motion up and down, or in and out, like an elbow joint, and horizontally when the top slide is moved. The weight of these frames is balanced by levers and balance-weights and chains above, and the lower edge of the second frame is furnished with a "feeler" or "guide" to traverse over the original model. There is a noticeable feature in the frames above mentioned, and that is, that in order to prevent their springing or going "winding" they are practically formed into solids by the erection of the outlines of a pyramid on each; this plan gives extreme stiffness at the expense of very little weight. With this machine undercutting as well as straight cutting can be performed. Watt called his second machine for making reduced copies a "Diminishing Machine." In this he employed a stout hollow tube, forming a long lever, fulcrumed at one end on a universal joint, so that the other end can be moved in any direction about the centre. This lever carries a "feeler" or blunt point near its outer end, and a drill near the fulcrum. The slides above named slide on the bed of the lathe, and are moved by a pentagraph or arrangement of levers. A further motion is provided for turning round the original and the copy, as is sometimes necessary when undercutting a bas-relief, and, of course, when copying the round figure.

Again, Thomas Blanchard, of Philadelphia, invented his well-known copying-lathe in 1819: in this, too, a "dummy" or model and tracer guide are employed.

Chapter IV. contains lucid descriptions of the construction and working of the various cutting-frames and the revolving tools used in complex shaping and ornamenting, with illustrations in autotype taken from executed work. This is followed by a chapter on one of the most important classes of tools used in the production of elaborate work, viz., the different forms of drills for ornamental recessing and piercing purposes, and of these the author gives a large number of illustrations, rightly urging the necessity of keeping their profiles absolutely true, or high-class work is an impossibility. A number of illustrations of patterns,—chiefly used for surface ornamentation,—produced by the eccentric cutting frame are now given: many of these are extremely complex, but some of them exhibit remarkable beauty of design. Plate 14 illustrates in autotype a very elaborate specimen of inlaid eccentric and concentric turning executed by an amateur, Mr. T. Brocklebank. It is in the shape of a plaque of African blackwood, with medallions ornamented with camwood, and edged by tulip-wood and ivory. Great ingenuity has often been exhibited in such work as this, and it has a beauty of its own in a geometric sense; but its artistic value is very low, compared with the means which go to produce it.

In Chapter VI., elliptical, epicycloidal, and rose-cutting frames are dealt with; interesting though they are, the limit of our space prevents more than a passing notice. We would, however, draw the author's attention to an extremely novel motion in this connexion recently invented by an amateur, Mr. Tighe Hamilton, of Dublin. For want of a better term it may be called a "drunken eccentric" motion, combining both revolving and horizontal traverse motions at the same time. At present it is utilised in cutting fine gear wheels from the solid, to the teeth of which it can give any desired degree of curvature, all sizes, pitches, angles, and tapers being variable at will. With some alterations it could be added to the turning-lathe, and used for dovetailing, and dovetail tongueing and grooving, as well as for various kinds of ornamental work.

The author, in Chapter VII., treats at length on eccentric and oval chucks, and Plate 35 shows two fine specimens of oval surface decoration. Chapter VIII. deals with the spherical and other chucks, and some very useful instructions as to working them will be found. Plate 41 illustrates a good example of a model clock-tower turned in ivory. This is intended by the author to show chiefly the capabilities of the rectilinear chuck, and no portion of the model was touched after leaving the lathe. A full description of the method of working pursued is given, which should be extremely useful to amateurs desirous of carrying out similar work; and this feature, showing what tools are to be employed, is one that could be extended with advantage. The great range of the work that can be performed by the lathe and its various adjuncts is well shown by a large number of illustrations of vases, tazzas, Gothic windows, recessed panels, &c. These two latter, by the way, can be much more rapidly produced on a vertical spindle, irregular moulding, and recessing machine than by a lathe.

In taking our leave of this really admirable book, we cannot help thinking that if some of the language and descriptions given were a little simpler it would be of still greater service to those for whom the book has been designed, viz., amateur turners; in point of fact, to understand it thoroughly, the amateur must really be a somewhat advanced technologist, which we are afraid, in the great majority of cases, he is not.

During a long series of years the lathe has gradually developed, until it has become the most advanced of all mechanical tools; but the author can congratulate himself on having done it ample justice, and on the completion of his next volume will have practically exhausted the subject, and completed a work on the lathe and its manipulation unequalled in any language.

## RAILWAY GOODS RATES.

### "OWNER'S RISK."

THIS subject, on which we have before offered some observations (see p. 183, *ante*), is one which may be approached from many points of view, but in whatever aspect it is looked upon there are considerable difficulties to be overcome. So uncertain and inconsistent are the regulations that a large amount of patient attention is necessary to comprehend them, and many of them will be found open to various interpretations.

A fruitful source of contention and litigation is furnished by the "Owner's Risk" system, and some information on this point may not be uninteresting, especially to those of our readers who are in the building trade, and to whom the subject must often become one of very practical importance. The rates charged for carriage of different articles vary in proportion to their bulk and value, goods of a damageable nature being highly rated accordingly. In an early stage of railway history it was found to be advantageous both to the Railway Companies and the public to adopt a system whereby the rates for certain easily breakable goods should be reduced on condition that the consignors agreed to relieve the companies from liability in case of damage. The amount allowed off the ordinary rates in such cases varies from 10 per cent. to 20 per cent. Articles rated second class are generally subject to a reduction of 10 per cent. or 15 per cent.; third and fourth class rates are reduced 15 per cent.; and fifth class 20 per cent. Thus, to take a few articles used by the trade as examples:—Carved stone for building purposes (not being for interior decoration) is chargeable at the second class rate, and, when at Owner's Risk, 10 per cent. less. Iron mantel shams, palisades, spoutings and connexions, kitchen and furnace boilers, ranges, grates, and stoves, are second class less 15 per cent. Window glass, joiners' work, marble and enamelled slate slabs (in cases) are rated third class less 15 per cent., and tomb-stones and carved decoration stone fourth class less 15 per cent. The 20 per cent. reduction only applies to such goods as organ work, looking-glasses, and a few other articles included in class five. It may be mentioned that the class rates run in something like the following proportion per ton:—For a distance of about 200 miles,—first, 33s. 4d.; second, 40s.; third, 50s.; fourth, 61s. 8d.; fifth, 75s. There does not, however, appear to be any rule on this point, as the proportion varies considerably between different places. The system of charging just described only came into operation on the 1st of January, 1883, and is therefore comparatively new; and though it was a step in the direction of uniformity, it was found, as a rule, to involve an increase in the owners' risk rates. Previously, the rule (with a few exceptions) was to charge one class lower when at owner's risk than when not so conveyed. It will be seen that the per centage now allowed does not amount to a reduction equal to that caused by adopting the next lowest class rate, and in many cases the proportionate difference between the class rates is much more than in the example given. Thus, though it is satisfactory to find a uniform system adopted, the change amounts to as great a revolution in the charges as did the scale for "smalls" introduced in 1877, which has been treated of in a previous paper. There are special owners' risk rates in force between certain points for exceptional traffic, and heavy traffic not included in the five classes is also subject to special arrangements. In addition to reducing the rates, the companies undertake to return certain goods to the senders to be repaired or replaced free of charge when

conveyed at the owner's risk, and damaged in transit. This arrangement does not apply to all goods which are so conveyed, it being obvious that some of the articles just mentioned are of no value whatever when broken, and that it would be useless to return them. But when the present system of charging was introduced, the railway companies raised a storm about their ears by announcing that they should discontinue the "free returns" altogether. This, as it was well put by one of the trade associations protesting against the alteration, would be putting a premium upon carelessness, as, when it was necessary for an article to be returned for repairs, the carriage upon it would have to be paid three times over; and the companies, recognising the manifest unfairness of their proposal, reverted to the original arrangement in this respect. This regulation also includes free conveyance of the repaired articles, or those sent to replace the broken ones.

The declaration signed by the sender of the goods, though familiar enough to many, may here be quoted:—"The —— Railway Company are requested to receive and forward, as per address and particulars on this note, the undermentioned goods, to be carried at the reduced rate below the Company's ordinary rate, in consideration whereof I undertake to relieve the —— Railway Company and all other companies over whose lines the goods may pass, from all liability in case of damage or delay." Some of the companies add the following:—"Except upon proof that such loss, detention, or injury arose from wilful misconduct on the part of the companies' servants." The omission of this last clause would not affect the right of a trader to sue for compensation in the event of the loss being caused under the circumstances therein mentioned, as the oft-quoted "Cardwell's Act" Railway and Canal Traffic Act, 1854) affords protection in such cases. That Act provides that every company shall be liable for loss of or injury done to any goods in transit, occasioned by the neglect or default of such company or its servants, notwithstanding any notice limiting such liability. At the same time it is provided that nothing contained in the Act shall be construed to prevent the company from making such conditions as shall be adjudged to be just and reasonable. Now, a contract without the latter clause would scarcely be looked upon as just and reasonable by any court or judge, as the company's servants would thus be protected, even in malicious and wilful damage, and the agreement would therefore be manifestly unjust. The only conclusion that can be arrived at with regard to the omission of the clause by some of the companies is that they rely on getting rid of some demands through the claimants being ignorant of the law, and being thus deterred from prosecuting their claims. Of course there is always a difficulty in bringing home a charge of wilful misconduct, but still it is quite possible for any one unaware of the provisions of the Act of 1854 to abandon a very clear case on being referred to the terms of the contract. Lord Justice Brett says, with his usual clearness, that although there is the alternative rate of carriage, if the exception as to the wilful misconduct does not appear in the document he would hesitate to allow the reasonableness of the contract, his opinion being that the consent of the parties does not make that reasonable and just, which, in the opinion of the court, is unjust and unreasonable. Other authorities have, however, expressed a different opinion, and this clause is an anvil upon which many a case has been hammered, there being numerous precedents to be referred to on both sides in cases of this nature. "Wilful misconduct" has been variously defined, but the exposition given by Lord Justice Cotton is, perhaps, one of the clearest. He says that wilful misconduct is a doing of something which the person doing it knows will cause risk or injury, or the doing of an unusual thing with reference to the matter in hand either in spite of warning or without care, regardless whether it will or will not cause injury. Perhaps this would have been more complete if he had added that it would include the omitting to do something which the party would know it was wrong to omit, being aware that the omission would be likely to result in damage. But this is a nice question, and one to be determined rather by the merits of the case than by legal or general definitions. Certain it is that the same words have been claimed as protecting opposing parties, and different circumstances give the verdict first to one side and then to the other.

## NOTES.

IN reference, we presume, to our "Note" of last week in regard to the Liverpool Cathedral site controversy, a printed protest with no names to it has been sent to us, accompanied by a plan of the site with the cathedral and cloisters of Wells laid down upon it, to show the inadequacy of the site. The cloisters stretch beyond the site considerably, though the cathedral plan is purposely drawn away to the west side of the site to emphasise the insufficiency of the ground. Of course if a residential cathedral with a cloister-garth is regarded as a *sine quâ non*, the site is too small; it is too small also, without the cloister and residences, for a processional Mediæval cathedral of the largest type. It seems to be quite forgotten, however, that the cloister had its *raison d'être* as part of a monastic institution, of which the church itself was only a part; and as it may be presumed that the intention is to build a cathedral and not a monastery, the necessity of the cloister is not apparent. As to the cathedral, we have already expressed a hope that some effort would be made to build an essentially modern cathedral for congregational worship, such as Wren would have made St. Paul's had he been allowed. Such a building would naturally be square in general plan, not long; and there is room for a fine building of such a type on the selected site. The clerical party (for we presume the circular emanates from them) have put a Mediæval plan on the site, which is certainly not suitable to it, as if that were the only alternative. We very much hope to see a people's cathedral built, and not a mere Mediæval imitation, which, in such a town as Liverpool, we should regard as little better than a costly anachronism.

THE works of Blake in which his genius appears at his best, the poems written and decorated by himself in his own extraordinary and unique style, have hitherto been known only to the few who possessed copies or who had studied those in the Print Room of the British Museum. *Fac-similes* in colour of some of the pages were given in the appendix to Gilchrist's life and in Mr. Swinburne's book, "William Blake, a Study," but these did not convey the feeling of the hand-painted originals. Mr. Pearson, of Pall Mall, has commenced the publication of a limited number of hand-painted copies of Blake's works, including the "Book of Thel," the "Visions of the Daughters of Albion," "The Songs of Innocence," and "Songs of Experience," the "Europe," the "Los," and the "Milton." Of these, the first two named are complete, and in the hands of subscribers, the issue of each book being confined to fifty copies. These are very remarkable examples of reproduction; and without seeing the originals alongside of the copies, it would be difficult to judge whether they were not original Blake copies, Blake's peculiar colouring and touch being so well imitated. The names of the artists who have worked upon them are not as yet published, but it is stated that there are several hands at work, and that each artist works on some portion of every plate, with a view to the obliteration of mannerism. The "Vision of the Daughters of Albion" exhibits more of the eccentricity and less of the real power of Blake as a designer than many others of his works, and some of the designs display that childish crudity in the drawing of the figure which is one of the most extraordinary characteristics of an artist who unquestionably *could* draw when he was minded to. Not so with that ethereal little work, the "Book of Thel," in which the sketched figures (for they are only sketches) are exquisite in their grace and fancy, and the poem, in Blake's quaint printed writing, reads like some "emanation," as he would have said, from an ideal world quite different from ours. It is something at least that fifty more people can now possess this little gem almost in its original beauty; and one only laments that the conditions of production are necessarily such as to limit the number of copies, and render the price prohibitive except to the few. Perhaps, however, it would not do to make Blake too common. One shudders at the idea of the thumb of the Philistine brushing the bloom off his pages.

PART II. of the Transactions of the Royal Institute of British Architects for 1883-4, which is just out, exemplifies the great and desirable advance made in the employment of illustrations, as well in quantity as in quality. A large proportion of the illustrations are representations of buildings recently erected in India, to accompany Mr. Emerson's paper; some of the Pugin Travelling Studentship drawings are also reproduced; and among more practical illustrations are two pages of constructive details, showing the "precautions to be adopted in introducing the electric light into houses." The Institute volume is now one which may become not only valuable to architects for reference, but of considerable interest to the educated public outside the profession.

THE *Daily News* calls attention to the neglected condition of the oddly-shaped open spaces at Hyde Park Corner which were formed in connexion with the so-called improvement recently effected in that locality, and suggests that they should be put in order pending arrangements being made for adorning these spaces with statuary, which, it appears, is in contemplation. It seems to be the fate of all new metropolitan improvements that the site should remain a blot and disfigurement for a considerable period. The Courts of Justice are no exception to this rule, a large plot of ground on the west side of the new buildings remaining to this day in a disgracefully neglected condition, being covered with all manner of *débris* and old building materials. If the Government cannot make up their mind as to the appropriation of this site, they might at least level it and make its appearance endurable; at present it is a scandal and an eyesore.

CONSIDERABLE weight should attach to the opinion expressed at the Congress of Railway Servants on the subject of automatic brakes. No class of persons are so competent to form an opinion on the value of this appliance as are the engine-drivers; and they appear to be tolerably unanimous in favour of the automatic method. As to the outcome of the discussion on the subject of overtime, the enforcement of a return to "set forth the number of men that are required to resume duty without an interval of rest of less than nine hours," if coupled with a return of any who are engaged for more than nine hours continuously, or with brief intervals for food, might not only tend greatly to the reduction of accidents to railway servants, but would also give satisfaction to the public. It is not easy to over-estimate the importance of any regulations affecting the safety of our great railway army, which contains some 368,000 men. Out of these, about 17 per cent. are directly concerned in working the traffic. It is on that small number, therefore, that the heavy per-centage of injuries to the servants of the companies has principally to be reckoned,—a fact which imparts irresistible force to the demand for a system of couplings which would avoid the necessity of the workmen going between the vehicles.

WE have received from Mr. Chas. Barry a copy of his Report on the designs sent in for the proposed new building for the Lincoln School of Science and Art, in reference to which he has been acting as professional adviser. As we stated a fortnight ago (p. 473), he has recommended, as the best three, the designs marked respectively "For ever," "Study," and "Academia." The

Report touches on some matters of general principle in regard to competitions. The treatment of the site has been of every variety, some competitors building over the whole of it, while others utilise only a part, while all equally declare their confidence in being able to carry out their building for the limited sum named in the instructions. Calculations convinced Mr. Barry that some of them would cost double the stipulated amount, and many would be considerably in excess of it. He therefore rightly decided to deal only with the best of those which could be executed for something like the maximum amount allowed in the instructions (7,150*l.*), and concludes his Report with these very pertinent remarks, which deserve to be duly weighed by Competion Committees generally:—

"I hope I may urge on the committee, on behalf of the profession to which I and the competitors have the honour to belong, that the object architects have in view in entering into a competition such as this is not the obtaining a premium (however well deserved that generally is for the labour in making a design), but the honour and professional credit of being allowed to carry out their design into execution. I do not doubt the committee are fully aware of this, and unless some serious reason should be found to exist to the contrary, that the authors of the three designs I have selected will, in the order named (subject to the verification of estimate), be deemed to have the first claim on their regard.

I trust the committee will not think it presumptuous on my part to make the above remarks, which I am sensible are beyond the strict duty laid upon me, viz., to select the three best designs, and those which were also found to be most in accordance with the conditions issued to competitors.

The committee will understand from what I have said that there are designs among those sent in of superior merit to those I have named, some as regards larger accommodation, convenience, and good arrangement, and some as regards design, and I regret that I do not feel at liberty to make my selection on the ground of merit only, irrespective of cost."

THE Architectural Association *conversazione*, at the Prince's Hall, on Friday last, was a considerable improvement upon that of last year. The number of invitations was restricted to the capability of the rooms, and the cloak-room arrangements were upon a more liberal scale than formerly, but in this last particular the accommodation still left much to be desired. The exhibits were of the usual miscellaneous character, wall-papers and carpets predominating; Messrs. Morris & Co.'s contribution was the most important, and included a small tapestry hanging of "The Goose Girl," from a design by Walter Crane; a very gorgeous wall-paper designed for the Waterloo Chamber at Apsley House; and some very handsome specimens of window curtains. Mr. R. Phené Spiers contributed some water-colour sketches in his usual effective style, and there were a large number of drawings by students of the Association classes. The sketches by Mr. Oakeshott, which obtained the Architectural Association travelling studentship, were deservedly admired. Some of these we published some little time since.

THE letter of an American landlord (or rather house-proprietor) which has appeared in a daily contemporary would seem to show that the woes of the tenant are absolutely unknown "in an important city" across the Atlantic. The name of this elysium is suppressed,—perhaps for fear of overcrowding,—but in it, we are assured, the tenant has discharged every obligation when he has paid his rent, while the landlord's responsibilities are almost incalculable. "I am obliged," he says, "to make all repairs, to keep the drains, hot and cold water pipes, furnaces, range,—in fact, *everything in the house*, in perfect order, and to do this at any time I may be called upon by the tenant. In fact, I am compelled to maintain everything connected with the house in first-rate condition." We presume the rents are high enough to cover this indefinite expenditure, and are punctually paid; otherwise the position of landlord must be one which only a philanthropist with a full purse would care to occupy. But, be this as it may, we certainly have here what, from a tenant's point of view, is a very enviable condition of things. The writer goes on to hint that legislation could and should bring it to pass in England also. We have frequently said that a tenant who desires to improve the sanitary state of a house should have a legal right to call on the landlord to contribute to permanent improvements of this kind. But *quid leges sine moribus?* The best sanitary system may be, and often is, rendered useless by the culpable carelessness of the very people in whose interest it has been devised. Without general education on the one part and special knowledge on the other, the mere addition of new laws to the Statute Book will be quite unavailing.

THE Junior Carlton Club, Pall-mall, is about to be enlarged by the addition of the site of Adair House, at the corner of George-street, which adjoins the club on the west side. A new reading-room, with a handsome library on the first floor, and a billiard-room over, will be formed on the site of Adair House; the principal staircase will be reconstructed, the present smoking-room enlarged, a new strangers' smoking-room provided, and considerable improvements made on the ground-floor of the building. An open portico will be formed in the centre of the front next Pall Mall, and new bay windows thrown out in the east and west wings. The architect is Mr. J. Macvicar Anderson.

THE Metropolitan Board of Works are about to reconstruct Hammersmith Bridge, at a cost of 82,000*l.*, including the provision of a temporary bridge. The design of the present bridge is simple and appropriate, but the Board appear to be dissatisfied with it, and propose to convert the plain massive stone towers carrying the chains into Chinese pagodas modelled apparently upon those at Albert Bridge, Battersea.

THE completion of the Inner Circle Railway has proved for the present to be a curse rather than a blessing. The state of things on the lines converging from Hammersmith, Putney, and other out-districts, to Earl's-court Junction, is simply intolerable, the greater part of the journey being occupied in blocks, not only at the station, but at intermediate points. Business men who travel by the Underground Railway will not stand this for long, the companies may be assured; and they had better recognise at once the fact that in trying to crowd too much on their lines they have simply choked the traffic, and must reduce it at once to such a number of trains as can really be worked, unless they want people to take to cabs and omnibuses again, as the faster method of locomotion.

A PUBLIC meeting is announced to be held at Woolwich on Wednesday the 22nd, under the presidency of Lord Forbes, when resolutions will be proposed "condemning the disgraceful state of the Thames, and pointing out proper remedies." The railway companies and the Lower Thames watering places (Margate, Ramsgate, &c.) appear to be among the interests specially represented at the meeting.

WE have received from Mr. Stayton, the surveyor to the parish of Chelsea, a copy of his special report to the Chelsea Vestry on the system of electric lighting as in use at Colchester. He says,—"The area supplied is in the centre of the borough, and comprises Head-street, High-street, and Culver-street. The generating station is in a yard in the latter street, the engine for driving the two 40-light brush dynamo-machines being of 25-h.p. nominal. I saw the machinery in full operation, and feel bound to add that there was no apparent cause of annoyance, and that similar stations might be established in any part of a town without creating inconvenience. The current is conveyed to six storage stations, five of which are ordinary cellars underneath street shops, and in which the necessary number of accumulators or secondary batteries are placed. The cables are carried underneath the footways in a brick trench, 9 in. by 7½ in., suitably arranged for drainage. The cables and service wires are all suitably insulated by lead coatings, and the service connexions to the houses are laid in wooden troughs under the footways." Only about thirty premises are at present supplied with the light, and at present it is not and cannot be a commercial success, but "the practicability of house to house lighting has been successfully demonstrated."

THE Fulham District Board of Works have printed a copy of a letter addressed to the Home Office, in reference to a case in which they had been accused of unnecessarily prosecuting costermongers and others for creating obstruction in King-street, West Hammersmith, by the establishment of fifty to sixty barrows or trucks remaining stationary in the roads for many hours, the barrows forming a continuous line, and the sales carried on causing crowds in the streets and greatly impeding the vehicular traffic. We are only in possession of the Board's statement, but on that we should be disposed to support them in their crusade. In connexion with the subject we may advert to the nuisance which has been occasioned during the whole time of the Health Exhibition by the crowd of low hawkers standing in a row on the curb, from the corner of Cromwell-road onwards, and making the locality hideous with their discordant cries. We do not believe there is any large city in England, except London, where such a nuisance would be tolerated, or where visitors to an important exhibition would be obliged, as it were, to run the gauntlet of a set of howling vagabonds each trying to shout louder than the other the recommendation of his particular gimcracks.

## THE KIND OF ARCHITECT WHO CANNOT GET ON.

His father was the vicar of a small country parish, and, the church requiring restoring, he thought it a good opportunity to make terms with the eminent architect who conducted that nowadays thankless operation for the professional education of the subject of our sketch. The anxious father was moved thereto by several considerations. First of all, young hopeful had missed the scholarship which was to have smoothed the way to a University career and had disconcerted all the family plans thereby; and, secondly, the good Vicar was taken aback at the, to his thinking, ample remuneration which the fashionable architect received for a few slight drawings and a casual visit or two,—an amount which contrasted sharply with the very moderate stipend which rewarded his own ministrations. He was, moreover, dazzled by the long list of similar commissions which the professional gentleman had on hand, and upon which he expatiated with off-hand volubility. And so the preliminaries were discussed and settled, the premium paid (not without a pang), and the young man, duly articled for three years, left his country home for the office of the great London architect, carrying with him the hopes and fears of his impoverished parents. He was not badly equipped for the profession selected for him. He had received a fair education at the local Grammar School. His breeding and his home life in an English parsonage had given him the manners and bearing of a gentleman, and his father's position might reasonably be counted upon for an introduction to the superior clergy and the county families.

His reception in the office of the master of the building arts was not quite what he expected. In the first place, his Principal was rarely seen. The important commissions he had on hand, and the still more important ones he had in view, kept that accomplished artist running about the country a good deal. His office business was conducted by one scantily-remunerated, but trusty, clerk, of tried fidelity, skill and experience, and of untiring industry, assisted by a number of pupils, who did as little and absented themselves as much as possible. The new pupil was taught nothing. He picked up the simple but showy art of tracing, and he copied specifications. In response to the importunate clamours of sundry clerks of works, he adapted to new circumstances some stock details which had done similar duty on several occasions, and he compiled some wonderful specifications by a process of selection from a store of originals. In neither of these occupations did he take any real interest, nor did either of them afford any suitable opportunities for his advancement. The *rationale* of the art

he was supposed to be acquiring was never explained to him, and he knew but little at the end of his three years' apprenticeship that he did not know at its commencement. The excellent aids to study which the ingenuous youth of the present day has at command did not then exist, and if they had existed our friend had not the energy to avail himself of them. When the day of his emancipation arrived, which his friends certainly thought would have brought with it a secure and honourable position in his employer's office, or a crop of cathedrals to restore, or churches and parsonages to build, they were surprised to learn that there was no longer room for him in the office. He was "pushed from his stool" by a newer crop of pupils, who were about to pass through the same course of "study." In this predicament he tried various devices. He failed to find an entrance to the offices of other architects. His friends with one accord recommended him to "set up for himself," to "start upon his own account." To their innocent minds this seemed like securing fortune by a sort of *coup-de-main*.

He took a dingy office in the Adelphi, very high and airy, and he added his name to the long list on the doorposts, garnished with his professional titles. And he soon discovered that "setting up" and "starting" were not quite the same thing. He did not "start," but "stagnate." It was very dull, sitting alone in that dingy apartment waiting for the clients who never came; and soon those little leaflets which grow on many an office-door began to show themselves, bearing dates which could not be reconciled with the confident statements as to the imminent return of the tenant. The young gentleman was meanwhile consorting with other young gentlemen similarly conditioned who railed on Lady Fortune in set terms, and could not for the life of them make out how it was that the Scotts, and Streets, and Waterhouses of the period got all the work. This state of things was brought to a sudden close. The youth returned to his ancestral home, whence he was driven by the death of his father, and the consequent disruption of his home. A compassionate friend found him office room and a pound a week,—as a temporary measure. This asylum failed him after a short time, and then his path in life led undeviatingly downwards. He had no qualifications for the battle of life. He was not even a draughtsman in any sense of the word, and could not subsist on that "charing" which has found for so many young men the bridge from clerkship to independent practice.

That "able assistance" which is so very easy to obtain,—*vide* advertisements,—was not his to give. Pen-and-ink perspectives of the effective sort he could in no wise prepare. The designs which he once undertook to furnish "from the rough sketches" of a distant and deluded employer were returned to him with a scornful letter rougher than the sketches. Of all practical knowledge he was quite innocent. "Quantities" had always been so repugnant to him that he never fully understood the meaning of the word, and was certainly unacquainted with the operations involved in their preparation. He could not have written an intelligible specification to save his life, and to price or criticise a builder's account was not to be thought of. He could trace what was drawn for him and copy what was written, and these he could do but "indifferent well." There is but a limited demand for such arts as these, and the remuneration they command is but trifling. And thus it came to pass that he fell into disgrace and poverty, and kept out of the way of those friends whose patience and purses he had long since exhausted.

There are but few architects in town who have not recently suffered a call from one or another of the numerous specimens of this class. The type varies but little, and one portrait will serve for the whole. He has no card, but sends in a name; a very good one, of course. The office-boy delivers it with mysterious reserve, but cannot enter upon explanations in the hearing of the caller, who is close upon his heels. The embarrassment he manifests is variously interpreted by his master. It may mean another vicarious application for that little account, and the professional gentleman is perturbed at the thought and at the impossibility of retreat. Offices are generally so badly planned. Or it may be a new client. Hope springs eternal in the human breast, and this delusive suggestion gains a decisive victory. The stranger is admitted, and his whole story is read at a glance. It is an oft-told tale. His costume is mainly noticeable for new and ingenious adjustments. His bearing is either offensively servile, and his address a whine, or he puts on the easy swagger of a familiar friend. Has Mr. Blank a vacancy in his office? Unfortunately, no. Things are flat. It is found by the visitor to be so in other quarters. Even the great Mr. Friba cannot offer him employment. Will Mr. Blank kindly look at a few drawings? At this juncture Mr. Blank suddenly recollects a very important engagement. But his retreat is cut off, and before he can escape the dirty package is untied, and some dirtier drawings displayed. Poor things enough! Designs for a country school, or something of the kind, culminating in a pen-and-ink perspective ludicrously out of drawing, with inhuman figures more preposterously ill-drawn still. A short lecture is delivered thereon with the volubility of frequent repetition. It appears that they were submitted in competition; but "of course a local man got the job," &c.

The conversation, or rather monologue, takes a sudden turn in the direction of certain irregularities in the matter of daily meals: of the absence of breakfast on that particular morning,—on many previous mornings, and finally settles down upon the immense relief which would follow the temporary,—merely temporary,—advance of half a crown. Sometimes the appearance of the applicant is a sure indication of the real cause of his misfortunes. In the saddest cases ability is not wanting,—only the ability to keep away from the establishment at the corner. And there are cases where the failure to keep a footing in the crush and crowd of modern life is not culpable. As the American Æsop wisely says in his modern version of the fable of the Tortoise and the Hare, "The race is not *always* to the slow." We have exact information as to at least one instance in which merit is but inadequately rewarded. Nevertheless a specialist can always get a living of some sort,—an artist will always find a market for art, a practical man can at least find employment as a clerk of works. If luxury cannot be attained, no one able and willing to work need despair of modest comfort. But woe to those who fail to qualify for some branch of the great profession which they adopt. As the world is more and more the individual certainly becomes less and less. He drops out of the crowd and is lost sight of. As the years go by the descent into Avernus becomes increasingly easy, and it is now more than ever necessary for those to bestir themselves who are ambitious even to keep their foot-hold; doubly so for those who would "get on."

## WHO IS A WORKMAN?

It is noticeable that, though well nigh ten years have elapsed since the passing of the Employers and Workmen Act, 1875, there has been very little litigation on the meaning of the term "workman." This shows, at any rate, that the explanation of that word in this Act has been comprehensive and clear enough to prevent disputes from arising. It is perhaps more important therefore to take careful note of judicial views which help to explain or to affect this statute, and some recent decisions enable those interested in the subject to obtain further light on the meaning of the word in question. Section 10 of the Act of 1875 defines a workman as not a domestic or menial servant, but, with this exception, to include any person who, being a labourer, servant in husbandry, journeyman, artificer, handicraftsman, miner, or otherwise engaged in manual labour, whether under the age of twenty-one years or above that age, has entered into or works under a contract with an employer, whether the contract be made before or after the passing of this Act, be express or implied, oral or in writing, and be a contract of service or a contract to execute any work or labour." It will be remembered that this section has, in recent years, become of greater importance, because the Employers' Liability Act of 1880 defines a workman to mean "a railway servant and any other person to whom the Employers and Workmen Act, 1875, applies." Until quite recently, as we have said, there has been little judicial discussion of the clause in the Act of 1875, but quite at the end of last year the Queen's Bench Division decided that an omnibus conductor was not within the meaning of the section. In so deciding they differed from the Court of Session in Scotland, who held in an earlier case exactly the opposite. Where judges disagree it would not be for us to step in. Nor is the question whether an omnibus conductor is within the statute of direct importance to readers of this journal. It is interesting and important, however, from the fact that it shows a judicial tendency to lessen the meaning of the words "engaged in manual labour," for, said Mr. Justice Smith, "the mere fact that a workman works with his hands is not enough to constitute him a workman within the section." A case, however, has just been reported (Jackson *v.* Hill & Co., Law Reports 12, Q. B. D., p. 618) which directly affects all enterprising manufacturers, and many others besides. A mechanic had been engaged by a firm "to assist as a practical working mechanic in developing ideas the firm wished to carry out, and in himself originating and carrying out ideas and inventions sui able to the business of the firm." This person worked by himself in a separate room, but disputes having arisen between him and his employers he was put to work in "the shop" as an ordinary practical mechanic. Very naturally this was resented, and the mechanic absented himself from the place, and was therefore summoned for unduly absenting himself from his work without lawful cause. The stipendiary magistrate held that he was a workman within the Act of 1875, and he thereupon appealed to the High Court. This tribunal considered that a person engaged as was this mechanic, not as an ordinary practical working mechanic, did not fall within the meaning of the words in the Act, and they reversed the decision of the magistrate. Yet, though the person was superior to the ordinary mechanic, it is clear that the gist of his employment was that he should, as a working mechanic, develope the ideas of those who were not skilled in manual labour, and certainly one would have called him a handicraftsman or a person engaged in manual labour. It may, perhaps, be said that this man was somewhat like a sculptor, who works with brains and hands; but it appears to us that whereas the sculptor is primarily a brain-worker, this man was primarily a hand-worker. We have said enough, however to show the effect and the importance of this decision without further criticising a judicial opinion.

## THE DUTIES AND QUALIFICATIONS OF TOWN SURVEYORS.

### THE EXAMINATION QUESTION.

In the course of the discussion which took place at the meeting of the Association of Municipal and Sanitary Engineers and Surveyors at the Health Exhibition, mentioned in another column,

Captain Douglas Galton said it was absolutely necessary that those who undertook the duties of surveyors of towns, or those of sanitary inspectors, should be qualified for their work. The Sanitary Institute, recognising this, had led the way in the matter by initiating examinations. A medical officer was not appointed unless he had obtained some diploma which certified that he was thoroughly competent; and, similarly, a diploma should be required from surveyors and sanitary inspectors before they undertook work which so eminently concerned the health of the community. He did not say that the Sanitary Institute was the best body for the purpose, but he did contend that some examination should be required, and a diploma obtained from one of the many colleges and universities which were now spread all over the country. But, on the other hand, having obtained an appointment under such conditions, it was equally necessary that some protection should be afforded the surveyor or inspector in his office, so that he should not be liable to be turned away after four or five years by the Board whom he was serving, without some power of appeal to a central authority, such as the Local Government Board. He hoped the hon. chairman (Sir Charles Dilke), as President of the Local Government Board, would consider these points.

Mr. E. Chadwick, C.B., advocated larger and more extended areas of local government, as calculated to secure the employment of better-qualified and more experienced officers, especially where towns had large and populous suburbs outside the borough boundaries. Qualified service was cheap service, and sanitary

officers should have their qualifications tested by the central authority. The economy to be dealt with by sanitation was a burden three times greater than the burden of the poor-rates, and the eradication of that burden by skill and responsibility was the greatest of all economies. There was no economy equal to the prevention of preventible sickness and mortality. They had proved that mortality was preventible by sanitation in towns where the death-rate had been reduced by one half or a third. He hoped this would be extended by legislation, in which he trusted the chairman would take an active part in the housing of the poor, and the removal of the slums.

Mr. Ellice-Clark expressed his opinion that a Minister of Health should be appointed, whose sole attention should be devoted to sanitary questions. Alluding to the observations of Captain Galton on the subject of examinations, although he would rather that the discussion should not take the form of a dispute between the Sanitary Institute of Great Britain and the Association of Municipal Engineers, he certainly thought its dignity had been somewhat compromised by the attitude taken up by the Institute in regard to the examination of surveyors. The Sanitary Institute had a field before it to enforce sanitary ideas, and he thought it might have left the examination of local surveyors to the Municipal Association. True, the Sanitary Institute was the first to think of the examination of local civil engineers, but it was within the experience of borough surveyors that assistants who had passed high examinations upon paper had proved altogether incompetent when put practically to the test. Then as to all local surveyors having a diploma. What kind of a diploma could they expect that man to have who was offered a salary of 120*l.* a year? Why, the idea sank into ridicule. The important borough of Northampton was actually advertising for a borough surveyor at a salary of 200*l.* a year! Two hundred pounds a year! Why, he was himself now carrying out a small work where the clerk of the works was in receipt of four and a half guineas per week. Again, reference had been made to some local authorities grudgingly allowing the wages of a boy to aid the surveyor; and he could bear this out, for when he was acting as the Borough Engineer at Derby, it was actually the subject of division whether an assistant should receive 12s. a week or 80*l.* a year! No doubt the existing staffs were in many cases inefficient. In all towns fees should be chargeable upon the owners for superintending the erection of new buildings, as was the case at West Ham. It was quite impossible, under present arrangements, for the local surveyor to see that even the rudiments of a building were properly carried out; and although there was a great objection to the demanding of fees, yet he believed that was the only solution of the difficulty. Next he came to the question of protection, which was necessarily a delicate one. The spirit of the age was to extend local government, and if they were now to deprive the local authorities of the power to dismiss their officers, they would be curtailing, rather than extending, the functions of such authorities. At the present time, however, he said emphatically that it was perfectly impossible for the majority of local surveyors to do their duty in such a manner as the Local Government Board would approve were they acquainted with all the circumstances of the case. It often happened that those sitting on committees were interested in the subject under consideration. Although he had an exceptionally good Board, he could bring forward one little case which would prove this up to the hilt. Within a few years he had had to summon six builders for using bad mortar, when there absolutely went into the witness-box two members of the Board to say that the mortar was good! And one of these very gentlemen was sitting on the Works Committee when the prosecution was ordered; while both, six months later, had to sit in committee on the question of the increase of his salary. In the mortar case, several analyses had to be obtained before the magistrates could arrive at the conclusion that the "muck" of which he complained was not mortar! He suggested that such cases should be tried by some special tribunal instead of by the local magistrates, and in conclusion said he hoped Sir Charles Dilke, by giving his attention to the several points that had been raised, might be able to devise some means for practically aiding the local surveyors in more effectually carrying out the duties which devolved upon them under the provisions of the Public Health Act.

Mr. Jones (Ealing) spoke in favour of fees for proper inspection of new buildings being made universal and compulsory. This would enable a Local Board to employ an adequate staff of competent men to supervise the erection of buildings. He felt they were right in pressing this point upon the President of the Local Government Board. He also urged that there should be power given to compel the drains to be laid at the commencement of a building, and to prevent them being covered up until they had been properly inspected. He held, too, that when a surveyor had been articled to a person of repute, had served his time, and had had practical experience, he held a position beyond what could be given by a certificate by the Sanitary Institute, without any disrespect to the latter body. As to protection to surveyors, he thought there was a great deal of truth in the remark of Mr. Robinson, that when a surveyor and his Board quarrelled, the sooner they parted the better. If an officer retained his position under the protection of the Local Government Board, he would not find his life a very happy one.

Sir Charles Dilke said he thought this would be a convenient time for him to offer the few remarks which he proposed to address to them. In the first place, he was glad to have the opportunity of meeting a representative assembly of the surveyors throughout England, and of saying that in the discharge of the duties which had been thrown upon him, not only in his capacity of President of the Local Government Board, but also as the Chairman of the Royal Commission on the Housing of the Working Classes, he found that the greater sanitary evils still existing throughout the country, were not mainly in those departments which came under the control of the surveyors. He thought the exceptions which still existed to the enormous general improvement which has taken place in sanitary science and public health were attributable to sources which did not come very directly within the province of the surveyors. Generally speaking, he was disposed to think that an enormous advance had been made in regard to those matters with which the surveyors would have been most concerned. There could be no doubt that there had been a great diminution of mortality in the country; and although this diminution had been general, there was no doubt that England compared to advantage with other countries; and for this result there was no man to whom more credit was due than to Mr. Edwin Chadwick. The exceptions to the general advance which he had come across were to be found in rural districts, which were not within the control of any urban sanitary district,—localities lying within the jurisdiction of boards of guardians not possessing urban sanitary powers. In the metropolis, too, there were numerous sanitary evils still in existence. Not only was there a good deal of conflict of local authority, but there was constantly going on an enormous creation of population. Hence the state of things in London was no fair test of what exists in the country generally. The surveyor's work in the metropolis was different from the work of the local surveyors in the country; for in London the work which in boroughs was done by the local surveyors fell partly on the Metropolitan Board of Works and partly on the vestries. There were, in fact, no fewer than thirty-nine different authorities concerned in the metropolis; and he was bound to say, while he wished to avoid controversial topics, that he felt it would be impossible to get rid of the evils which still existed without some further concentration or unification of authority. As regarded rural districts, he thought they would still find, in some places, that people were drinking water drawn from small ponds into which the drainage of rows of cottages passed. He had found this to be the case at Marston-green, Birmingham, in Essex, in Surrey, and in the West of England. He had not, however, found this state of things to exist in urban sanitary districts, and he believed the instances were now exceedingly rare. There had been some great exceptions to the general improvement in the health of the country. There had been painful epidemics at Kidderminster and at Beverley, and an outbreak of typhoid and small-pox at Liverpool. He did not, however, think that any of these cases were traceable to causes within the control of the local surveyors. He thought they arose out of other people's business than more directly theirs. The condition of the River Thames, of the River Lee, and of the Cam at Cambridge, were all questions which might occupy the attention of the surveyors of the country. He was inclined to greatly congratulate that body upon the work of the past, and he repeated that he had very little fault to find with those matters which came within their care. Passing from general considerations to details, he found there had been complaints that, upon Local Boards, there were persons interested against sanitary reforms; and that this element constituted an immense difficulty in the way of the surveyors, as also, of course, of the medical officers. This was no new charge. He had himself made it matter for comment in Parliament, and the charge was one which could be substantiated by an immense amount of information every day. Now, how could this be got over? It had been suggested that the Local Government Board should take steps to remedy the evil complained of. At present, when matters came under the notice of the Board, suggestions were at once forwarded by letter in small cases; and in other cases, where the public health was likely to be seriously affected, an inspector was sent down to hold a local inquiry. But, as regards doing the work or becoming responsible to the public for its performance, there were enormous difficulties in the way. He did not think any Government department could be made sufficiently large,—he did not think they could have a sufficiently enormous staff,—to perform the duties which would, in such case, be thrown upon it. At present there existed power for the Local Government Board to declare an authority in default, and to step in and do the work; but this power had never yet been acted upon, and he did not think, unless in a case of very great emergency, where the public health might be jeopardised to a very great degree, it was ever likely to be acted upon. Next, he came to the question of the examination of local surveyors. This was a matter which had been brought very prominently before the Royal Commission of which he spoke just now. They had had examinations suggested, and they had on the Commission Mr. George Godwin, who had very strong opinions upon that point. He (Sir Charles) must not anticipate what the nature of the report of the Commission would be, but he might go so far as to say that he thought it probable some allusion would be made to the question of examinations, and that possibly some observations might also be made on the subject. Mr. Ellice-Clark, in the admirable remarks he made, had summed up very concisely the arguments upon what the Association called the question of protection. Nothing could have been better than the way in which he had stated the case. The reader of the first paper had referred to the case of Poor Law officers, and had shown that they already possessed that protection, which meant, supporting a man in his appointment against the wishes of the local authority who appointed him. If such were very generally the case, he (Sir Charles) thought the local authority would manage to make the position such that the official would find it impossible to hold it. Therefore he did not think that arrangement would be desirable, or that the Local Government Board should interfere, except, perhaps, in the case of a very near division and a close minority. Generally speaking, and judging from what he knew of the feeling throughout the country, he did not think, whether the Government in power was Liberal or Conservative, that anything like increased centr l control would be given to any department. He had, however, considered the expediency of there being some representative county authority which might be constituted a court of appeal from the smaller local authorities. In conclusion, he should like to allude to one or two other points upon which it might be desirable that legislation should take place. He had no doubt that the Royal Commission to which he had alluded would recommend legislation upon various matters, but he did not anticipate that they would recommend any violent or sweeping changes. The recommendations would more likely be in the direction of the enforcement of existing legislation than in the extension of it. Formerly Governments had more power for legislation than individual members; but now things were changed, and many Bills were opposed and stopped simply because they were

the measures of the Government. He therefore advised the Association not to look to interference from the Government on the matters which had been brought under consideration, but to see whether they could not get some private members to take up matters on their behalf.

Mr. W. H. White (Oxford) spoke of the difficulty of getting satisfactory by-laws adopted where the sanitary authority was distinct from the corporation, and where the latter owned a quantity of old property, crowded upon a small space, which could not be rebuilt in the same way if proper by-laws were in force. He suggested that, in such exceptional cases, the Local Government Board should not be so strict in insisting upon the adoption of their Model By-laws, but should approve of the best code that could be carried. He objected altogether to the suggestion of Professor Robinson, that the Local Government Board should act promptly on the complaint of individual ratepayers. There was far too much of this at present, and there was often a great deal of troublesome correspondence about trifles that could readily be explained. He expressed strong doubts as to the value of any certificate of examination, and said he had had several men in his office who had passed such examinations very satisfactorily, and he was not far wide of the mark when he said that the men who had come out the best in examinations were of the least use in the office. He should like to see the surveyor strengthened, as his position was frequently a most difficult one; but he held that the only true and permanent remedy was to educate the constituencies by whom local authorities were elected. Until they were sufficiently educated to elect men solely because they were well fitted to look after the public health, he feared they should not get efficient sanitary work done.

Mr. Lemon (Southampton) said the conflict between local and district surveyors must be got rid of, because the result was that the supervision over buildings was very inefficient. He suggested that the payment of fees should be to the local vestry direct, instead of to the district surveyor, and that from the fees the latter should be paid a salary, and men to exercise proper supervision should also be provided. He believed the principle of allowing Boards of Guardians to act as sanitary authorities was altogether unsound, as they practically neglected the business. If, as Mr. Chadwick had suggested, the sanitary areas were enlarged, many difficulties would be got rid of, and more efficient officers would in many instances be employed. He also condemned the practice of paying heavy compensation for old ruinous property, and endorsed the suggestion that the landlord should not be allowed to receive rent for property that was in an unsanitary condition.

Mr. Pritchard (Birmingham) said the consensus of opinion, both on the part of the readers of the papers and those who had joined in the discussion, was that local government was in some respects defective. He believed the questions of the qualifications and the protection of officers would be settled by increasing the area of districts, and the formation of county boards as had been shadowed forth. Having spoken of the satisfactory way in which the rural sanitary authorities of Solihull and Aston discharged their duties, Mr. Pritchard briefly referred to the epidemic of typhoid at Kidderminster, and to the "slums" which exist there, and concluded by again expressing his preference for enlarged sanitary areas and county boards.

Mr. Jerram (Walthamstow) and Mr. Gamble (Grantham) having spoken,

Mr. Fowler (Manchester) said the difficulty he felt with respect to examination was that experienced by practical old George Stephenson, —"Who is to examine me?" He sharply censured the practice of the "popular" members of local governing bodies, who, for the sake of apparent economy, sacrificed efficiency.

Mr. Angell and the readers of the other papers then replied, and the meeting closed with votes of thanks to Sir Charles Dilke for taking the chair, and to the gentlemen who had read papers.

**The Sanitary Congress at Dublin.**—The paper on House Drainage in connexion with town sewers was read by Mr. Geo. B. Nichols, of Birmingham, not "J. B. Nicholls."

## SHALL PARIS HAVE HER SOUTH KENSINGTON MUSEUM?

This was the question which seemed to meet with something like a solution on Thursday, the 9th, at a banquet given by the "Union Céramique et Chaufournière" to M. Jules Ferry and to M. Antonin Proust, who is president of the "Union Centrale des Arts Décoratifs," to the members of the Jury of the Exhibition at present open at the Palais des Champs-Élysées, and to the press. But we may as well touch on the day's history,—the conference before the banquet.

At two on the same day, then, M. Baudot, member of the Commission des Monuments Historiques and Inspecteur-Général des Édifices Diocésains, delivered, in one of the halls of the Exhibition (the one decorated with the Gobelins tapestries) a lecture "On the Employment of Polychromatic Materials in Construction, and on Ceramic Work in general." M. Baudot has employed ceramic work largely in the new Lycée now rising in the outskirts of Paris, of which he is the architect; and as the completing architect for the restoration of the Château de Blois, commenced by the late M. Duban (see *Builder*, June 28th, p. 942), and the favourite pupil of Viollet-le-Duc, to whom he owes his official position, M. Baudot has every qualification for speaking with authority on so important a subject. He addressed a numerous audience, where by the side of Government architects and members of the "Société Centrale" were crowded the manufacturers of the "Union Céramique" and members of the Académie des Beaux Arts, including MM. Ballu and Garnier, architects, M. Guillaume, sculptor, M. Lauth, director of the manufactory at Sèvres, M. Lameire, the brilliant decorative painter, M. Didron, artist in stained glass, and others. The paper, of three-quarters of an hour long, read by M. Baudot, did not, however, speak very well of the progress of ceramic art in France. Certain veiled sarcasms against his professional brethren who employed too much stone in their buildings or who did not make sufficient effort to harmonise the various materials they used; certain not very definite bits of advice to those more sober and serious minded ones who looked for the decoration of the buildings to ceramic art alone; a very warm eulogium of the Union Céramique et Chaufournière, from the point of view at once of industrial and social, we might almost add of national, advancement,—such are the main points of the address which remain in our memory. Two special recommendations may, however, be mentioned: one was, the necessity of raising a *tarif* on foreign ceramics imported into France, in order to provide a better market for French work (a very questionable principle, M. Baudot); and the second was a special eulogy of Viollet-le-Duc, to whom was due a considerable portion at least of whatever progress had been made in ceramic art in France, through his researches and practical experimenting in the judicious employment of these materials.

M. Baudot also put a question in regard to his eminent master, to which we feel moved to suggest an answer. How was it, he asked,—though it was true that no one is a prophet in his own country,—how was it that the work of Viollet-le-Duc was so much more appreciated in foreign countries than in his own? Without calling to mind here how, by the side of his admirable work of restoration, Viollet-le-Duc has too often crowded against the magnificent cathedrals of France little parasitic modern-thirteenth-century edifices which harmonise ill with the old work, one may find an easy answer to the question. For two centuries, as Mr. W. H. White has well shown in his interesting work on "Architecture and Public Buildings," France has possessed a vast network of institutions, inwound one with another, under the comprehensive title of "Académie d'Architecture," or "Académie des Beaux-Arts," "École des Beaux-Arts," "Académie de France à Rome," "Conseil-Général des Bâtiments Civils," and "Inspections Générales" of all branches of architecture; and they have maintained as a special and fundamental law of being, that all, or nearly all, official architects should have a competent knowledge of the art of Greece and Rome, and even of Egypt; while in other countries, in England especially, architectural education has been exceedingly unshackled, and hence the tendency to regard Mediæval architecture, much more than in France, as the specially national architecture; and this tendency has given a special value to the works of Viollet-le-Duc, in which are laid down, with the authority derived from thorough knowledge, the principles, the elements, and the manner of development of the "architecture ogivale" and the arts which cluster round it, as well as the varied resources which it offers to the artist.

Some hours afterwards, many of those who had listened with interest and applause to this lecture, found themselves at the aforesaid banquet, and drawn together by a subject of great interest, for the "Union Céramique et Chaufournière" was really a pretext for putting the great question,—the vital question for French art-industry; the presence of the President of the Council (M. Ferry) furnishing an opportunity for asking once more for the institution of a "Musée des Arts Décoratifs" on a large scale, as the centre for instruction in the industrial arts. M. Proust, the spirited president of the Union Centrale, has pursued this object perseveringly for several years, and on this occasion terminated his speech by demanding, amid the applause of the company, the use of the ancient Palais du Conseil d'État for exhibitions, partly permanent, partly annual, of decorative art.

We believe that M. Ferry, though his official responsibility did not allow him to accede to such a request on the instant or in a formal manner, has promised more or less officially to the Senior Minister of Arts, who is appointed Commissary-General for the Exhibition of 1889, to give fair play to the proposition, and that having remarked that "we must re-establish the system of apprenticeship, that admirable institution of our forefathers," he was understood to say that he would do all in his power to facilitate the creation of a museum where the production of future masters in the industrial arts would be preserved. It is to be hoped the movement may prosper, for all French or foreigners, will be the gainers by such an enterprise; but the palace on the Quai d'Orsay, enclosed by streets which limit it in every direction, could hardly become other than a museum for the fashionable quarter, and seems ill adapted for the installation of a great school of industrial arts, decorative and other. But it is, at all events, a question to which it will be of interest to return at some other time.

## THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

On Thursday, October 9th, a special meeting of the members of the Home Counties District of the Association of Municipal and Sanitary Engineers and Surveyors was held in the Jury Room at the Health Exhibition. There was a large attendance. Mr. H. G. Lawes (Newcastle-on-Tyne), president of the Association, occupied the chair in the early stage of the proceedings, but subsequently resigned the position to Sir Charles Dilke, M.P. Among those present were Capt. Douglas Galton and Mr. Edwin Chadwick, C.B.

The business having been commenced by the Secretary (Mr. Thomas Cole) reading the minutes of the last meeting, which was held at Ealing,

Mr. O. Claude Robson (Kilburn) was, on the motion of Mr. C. Jones (Ealing), seconded by Mr. Hall (Torquay), unanimously chosen District Secretary for the ensuing year.

Mr. Lewis Angell first read a paper explaining the origin, the constitution, and the objects of the Association. Mr. Angell urged strongly that the erection of new houses should be strictly supervised by a staff of special officers, who should be remunerated by fees paid by the builders for the necessary supervision. Such powers had been obtained by Eastbourne and West Ham by private Acts of Parliament, but he argued they should be extended by a Government measure to the whole of the kingdom. The reason why the erection of new houses was not efficiently supervised was that the local surveyor had so many diverse duties, and was not provided with an adequate staff. He also referred to the want of building by-laws outside of the metropolis, and said that, even where adopted, they were frequently not properly enforced. The laying of drains should be made one of the first things done; and the law relating to the dedicating of private streets to the public, a subject bristling both with practical

and financial difficulties, needed considerable amendment. After pointing out other defects in the existing Public Health Act and the by-laws framed under it, Mr. Angell referred to the obstruction offered to sanitary improvements by interested members of local authorities,—men who had secured their return to promote their own personal interests and protect jerry builders and small property owners from their natural enemy, the local surveyor. It was impossible to speak out on this subject, because surveyors had not the protection which the Local Government Board extended to workhouse officials. He urged that such protection was not only needed, but was desirable, and that the status and functions were quite as good and as important as those of a poor-rate collector, over whom the Government spread its protecting ægis. Passing to the qualification of sanitary officers, Mr. Angell said :—

"It must be admitted that the charge of inefficiency has had some force with regard to some of the smaller towns, and even to larger towns which make small appointments. Sometimes these positions have been given as a reward for local party services, or out of charity,—to a local builder, for instance, a 'practical man,' who had failed in his jerry speculations. There is on record the case of the appointment as surveyor, by his fellow townsmen, of a bankrupt linen-draper, 'because he had been used to measuring.' But such things, if not very remote, are becoming things of the past. The greatest difficulty is in small places and with boards of small calibre; the remedy would appear to be in county government. The action of recent public opinion has resulted in the demand for and offer of better inducements to sanitary engineers and surveyors of professional standing and experience. Among our number are many members of the Institution of Civil Engineers, and of the Royal Institute of British Architects, and I think it may now be safely asserted that every important centre of population has the services of a fully-competent sanitary surveyor, although he may be hampered in his work in the ways I have previously indicated.

A society, junior to our own, is seeking to impose on local surveyors an examination of competence, of which they, the Sanitary Institute of Great Britain, shall be the judge and dispenser of certificates. I think the members of our Association would, in their own interest, generally assent to the principle of examination. We would even extend the principle further, and apply it to the members of local authorities. In a profession like ours, practical experience is of far more value than the cram and bookwork which may qualify for a certificate, but not for the responsibility of office. But, admitting the examination, who are to be the examiners,—a newly-constituted society of persons having themselves no guarantee of qualification, or some of the older chartered professional bodies which have our confidence? Our own Association is senior to the Sanitary Institute, and composed exclusively of, so to say, picked men,—that is, sanitary engineers and surveyors by profession, each selected from a large number of other candidates, to fill a public office, without which qualification no one is eligible as a member of our Association. If it be objected that we should not give confidence by examining ourselves, then we have the Institution of Civil Engineers and the Royal Institute of British Architects, having charters half a century old. The latter body, of which I have the honour of being one of the Board of Examiners, is charged by Parliament with the duty of conducting examinations for the office of District Surveyor under the Metropolitan Building Act, and the Institute has extended the examination to the office of local surveyor. The diploma of the Royal Institute of British Architects would certainly carry greater *prestige* than that of a newly-formed non-professional society. There are also the Universities, or the Civil Service Commissioners, or a joint examining board might be formed of some of these bodies. We have no antagonism to the general objects of the Sanitary Institute, of which body, indeed, I am a Fellow; we wish the Society every success in educating the public in promoting sanitary progress, but, as professional engineers, we decline to admit the claims of a new *dilettanti* society to examine us.'

Professor Henry Robinson, M. Inst. C.E., followed with a paper on "Sanitary Legislation and its Enforcement." He said,—The Public Health Act of 1875, and the Metropolis Local Management Act of 1855 (the latter Act constituting the Vestries the sanitary authorities for the metropolis), contain provisions for the protection of the public from avoidable sanitary dangers, which if vigorously put in force would remove many evils which call for drastic treatment. If these Acts were framed now, they would doubtless be drawn with less of the optional or permissive and more of the compulsory element than is found in them. At the time, however, when they were passed, public opinion was not nearly so alive as it is now to the consequences attending sanitary neglect. It is a fact that in many respects even the existing mild legislation is not put into operation. This arises from two causes, one being the ignorance or indifference of the sanitary authority to carry out the powers confided in them, and the other being the legal difficulty and expense which an individual ratepayer has to meet in order to compel his sanitary authority to exercise their powers when they had failed to do so. Take one point which is of very common experience. The sanitary authority is either apathetic or obstinate as to remedying a condition of things which is injurious to health. The evil and the remedy are both obvious. The Acts prescribe that the course of action is by representations to the officers of the authority. But these officers may be the offenders themselves, either by neglecting to take the matter in hand, or by being unable to obtain from their authority the necessary permission to rectify it. This neglect or want of appreciation of the evil by the authority is of constant occurrence, and is due to the fact that a very large number of those who compose the corporations, local boards, and vestries are deficient in zeal for the public good, as regards health, and in many instances have vested interests directly antagonistic to any action being taken.* Where the desire to suppress inquiry exists it is difficult for it to be brought about. The officers are all appointed by the board. A too zealous official soon gets removed. The remedy, we think, is for the Local Government Board to take prompt action on the memorial of any ratepayer, and to take the necessary steps to immediately remedy the evils complained of. Further, the sanitary inspectors and similar officials should not be wholly dependent on the sanitary authority. It is also very necessary for all officers of health to be subjected to an examination in test of their fitness for the duties they seek to discharge. In my experience most unfit and incompetent persons are appointed by local authorities to administer the Public Health Act. Having acted for some time as one of the Examiners of the Sanitary Institute of Great Britain in granting diplomas for surveyors and inspectors of nuisances, I have had opportunities of testing the fitness of many men holding important positions of this kind. A great amount of preventible mortality arises from houses being occupied which do not conform to the most elementary rules of house sanitation. A fruitful source of mischief arises from defective drains, water-fittings, and plumbers' work, which being hidden from sight is often performed by unskilful or dishonest men. This class of work requires the most stringent regulations to ensure its proper execution. We would require every man engaged in it to be certificated and registered, as we are confident that without such a system to protect the public, the existing bad work and consequent mischief will continue. We might advantageously copy the example which has been set us by the City of New York. In the year 1881 an Act was passed to secure the registration of plumbers and the supervision of plumbing and drainage in the cities of New York and Brooklyn. This Act was the outcome of a public movement which was set on foot by those who appreciated the evils we have referred to. Amongst the most prominent of these reformers, and the one to whom the passing of the Act is chiefly due, was Mr. Henry C. Meyer, the proprietor of the *New York Sanitary Engineer*. It should be mentioned that in the Health Exhibition there is an exhibit of Mr. Meyer for the purpose of showing to the British public how the State of New York has dealt with some of the sanitary evils with which we are grappling.

Mr. H. Percy Boulnois, M.Inst.C.E., Borough Engineer of Portsmouth, read a paper showing "The Effect of Municipal Government upon Sanitation." The water-supply, he held, should always be in the hands of the local authority; but often this was not the case, from the fear of interfering with vested interests, or the first cost of acquisition. In some instances there was worse neglect, by permitting an insufficient or impure supply of water to be used, instead of providing a pure and sufficient supply. The sewerage of a district, which must of necessity be in the hands of the local authority, was second only in importance to the water supply. Permissive legislation led frequently to nothing being done, and the difficulties connected with the removal and disposal of sewage were made the excuse for inactivity. The supervision of house-drains was generally inadequate and a mere form, and it would require a far larger staff of officials to attend to it properly than a local authority is at all likely to supply. With respect to defective house-drainage, some easier and less cumbersome mode of procedure than than afforded by section 41 of the Public Health Act is required, to secure a prompt remedy. The delay entailed rendered action almost useless in such cases, and a few authorities had been obliged to obtain private Acts. Scavenging was also a most important duty. The duty was often greatly neglected, and the practice of storing large heaps of house refuse, to effect a sale of some portion, and thus bring in a small revenue, was much to be deprecated. Some improvement was needed where new streets are required, as great cost for compensation has frequently to be incurred. Mistakes as to soil and position were often made in the selection of cemeteries, and as population increases, cremation will doubtless have to be substituted for the present system of burial. He also strongly urged that all public works should be of the best and most substantial kind, but frequently a false economy resulted in the lowest tender being accepted.

The discussion which took place upon these papers, including an important speech by Sir Charles Dilke, will be found in a special report on another page of this week's *Builder*.

Additional papers were read by Mr. Robert Godfrey on "The Removal of House Refuse," by Mr. S. C. Trapp on "The Destruction of Excreta," &c., and by Mr. George Winship on "Some Advantages and Results of the Supply of Water by Meter in Domestic Consumption." To these we may return.

* One of the latest illustrations of this fact is reported in the *Pall Mall Gazette* of Wednesday last. A member of one of the Metropolitan local vestries or district Boards of Works is the owner of some property which, on the showing of the sanitary officer, is in so insanitary a condition that there is "eighteen inches of sewage in the kitchen." The Sanitary Committee have the courage to act upon their own responsibility when the matter is brought before them by the officer during the vacation, and, as the owner of the property refuses to put it into proper condition, they order the work to be done. When the report of the Committee comes up before the Board, there is, apparently, one of those acrimonious and recriminatory "scenes" which have done so much to bring small local authorities into contempt, and, in the end, the Board adjourns without having adopted its Committee's report.—Ed.

## THE ALBO-CARBON LIGHT.

Amongst the numerous claims for the best illuminating medium, whether gas or the electric light, we venture to think that the albo-carbon light will "hold its own" in either case. The recent successful application of this system at the new Brompton Oratory has demonstrated its capability to bring out clearly the architectural features of our churches and chapels, and those who will take the trouble to visit the Oratory at night cannot but be much impressed with the effective appearance of that vast building, due to the brilliant, yet subdued light thrown over its area. The fathers of the Oratory are not only satisfied with the effect produced at night upon their gorgeous ritual by the albo-carbon light, but really seem to think there is almost more light than absolutely necessary,—a good fault, seeing that there are only eight twelve-light, two six, and two four-light clusters in the whole building, lofty as are its proportions.

On the ground of comparative economy, as against the ordinary system of gas-lighting, some interesting experiments have recently been made,—in the one case with a single light by Professor Keat, and in the other by Mr. F. W. Hartley (the gas engineer), with a cluster-light burner. With a single light it was found that by a consumption of 5 cubic feet of gas per hour, an illuminating power was produced of 36·7 candles, whilst one eight-light cluster, burning 30·7 cubic feet of gas, gave an illuminating power of 271·5 candles. These figures speak for themselves, but in addition to the greatly enriched power of the flame produced is the fact that with the increase of light there is a very considerable diminution of heat, which is a most important feature, and indeed, is one of the chief recommendations of this very beautiful system of lighting.

**The Dairy Show.**—At the ninth annual show of the British Dairy Farmers' Association, held at the Agricultural Hall, London, the first premium and silver medal have been awarded to Messrs. Clark & Moscrop, architects, Darlington, for the best plan arrangements for model dairy farm-steading. There were fourteen sets of drawings.

## Illustrations.

### THE NICHOLSON INSTITUTE, LEEK.

THIS Institution, which was opened this week with much ceremony, and of which we give a view as well as the two principal plans to a small scale, occupies a very central site in Stockwell-street, facing south to Market-street, whence an imposing and effective view of the grand entrance, with its lofty domed tower, is obtained. This view is diversified by one of the ancient houses of Leek, stone-built and ivy-clad, "with many blinking windows, row on row," which, by the removal of a neighbouring modern building, it has fortunately been found practicable to preserve. With its quaint garden of sunflowers and hollyhocks it imparts a charming old-world flavour to the whole scene, and contributes very largely to the success of the *tout ensemble*.

The style of the new buildings is a somewhat severe form of Classic Renaissance, and the materials used are thin, hard-fired local bricks with black joints, dressings of red Roche and mottled Alton stone, and Broseley tiled roofs. All the windows are glazed with faintly-tinted antique glass in lead quarries.

The leading feature of the front is the tower, which rises to a height of about 100 ft. from the street. This has the spacious principal entrance doorcase at its base, supporting in the same composition the great staircase window with pedimented crown with carved urns; and large elliptical lights in each face of the upper stage. The domed roof and lantern are covered with sheet copper, which in a few years will, no doubt, assume the green *patèn* which strikes one so often sees on such features in the old Dutch and other Continental towns.

The façade between the gable and the tower has a stone balustrading with urns, and contains a large window lighting the hall. The fanlights contain the effigies of four eminent men, representing the four last centuries, carved in high relief in stone from models by Mr. Stephen Webb, which are hung in the building. Tennyson stands for Literature and the nineteenth century; Sir Joshua Reynolds for Art, and the eighteenth; Sir Isaac Newton for Science, and the seventeenth; while Shakspeare for the sixteenth century may be said to reflect Humanity *in toto*. Above these "animated busts" a carved scroll supported by griffins carries these words of John Milton's "Areopagitica":—"A good booke is the pretious life-blood of a master spirit, embalm'd and treasur'd up on purpose to a life beyond a life."

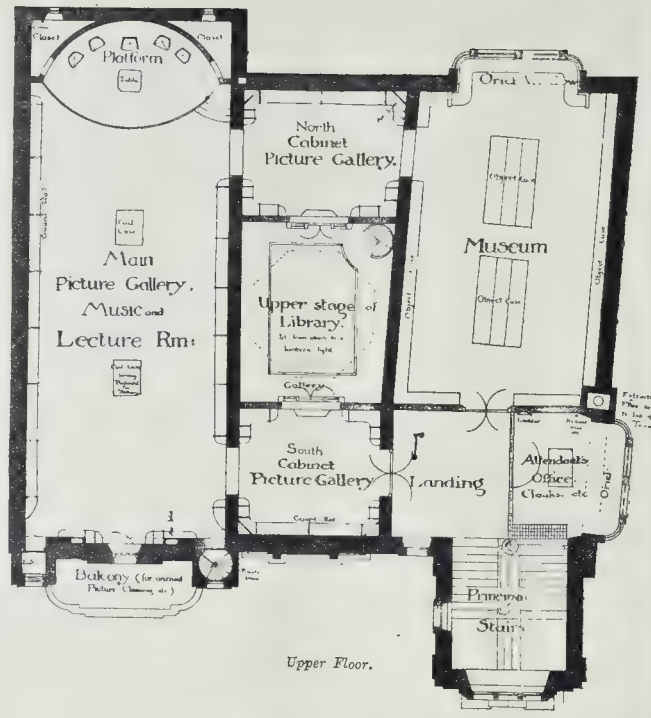
Internally the building consists of three floors, the central one elevated some 9 ft. above the street. On this floor the various reading-rooms, &c., are located; the floor beneath it contains the School of Art, &c., and that above the museum, picture galleries, &c.

The first floor is lighted by clearstories, or vertical lights on each side, with a solid ceiling intervening between them: the effect of which is certainly comfort and substantiality,—to be infinitely preferred to the flat glass shed roofs now so largely adopted in picture galleries. The height of the large rooms is 33 ft., and this enables the glazing to be kept high enough from the floor to prevent any possibility of "glitter" from refracted light upon the pictures. The gas-lighting, which is by continuous jets, is similarly arranged; and in such a way that it lights the gallery by night at about the same angle as the day-light enters.

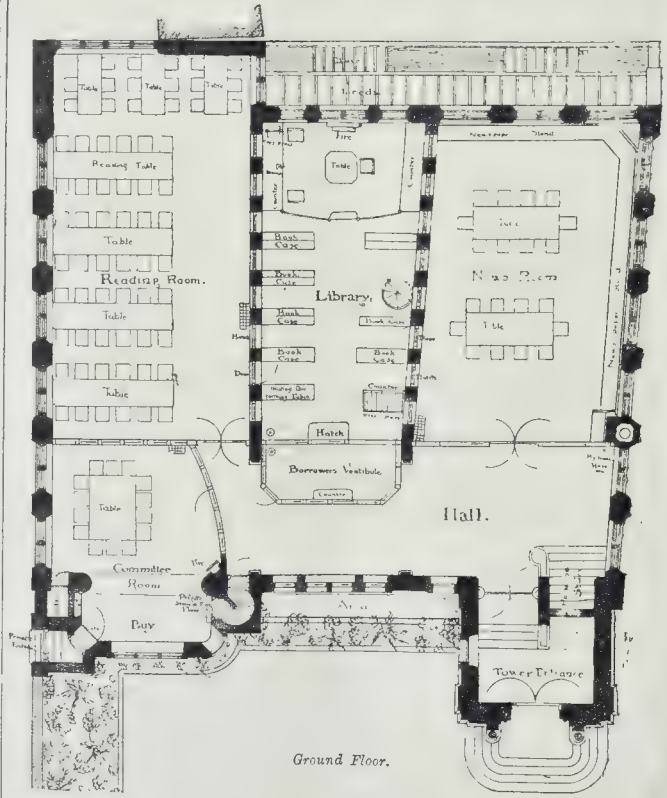
Every precaution has been taken against fire. The floors throughout are of iron and concrete, paved solidly with thick wooden blocks, laid parquet-wise in bitumen; and on each floor are hydrants with leather buckets and branch pipes and hose, slung on rings and chains, ready for immediate connexion.

The ventilation has had special attention. Fresh air supplies abound; and the over-heated and vitiated air is drawn off from each room at a high level, and conducted by shafts to a large flue in which the air is artificially rarefied. This flue discharges from the louvred lantern at the top of the tower. The warming throughout is by the low-pressure system of hot water, by which a constant and genial heat is secured, and the deterioration of the atmosphere attendant on so many other methods is avoided.

The School of Art comprises an elementary school, 25 ft. by 37 ft.; an advanced room, 20 ft. by 32 ft.; and an antique and life room, 25 ft. by 25 ft., with head-master's office and




*Upper Floor.*



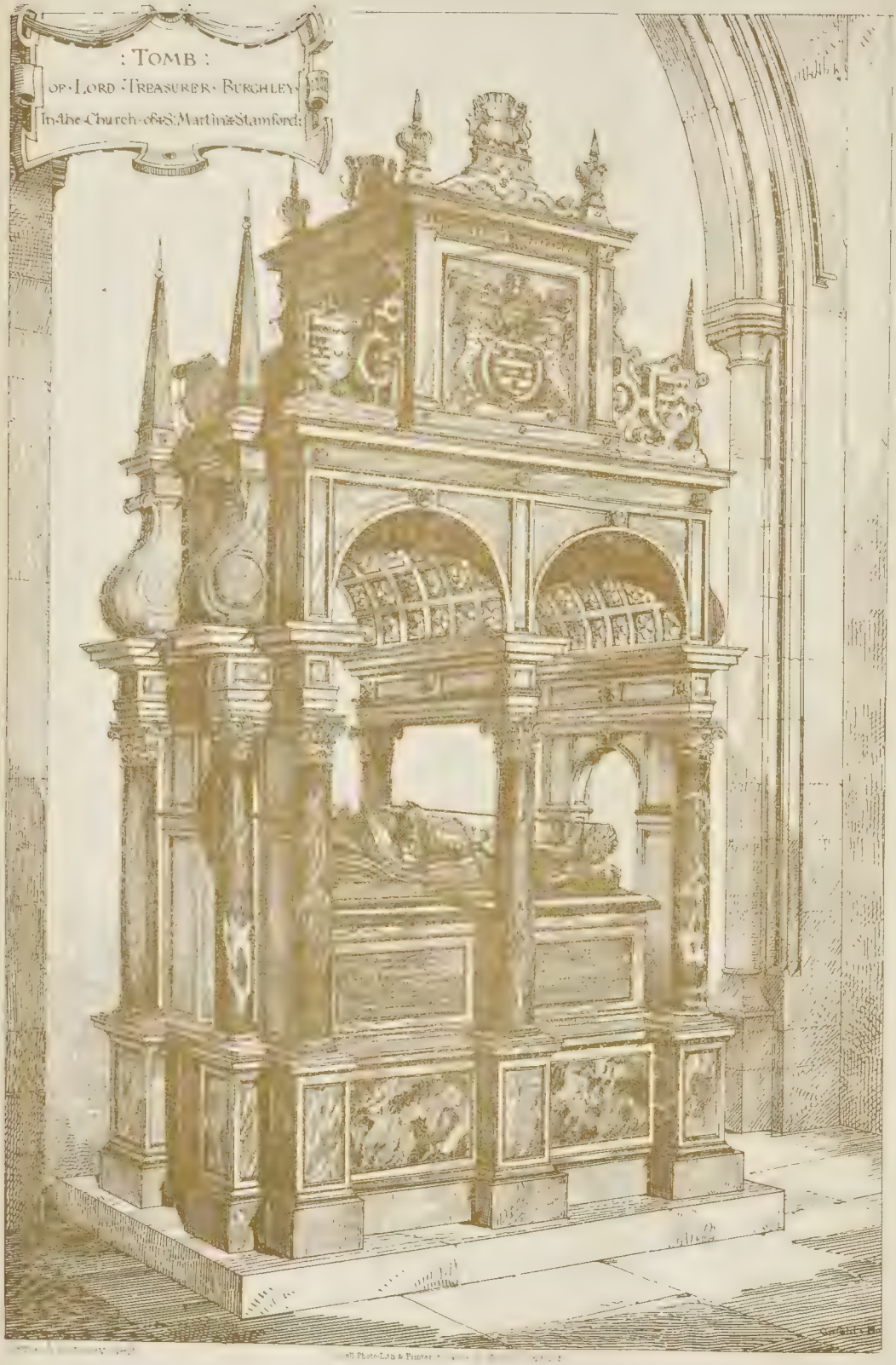

*Ground Floor.*

THE NICHOLSON INSTITUTE, LEEK.—*Plans.*





: TOMB :
OF · LORD · TREASURER · BURGHLEY
In the Church of S. Martin at Stamford

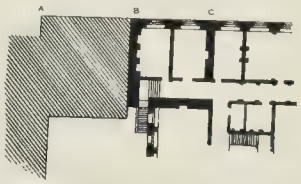


DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

GROUND PLAN.

BY MESSRS. MAXWELL & TUKE.



*Alternative Plan, showing Line of Frontage of Horse Guards Corner, if kept to stipulated boundary.*


REG STRARS
CLERKS
WAITING
LAVATORY
CHIEF ENTRANCE
MEDICAL
ADMIRALTY GLASS COVERED CARRIAGE COURT
WAR OFFICE GLASS COVERED COURT
CONTRACTS
GREAT QUADRANGLE
WAR OFFICE GLASS COVERED COURT
HORSE GUARDS
BOARD ROOM
STAFF OFFICER
OPEN COURT
LAVATORY
MESS ROOM
WAITING
CLERKS
BOARD ROOM
CLERK OF WORKS
CLERKS
CHIEF CLERK
CLERKS
CHIEF CLERK
CLERKS
CLERKS
CLERKS



DESIGN FOR NEW ADM

By Messrs.

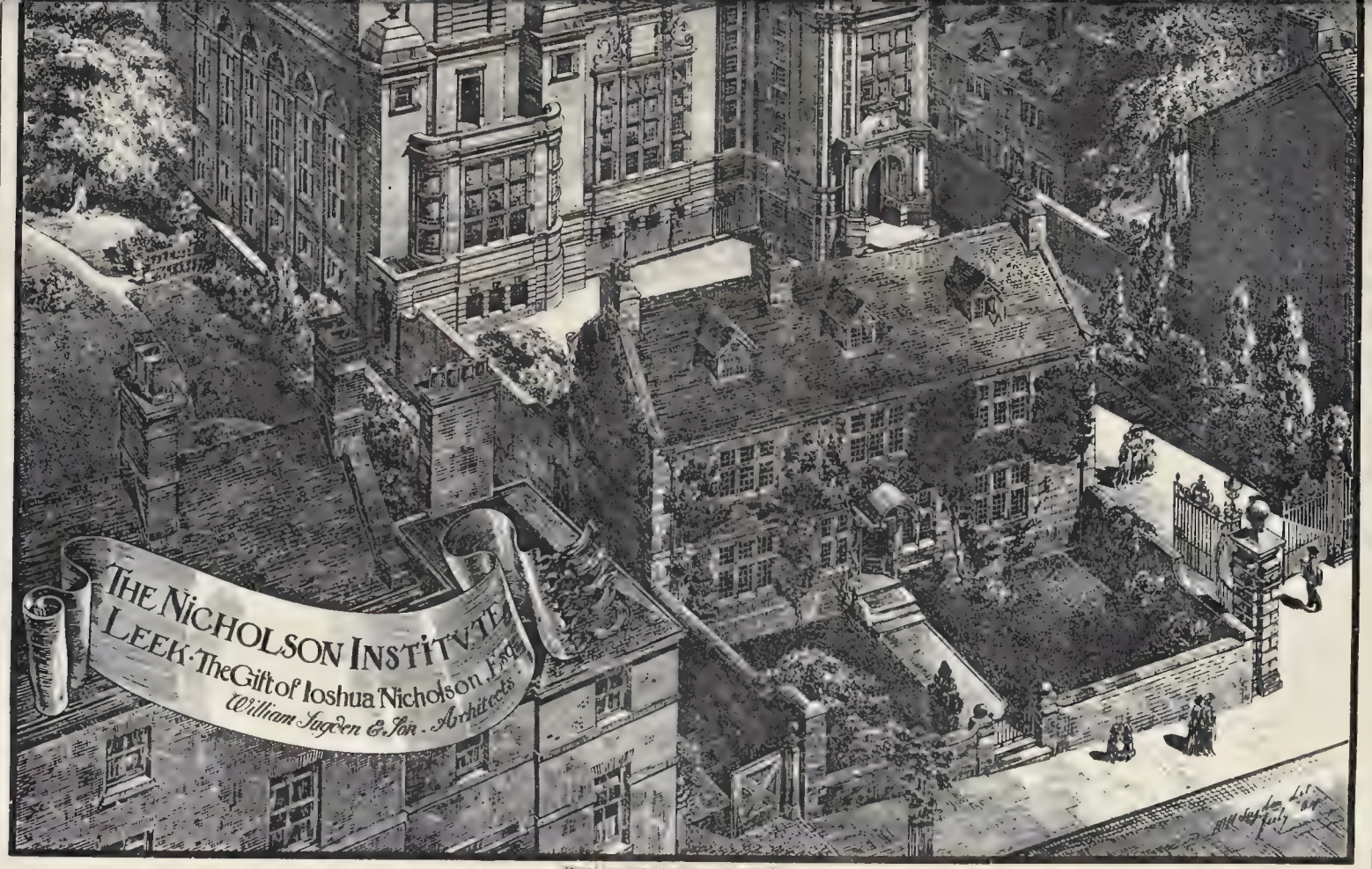


TY AND WAR OFFICES.

L & Juke.

4.



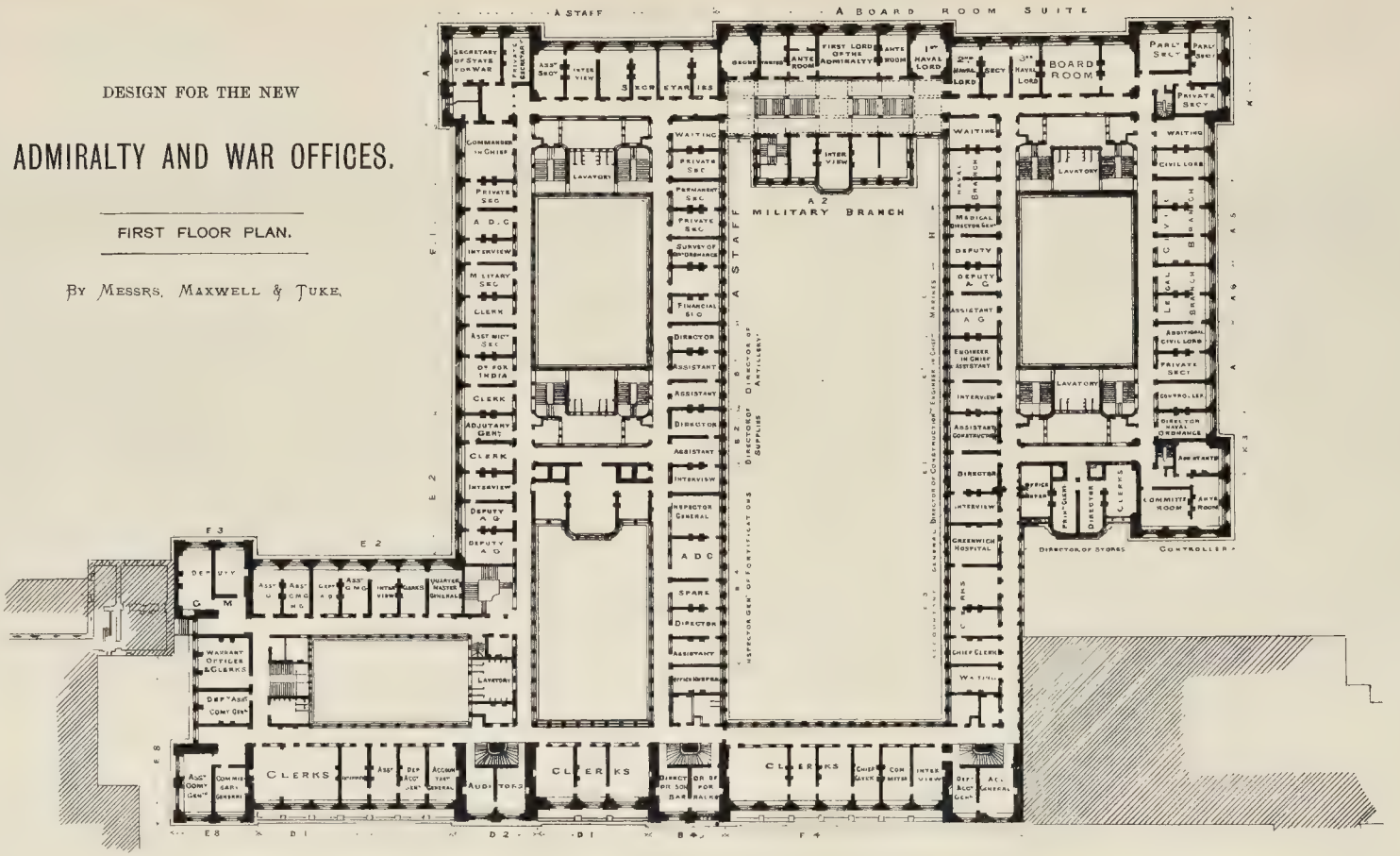

THE NICHOLSON INSTITUTE
LEEK · The Gift of Joshua Nicholson Esq
William Sugden & Son · Architects

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

## FIRST FLOOR PLAN.

By Messrs. Maxwell & Tuke.




Wyman & Sons, Photo-Litho

C. Queen St. London W.C.



Vitre. Rue Poterie



Old house
Male
Sanitary arrangements.



Dol.



Dinan House near River

C. E. Kell Photo Lith & Printed

Published at 46 Holborn London E.C.

SKETCHES BY A DISTRICT SURVEYOR. No I.

stores, entrance vestibule, male and female cloak-rooms and lavatories, &c. These rooms have been very tastefully and completely furnished by the committee of the Leek School of Art, and are well appointed in valuable casts and copies from South Kensington, &c. The head-master is Mr. Joseph A. Kean, late head-master of the York School of Art. Sloping north lights are secured in the principal rooms, and at night ventilating sun-lights are used.

The whole of the works, including all details of decoration and furniture, have been carried out to the designs and under the superintendence of Messrs. William Sugden & Son, architects, Leek.

The following firms have been engaged upon the various branches of the work, viz.:—The builders, Messrs. H. & R. Inskip, Longton, whose assiduous foreman, Mr. Johnson, has very satisfactorily superintended the progress of the structure; Mr. Edwin Phillips, Leek, for the plumbing, painting, &c., and the duresco decorations of the interior; the heating, &c., by Messrs. Haden & Sons, Trowbridge; Mr. Roger Lowe, Farnworth, the iron and concrete and wood block flooring and waterproof concrete flats; the Gateshead Stained Glass Company the lead quarry glazing; Messrs. Minton, Hollins, & Co., Stoke-on-Trent, the tile floors; Messrs. Balfour & Co., Longton, the perforated tiles in coil cases; Mr. Millson, Manchester, the wood and stone carving and the sculptured medallions (the latter from models by Mr. Stephen Webb); Mr. Robert Hird, Shipley, the iron staging and spiral stairs of library,—the gun-metal patent casements and the guard rails in galleries; and Mr. Woodhead, Leek, other castings; Messrs. Elgood Bros., Leicester, the wrought-iron entrance-gates, and all the bronze door-handles and metal fittings throughout, except such as were provided by Messrs. D. Cartwright & Son, Leek; Messrs. T. Brawn & Co., Birmingham, the wrought-iron and other gasfittings; Messrs. Young & Glover, Wolverhampton, the locks, &c.; Messrs. W. Tonks & Son, Birmingham, the patent book-shelf fittings; Messrs. Braby, Liverpool, the copper covering of tower dome; Mr. Blackburn, Nottingham, the lightning conductor; Mr. Hindshaw, Manchester, plaster modelling; and Mr. John Shaw, Bowdon, the planting of quadrangle and approach. The furniture of the Institute was supplied by Messrs. Inskip, Longton; Messrs. Kendal, Milne, & Co., Manchester; Mr. A. Overfield, Leek; and Messrs. Eckstein, Birmingham; that of the School of Art by Messrs. Mackrell, Nixons, & P. Tomkinson, builders, of Leek.

The whole outlay in connexion with the undertaking has been generously borne by Mr. Joshua Nicholson, a silk manufacturer, of Leek, and a citizen for many years prominent in every local or general movement for the popular good.

## DESIGN FOR ADMIRALTY AND WAR OFFICES.

BY MESSRS. MAXWELL AND TUKE.

We give this week the Whitehall front and, as in other cases, the two principal plans, of Messrs. Maxwell & Tuke's design as submitted in the second competition. Of the plan we have already observed that it is in some respects one of the best, if the normal objection to a not very wide closed quadrangle be put on one side; the rooms are well grouped in reference to their respective uses, and the traffic lines of the plan reduced to the greatest simplicity. There is, however, the defect which it shares with some others of the plans which are otherwise praiseworthy, viz., the employment of long and narrow rooms with one not over large window at the end. At some times of the year in London such an arrangement would practically render one half of the room useless for work except by artificial light. The design we cannot care for much: the spirit of Manchester seems very predominant in it, and this is the more emphasised by comparison with the Horse Guards building, to which the new building disdains to accommodate itself in any way. The following extracts from the architects' Report may assist in rendering clear their intentions:—

"We desire to call attention to the disposition of the central quadrangle with its three surrounding glass-covered courts, its open court near to the Horse Guards, and the four spacious courts lighting the secretaries' messengers' rooms and cross corridors.

The quadrangle is 280 ft. long and 113 ft. wide, and bountifully lights most important offices on three sides and a corridor on the fourth side, and by means of areas 15 ft. wide it renders the basement offices on both sides as valuable as if on the ground level.

The chief approach to the quadrangle is by three broad archways from Whitehall; the central one being for carriages and the sides for pedestrians. The total width of this entrance is 43 ft.

The second entrance to the quadrangle is from Spring-gardens after passing through the Admiralty Court. The width of the carriage entrance in Spring-gardens is 3 ft. wider than the central entrance to the quadrangle of the new Government Offices in Charles-street.

It will be observed that five principal entrances to the Admiralty and War Offices open into the quadrangle, that under the *loggia* to the west being the principal entrance for the chiefs of the staff on the War Office side as well as for the Lords of the Admiralty. The two entrances on each side of the quadrangle give direct access to important sections of the War Office and Admiralty.

The glass-covered court upon the Admiralty side is in reality a spacious hall, 90 ft. by 60 ft., in addition to the arcade on two sides on the ground-floor, and the surrounding corridors on the upper floors. There are four entrances to the Admiralty from this court, leading at once to the feet of the four principal staircases, and it will be observed that no office of any importance opens directly into the open court, but that all the office doors open from the corridors.

It will be seen that this system of lighting gives splendid results, not only to the corridors, but also to the adjacent offices, which will thus be as well lighted at the rear as on the window side.

The two covered courts to the War Office are intended really to be entrance-halls, and, there being no carriageway traversing them, will be much warmer than the Admiralty court. For this reason we have not thought it necessary to isolate the offices on the ground-floor by means of corridors.

The court near the Horse Guards is open down to the basement-floor, and forms here a sort of house-yard for the dwellings surrounding it. There are cloisters on two sides, and an approach out of the Horse Guards Parade.

It will be seen that, with the exception of the messengers' lobbies, not a single office obtains its light from the covered courts. These are devoted solely to the illumination of the corridors, messengers' lobbies, waiting-rooms, committee-rooms, libraries, lavatories, and stairs.

The eastern end of the great quadrangle is devoted, on the upper floors, to the lighting of the corridors, but with this exception the whole of the quadrangle, Whitehall, St. James's Park, Horse Guards, and Spring-gardens fronts are devoted to offices, and no portion of these valuable frontages is wasted upon water-closets, staircases, or other secondary purposes.

Whilst referring to this portion of the site we had better explain the leading idea dictating our arrangement of the pavilions flanking the Horse Guards Parade:—We observe in the block plan supplied to us certain dotted red lines indicating proposed new buildings on the south side of the Horse Guards Parade arranged in such a way as to form a noble square, of which the old Horse Guards would be the centre. In designing the Park and Parade fronts we have, therefore, assumed that the features of our design, if successful, would be repeated on the opposite side of the square, and this consideration has determined the position and design of the massive sentinel-like pavilion at the south-west, or Secretary of State corner, as well as the two slighter pavilions commanding the Horse Guards, which will form so conspicuous a feature in driving up Whitehall.

The style of architecture appears to have been dictated to us by the existing new buildings in the immediate locality, as also by Messrs. Inigo Jones's beautiful hotel in Whitehall.* (!!) It appears to us that any building not in perfect accord with these examples would destroy the unity of the grouping which we have studied to maintain."

*Key to References on Plans.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
B 1. Director of Artillery.
B 2. ,, Supplies.
B 3. ,, Contracts.
B 4. Inspector-General of Fortifications.

* So in the copy of the report furnished to us by the architects.

C. Central (or Secretary of State's) Department.
C 1. ,, ,, ,,
C 2. ,, ,, ,,
C 3. ,, ,, ,,
C 4. ,, ,, ,,
D. Finance Department.
D 1. Finance Department.
D 2. Auditors.
E. Military Department.
E 1. Military Secretary.
E 2. Adjutant-General and Quartermaster-General.
E 3. Intelligence Department.
E 4. Deputy Adjutant-General R.A.
E 5. Deputy Adjutant-General R.E.
E 6. Army Medical Department.
E 7. Military Education Department.
E 8. Commissary-General's Department.
E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
F 1. Army Purchase Commission.
F 2. Judge Advocate General.
F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
F 4. Pay Office. Army Hospital Corps.
F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
A 1. Board-room Suite.
A 2. Military Branch.
A 3. Intelligence Branch.
A 4. Naval Branch.
A 5. Civil Branch.
A 6. Legal Branch.
A 7. Registry Branch.
A 8. Record Office Branch.
A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
E 1. Director of Naval Construction.
E 2. Engineer-in-Chief.
E 3. Director of Naval Ordnance.
E 4. Store Branch.
E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
F 1. First Division.
F 2. Second Division.
F 3. Third Division.
F 4. Fourth Division.
F 5. Fifth Division.
F 6. Sixth Division.
F 7. Greenwich Hospital Division.
F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

## TOMB OF LORD TREASURER BURGHLEY, IN ST. MARTIN'S CHURCH, STAMFORD.

The tomb stands on the north side of the chancel, and is a fine specimen of late sixteenth-century work. The recumbent figure of the Lord Treasurer is in alabaster, and represents him in rich armour, and bareheaded; decorated with the insignia of the Garter, and holding the wand of office.

The different marbles in now faded colouring combine to enhance the effect of the whole. The drawing, which was in the last Academy exhibition, is by Mr. G. C. Horsley.

## SKETCHES BY A DISTRICT SURVEYOR.

I.

*Vitré.*—The strangest and most bizarre of all the old streets are the Rue Poterie and the Rue Bondrairie. A confused mass of projecting wooden houses with penthouse roofs covered with thick slates, the ground floor being occupied by porches with a sort of square pillars supporting superstructures and forming covered galleries, into which open miserable shops. In some cases the buildings are ornamented by statuettes or sculpture.

*Dol.*—This and some other sketches which will appear are intended to assist the register of quaint buildings in this old town, which are from time to time being swept away under pretext of embellishment.

In the chief street are many old houses which preserve its Mediæval physiognomy the moulded woodwork of which, and variety of columnar design, will repay the trouble of noting. The example chosen has some such columns which support the superstructure, and form a public covered way.

*Dinan.*—The old house at Dinan, by the side of the river, was, in its day, probably of some importance, and its moulded woodwork, so characteristic of Brittany, may be studied with advantage. In the interior of the town are many streets which have conserved their original features, and on several of the buildings are figures of saints, mythological and grotesque subjects.

*St. Malo.*—The sketch of part of old house at St. Malo was made to exhibit the abominable arrangements of the place for disposing of house

refuse of every kind. Outside the window of each story (the house being let out in tenements) is fixed a receiver, syphoned after a fashion, and connected with a vertical stack of badly-jointed earthenware pipes.

## THE ARCHITECTURAL ASSOCIATION

### *CONVERSAZIONE.*

The opening *conversazione* of the Architectural Association was held on Friday, the 10th inst., in the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly. There was a large attendance of members and their friends, but the crush was not so great as on the last occasion, for, as Mr. Cole Adams, the President, explained at the outset of his address, the Committee had, owing to the growth of the Association (which now numbers 995 members), been compelled to limit the number of invitations sent out to other than members of the Association. There was, as usual, a good display of drawings in illustration of the work done in the classes in competition for the various prizes; and there were numerous exhibits of "art-furniture," upholstery, decoration, paperhangings, &c. Mr. Alfred Newman had on exhibition some good modern ironwork, as well as an interesting collection of old Flemish and German specimens.

The greater number of the company having taken their seats in the Prince's Hall (which was very draughty and chilly, by the way), the President, Mr. Cole A. Adams, proceeded to distribute the prizes. The following is the Prize List:—

*A. A Travelling Studentship.*—Studentship and Medal taken by Mr. G. J. Oakeshott. Second prize, value 5*l.*, taken by Mr. G. G. Woodward. Honourable Mention made of Messrs. W. H. Bidlake, G. G. Wallace, and E. H. Selby.

*Association Medal.*—Taken by Mr. Arthur Sykes.

*Class of Design.*—First prize, value 3*l.* 3s., taken by Mr. C. C. Bradley. Second prize, value 2*l.* 2s., taken by Mr. F. S. Granger. Honourable Mention made of Mr. W. Dowes.

*Elementary Class of Design.*—First prize, value 2*l.* 2s., taken by Mr. F. M. Day. Second prize, value 1*l.* 1s., taken by Mr. A. H. Hart. Honourable Mention made of Mr. Ferguson.

*Colour Decoration Class.*—First prize, value 3*l.* 3s., taken by Mr. A. W. Hennings.

*Architectural Book Prize.*—Not awarded.

*Class of Construction and Practice.* First prize, value 3*l.* 3s., taken by Mr. S. H. Seager. Second prize, value 2*l.* 2s., taken by Mr. Frank Massie. Third prize (presented by Class), value 1*l.* 1s., taken by Mr. H. P. B Downing.

*Class for Study of Planning and Specification Writing.*—First prize, value 3*l.* 3s., taken by Mr. Ernest A. W. Barnard. Second prize, value 2*l.* 2s., taken by Mr. M. Collins.

*Sketch Book Title-page Prize*, value 5*l.* 5s., taken by Mr. William A. Pite.

*Essays.*—First prize, value 5*l.* 5s., taken by Mr. F. P. Tucker. Second prize, value 3*l.* 3s., taken by Mr. Lionel Littlewood.

*Lectures on Construction.*—First prize, value 3*l.* 3s., taken by Mr. N. C. H. Nisbett. Second prize, value 2*l.* 2s., taken by Mr. Herbert S. Saunders. Third prize, value 1*l.* 1s., taken by Mr. J. W. Stonhold.

*Lectures on Architecture.*—First prize, value 3*l.* 3s., taken by Mr. G. T. McCombie. Second prize, value 2*l.* 2s., taken by Mr. H. Abraham. Third prize, value 1*l.* 1s., taken by Mr. Norman C. H. Nisbett.

The President then proceeded to deliver an address, in the course of which he said,—

It is one of the obligations of the office of president to deliver an address on the occasion of the annual *conversazione*, and one of the obligations you have entered into this evening by the attendance you have honoured us with is to listen to it. I see no escape for either of us. I will endeavour, however, to be as brief as possible, so as not to weary, and you, on your part, will kindly extend to me your patience for a short time, before adjourning to lighter and more congenial amusement. You have just witnessed a ceremony which, I hope, has interested you; the rewards of merit have been made more valuable to the gainers of them by your generous applause, and that touch of sympathy which every one values. The ceremony of bestowing the prizes has been a very short one, but it has taken a year's work to win them. On the walls of the gallery above you will see something of the labour involved, and I hope you will not leave this evening without at least a glance at them. You will see how much labour it takes to win distinction, and obtain some idea of the study required to make an architect. What you will there see is but a fraction of what is necessary for that purpose. The Architectural Association was established several years ago for the object of mutual improvement and instruction in the art of architecture, and upon a voluntary basis. The senior members impart instruction to the juniors, who, in their turn, become teachers. We have lectures, classes, discussions, and exhibitions, for the study of design and construction, and in our ranks are all sorts and conditions of men, who go to make up the profession. Among these are those who are in practice, but who retain their names on the list of members from the affection they bear to the society which has aided them in their work, and their desire to keep touch with those who yearly join it, and many remain in the ranks to render help in the work carried on. Others, and a large proportion, are in offices as assistants, anxious to avail themselves of the instruction to be obtained at a very small cost; and lastly, we have yearly drafts of young men who are serving their articles, and have just entered on the duties of the profession they have selected. The advantage of this chain of connexion from the first link in the professional chain to the last is obvious, and helps the creation of an *esprit de corps* and kindly sympathy which is most advantageous. We claim that the Architectural Association is a unique body, doing valuable service to the public and to the profession, breaking down the barriers of little jealousies, and forming that union which is strength. . . . . To those who have given any attention to the study of architecture, the progress that has been made of late years must be apparent. A glance only at the exhibits in the galleries upstairs so kindly and generously lent to us for this evening, and contributing so largely to the enjoyment of it, will go a long way to prove this assertion. These exhibits, it is true, are only accessories to architecture, but they are the outcome of the improvement which has taken place of late years. Many of the objects on view are designed by architects in practice who are members of this Association, and all the exhibits will repay your careful examination. It is too much the fashion to sneer at modern architecture and those who practise it; but let any one whose eyes are not hopelessly blind examine with care and attention the buildings, both ecclesiastical and civil, which have been erected during the last quarter of a century, and one may go farther back than that. The Gothic revival has produced men who have covered the land with churches and buildings, many of which are masterpieces of design, and which I venture to think, future generations will do greater justice to, and treasure them as precious legacies. The works that will live are the creations of minds which have devoted their lives to the study of their art, men who have unceasingly toiled to learn their craft, and who have ransacked the treasures of the past with an absorbing love for the work, which is above praise. There are very few old buildings in this country, or on the Continent, that have not been visited, and careful drawings made of such parts which would serve for study and be useful in practice. That the result of this should be a too close resemblance to ancient architecture, justifying the charge of forgery in many cases, is natural, but in the works of the best masters and by their works progress in modern architecture should be judged. You will always find originality and a distinct adaptation of forms to modern usages, and any one well acquainted with old work will at once distinguish and appreciate the merits of the modern. The old Gothic architects were just as much copyists as the modern ones, or else how is it that the same plans, the same features, the same forms, and the same mouldings may be traced in buildings, from one end of the country to the other, and in far less variety than you see now in modern work.* The great advantage the old builders possessed over ourselves was that they were happy in living in an age when they could practice their art in one style, and so bring it to greater perfection. Changes came very slowly to them, and men were left more to the quiet contemplation and development of their art, and to practice it free from the competition, rush, whirl, and excitement that attend upon us moderns. So much of the charm of old work lies in its antiquity and in the sentiment that surrounds it. Time is a skilful artist, and with loving hands colours the walls and roofs, gently tones down the interior, darkens the woodwork, knocks off sharp edges, softens and refines any crude contrasts, and produces generally that charming *ensemble* we call picturesque. There are many old buildings which, if the magic wand could pass over them and change to what they were when the builders left them, would be passed by as unworthy of notice. Do not think for one moment I am drawing comparisons to the disadvantage of the past; far from that is my intention; but I plead for a fairer and more honest examination and judgment upon the work of the present, and for greater discrimination. I do not assert that the Gothic revival has produced work so grand and noble as the source from which it has sprung; the wonder is that such progress towards perfection has been made amidst difficulties which only those who adopt our profession can have any distinct knowledge of. What has been done in time past it is possible the world may see again, and with the progress that has undoubtedly been made of late years is it too Utopian to hope that buildings shall yet arise which shall be a delight and wonder to coming generations? The hope of modern architecture rests much with the public. It is sad to the enthusiast to find how people, as a rule, care little for architecture at all, and yet how lavish many are in expressing their opinion about it. The facilities for travelling afford opportunities for visiting edifices which are the admiration of the world; but they are not studied by the mass; hasty judgments are formed, and opinions expressed, borrowed from writers good, bad, and indifferent. Such people fail to see the lesson taught by what they have visited, and to analyse the reasons for their likes and dislikes. Education is making rapid strikes in every branch, and, may be, in time a more intelligent reasoning will take the place of the indifference to the study of architecture which characterises us a nation. Should that time come, when architecture shall be studied with delight, then the sure outcome of this will be a revival which shall eclipse all our previous efforts. If, as the wheel of time goes round, men will turn to the study of architecture, they will become more critical in their judgment, and demand a higher standard of design and workmanship than they do at present. They will seek out for employment only those architects who are architects in deed as well as in name. In time, perhaps, a diploma will be granted to architects who are able to satisfy the examiners that they are men skilled in the art. Such a course would be a guarantee to the public, and shut out men who have no sort of right to be trading on the ignorance of their employers. A step in this direction has quite recently been taken, and no man can now become an Associate of the Royal Institute of British Architects without passing an examination: make it compulsory that no man shall practise without this test, and improvement will take place. Such a step might not produce all the results hoped for from the artistic side; that difficulty must one day be met by a college of architecture presided over by distinguished professors; but from the practical side great good would follow. Buildings would be erected that would be better in construction and planning, and in that most important condition, better in their sanitary arrangements. With the responsibility which a legal status would give, some obstacles would be raised up against speculative building which, as at present practised, is such an absolute disgrace in too many instances to the architecture, if it may be called so, of this country. As long as the public are content with the present state of things, there is no remedy possible, but in all fairness they should be discriminating in their censure of architects and their work, and not judge the architecture of their time from the houses most people are compelled to inhabit, which are, for the most part, the creations of men absolutely ignorant of design and plan. Let a taste for architecture be cultivated, then a demand will arise for good and intelligent design, and there is the material always at hand to meet the supply.

* Does Mr. Adams seriously mean to say that he does not perceive the enormous and radical distinction in principle between the two kinds of "copying" to which he refers?

**Clocks.**—The church at Great Houghton, Northampton, has just been enriched by having a large new clock fixed in the tower, which strikes the hours on a large bell, and shows time on two dials, each 4 ft. diameter. Messrs. John Smith & Sons, Midland Clock Works, Derby, have carried out the work. They have also erected the large new clock at Wootton Church, near Bedford. It strikes the hours on a large bell, chimes the ding-dong quarters, and shows time on a copper dial 5 ft. in diameter. It is fitted with all the latest improvements.

## THE VENTILATION OF PRINTING OFFICES.

The necessity for the efficient ventilation of printing-offices must be apparent to many who have had occasion to frequent them, if not always to those who own them or work in them. No doubt the difficulties in the way of providing ventilation, without objectionable draughts, are great, especially in some of the older offices, although in some new buildings of the kind the means of ventilation are either inadequate or inconveniently primitive. As everybody knows, the production of a newspaper entails much nightwork, and, in the composing-rooms especially, a good light is essential. Hence the plentiful, not to say profuse, use of gas, and the consequent rapid vitiation of the air. Much improvement in this direction may be hoped for from the use of the electric light, but we believe it to be a fact that the lighting of composing-rooms by electricity has not yet proved altogether successful where it has been tried. However, whether gas or electricity be the illuminant of the future for printing-offices, ventilation will always be needed to remove the products of respiration thrown off by the large number of compositors and other workmen, and to bring in fresh air, warmed when necessary. In this connexion we are glad to be able to call attention to the fact that, with laudable consideration for the health of their *employés*, the proprietors of the *Daily Telegraph* have just had their composing-room ventilated by means which appear to be eminently successful, viz., by the Æolus water-spray ventilator, which appears to have been successfully used for ventilating the Life School of the Royal Academy, and many other public buildings. In the composing-room of the *Daily Telegraph*, 170 compositors work throughout a great part of the night, and seventy Argand burners light the "cases." Under the advice and direction of Messrs. Arding, Bond, & Buzzard, the proprietors have put a new and lofty roof, which is covered by a lantern along its whole length, the windows on both sides of the lantern opening in two divisions by lever bars at each end of the room. This provides an ample outlet for the vitiated air in summer time, or in calm moderate weather, when open windows are unobjectionable. Fresh purified air, either cold or warm as may be required, is driven in by a 16-in. Æolus Waterspray Ventilator fixed in the basement. The fresh air is delivered into the room by a series of fourteen 3-in. tubes, rising 5 ft. from the floor, and each, as shown by tests with the anemometer, capable of sending 630 cubic feet of air per minute into the room, without draught. In warm weather the cool fresh air is used to keep down the temperature to an agreeable point, while in winter the fresh air can be raised in a few minutes to a temperature of 100° by simply lighting the gas-burners around the tubes through which the fresh air passes. A continual supply of fresh air, equal to five times the cubical contents of the room, is thus afforded every hour, and of a temperature adapted to the sensitiveness of men engaged in sedentary occupations. Returning to the subject of extraction, when the weather is such as to render open windows undesirable (and in this climate of ours such an objection obtains for several months out of the year), the vitiated air is drawn off by two 16-in. Æolus waterspray ventilators, which have their communication with the composing-room through two panels occupying the position of two of the side-lights of the lantern; these are continued by 16-in. galvanised shafts outside the roof, which enter the composing-room again through the roof by the plate and descend through all the floors into the basement. In each of the last 6 ft. lengths of these shafts a waterspray is fixed, and by simply turning the tap a powerful exhaust is immediately set up, dragging down the vitiated air from the composing-room into the basement. A continued change of atmosphere is thus ensured for the composing-room, although doors and windows be tightly closed. Another peculiarity in this application of the waterspray as an exhaust is the fact of the upper part of the shaft, falling down the slope of the roof, being exposed to the action of the cold atmosphere outside; this condenses the carbonic acid held in suspension in the heated air, which by its own gravity assists the downward current.

We understand that the new offices of the *Daily News*, now in course of erection in Bouverie-street, Fleet-street, and of which we lately gave some particulars, will also be ventilated by the Æolus Water Spray Ventilator.

## RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

211, Improvements in Exhaust Ventilators. George William Webb, Reading.

In this invention, a novel pattern of exhaust ventilator is made by fixing guards or plates in a peculiar manner at the angles or corners of a cowl. Perforated zinc or wire gauze is used instead of the ordinary louvre or shutter. The air rushing through the slits exhausts the vitiated air from the up-take pipe, and discharges it in the ordinary manner. The claim is really the arrangement of the shutters, which form four partitions around a central chamber.

1,533, Improvements in Metallic Sash Lifts. Charles Showell, Birmingham.

The improvement consists mainly in manufacturing metallic sash-lifts from sheet metal. It is principally adapted to such fixings as have a ring or loop in the centre, in which the finger is placed to lift or cover the sash. One piece of metal only is used, and from a T-shaped blank worked in a press or stamp, a loop of the ordinary pattern is made.

9,018, Improvements in the Manufacture of Fireproof Blocks or Slabs for Preventing the Transmission or Radiation of Heat. C. Toope, London.

This invention relates to the manufacture of hard coherent fireproof blocks or slabs from silicate cotton, asbestos fibre, and a solution of silicate of soda and pipe-clay. The fireproof blocks or slabs, when made of the proper shape, are especially adapted for protecting the joists of buildings; but they may also be used for covering steam-boilers, fireproofing wooden structures, and preventing the radiation and transmission of heat generally. The blocks or slabs may be composed of either the silicate cotton or asbestos fibre alone, in conjunction with the silicate of soda and pipe-clay, or they may be composed of a mixture of silicate cotton and asbestos fibre in any suitable proportion in conjunction with the mineral ingredients already mentioned, the proportion in which they are employed depending in either case upon their quality. In manufacturing the blocks or slabs, 8 lb. of pipe-clay are mixed with about one gallon of silicate of soda, and then sufficient silicate cotton or asbestos fibre (or a mixture of the two) is added, to form a plastic mass. The whole is then thoroughly incorporated in a pug-mill or otherwise. Afterwards the material is rammed into moulds of the desired shape, and the blocks or slabs turned out are baked in ovens at a temperature of about 175 deg. Fahr. until they are thoroughly dry. The blocks or slabs may be coated with asbestos sheeting or asbestos paper to give them a smooth surface, and this may either be done after the blocks or slabs are produced in the operation of moulding. In the latter case sheets or strips of the asbestos sheeting of the proper shape are laid in the moulds before the introduction of the plastic mass of composition, which is then filled into the mould and adheres to the sheeting or paper. In the former case the sheeting or paper would be cemented to the blocks, &c., after they have been baked by a cement composed of pipe-clay and silicate of soda in suitable proportions.

APPLICATIONS FOR LETTERS PATENT.

*Oct.* 3.—13,119, F. Mason and J. Conqueror, Sunderland, Manufacture of Rolled Plate Glass.—13,124, G. W. Elliott, Liverpool, Improvements in Axes, Hammers, Spades, Shovels, and other Tools.—13,143, H. Taff and C. R. Mathews, London, Water-waste Preventers, especially applicable for Flushing and Disinfecting Water-closets.—13,147, R. Oakley, London, Ventilating and Warming Buildings.—13,148, W. H. Lindsay, London, Improvements in Bridges.—13,152, T. Parsons, London, Boring Apparatus.

*Oct.* 4.—13,160, J. Law, Balsall Heath, Portable Hall Lantern Frame.—13,164, R. H. Perks. Birmingham, Self-closing Waste-preventing Valve for Flushing Cisterns.—13,181, J. Rogers, London, Fire Partitions.—13,183, J. M. Stanley, London, Construction of Furnace, Boiler, and other Fireplaces.

*Oct.* 6.—13,125, J. Kretschmann, London, Water-closet Valves.—13,231, F. C. Hustler, London, Window-sash Fasteners.—13,237, J. W. Matteson, W. J. Chapman, and T. G. Matteson, London, Manufacture of Portland Cement.—13,238, R. Hunter, London, Improvements in Kitchen Ranges.—13,243, Sherwood & Co., London, Manufacture of Cathedral Glass.

*Oct.* 7.—H. J. Allison, London, Improvements in Brick Kilns.—13,270, R. Entwistle, London, Water-tap.—13,279, J. C. Hudson and T. Bayley, London, Improvements in Locks.—13,284, F. George, London, Connexions for Lead or other like Pipes.—13,302, W. R. Lake, London, Machines for Manufacturing Wood Screws.

*Oct.* 8.—13,314, W. Lester and W. R. Lester, Glasgow, Glazing Bars or Astragals.—13,325, G. Moore, Lewisham, Combined Self-acting and Hand-actions for Water-closets, Urinals, &c.—13,332, J. T. Green and J. Green, London, Latching Mechanism for Swing Doors and Gates.—13,335, G. Richards, London, Machine for Grinding Planer Knives or Cutters, and similar Edge-tools.—13,338, M. Sugar and L. Hidveghy, London, Apparatus for Stamping and Setting Stone Paving and other Blocks.—13,339, J. S. Bruce, Birmingham, Opening and Closing Ventilators.

*Oct.* 9.—13,350, J. W. Chalk Webb, Worcester, Kilns and Stoves.—13,355, W. Smith, Dublin, Waterproof Cement.—13,364, A. A. Joy, London, Sash-fastener.—13,375, J. A. R. Main, Glasgow, Iron or other Metallic Roofs.—13,377, J. Kemp and F. Fissi, London, Improvements in Earthenware Pipe Connexions.—13,379, A. Cuff, London, Improvements in Balconies.—13,380, J. J. Barclay, R. Allison, and J. Barclay, London, Kilns and Apparatus for Burning and Drying Bricks.—13,381, W. Wright, London, Mounting, Balancing, and Securing Window-sashes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,763, G. Macfarlane, London, Flushing Apparatus for Water-closets, Urinals, and Drains.—11,722, J. Hamilton, Derby, Wood Planing Machinery, and Cutters for same.—12,067, E. V. Bailey, Birmingham, Attaching Knobs to the Spindles of Locks and Latches.—12,368, J. Tottenham, London, Improvements in Hoists for Raising Materials for Buildings in course of erection.—12,499, G. H. Couch, London, Covering Roofs and other Parts of Buildings with Tiles.—12,589, E. Warburton and G. H. Warburton, Manchester, Planing and other Wood-working Machines.—12,619, J. H. Sams, London, Improvements in Mantel and Chimney Pieces.—12,765, W. Day, London, Kilns for Burning Bricks and other Articles.—12,780, W. J. Hinitt, Birmingham, Sewer-gas Interceptors for Drains.—12,875, W. J. Stokes, London, Improved Sash-fastener.—10,884, J. B. Fidler and T. B. Fidler, Wolverhampton, Lever Locks and Latches.—11,855, A. Lawrance, London, Decorating Glass.—11,931, W. Morrison, New Swindon, Chimney-tops.—12,356, C. Cowney, Birmingham, Improvements in Closets and Urinals.—12,625, W. H. Chubb, Birmingham, Lever Locks.—12,761, C. D. Douglas, London, Improvements in Locks and Latches, and securing Knobs and Handles to the Spindles thereof.—12,821, T. Robinson, Bristol, Water Meters.—12,880, G. Trice, London, Lock Protector.—12,881, J. Menzies, London, Appararus for Cutting and Sharpening Stone.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

15, J. A. Walter, Rainham, Kent, Improvement in Locks.—84, J. D. Tucker, Bromley, Sliding Window-sashes.—441, E. V. Bailey, Birmingham, Converting and Adjusting Door-knobs to their Spindles.—1,738, R. Stanley, Nuneaton, Manufacture of Terra-cotta and other Clay Goods.—2,474, A. Shepherd, Birmingham, Machinery for Painting the Laths of Venetian Blinds.—125, A. Clark, London, Hydraulic Lifts.—512, J. Dean, Oxford, Self-acting Open Fire Ranges.—1,553, R. Wright, Richmond, Preventing Smoke in the Combustion of Coal in Open Fireplaces.—2,524, G. C. Davies, London, Improvements in Inspection or Access Pipes for House-drains and Soil-pipes.—7,610, G. H. Chubb and H. W. Chubb, London, Improvements in Latch Locks.—10,596, Hans A. Hansen, Christiania, Improvements in Saw Sets.

## THE DECORATION OF ST. PAUL'S.

Sir,—I addressed a few lines to your readers on the subject of the decoration of the dome of St. Paul's shortly after Mr. Pullan's paper at the Institute.

And I then took occasion to draw attention to some of the methods of decorating domes which had their internal concave finished as a smooth surface, and not constructed with deep coffers,—the majority of cases being treated as if there were no dome at all, but a vision of the heavenly host intervening; its very existence was a thing of the imagination only. And, further, I asserted that if it was desired to retain the form of the dome as an opaque concave roof covering, this could only be done by rejecting the impossible architectural forms introduced into Thornhill's paintings; for, though their incongruity might not be painfully apparent while executed in sepia only, when done in bright colours it would be absolutely unbearable.

I felt I was but repeating a generally accepted truism, but to my surprise Mr. Seddon and Mr. Cave hold a different opinion; and I am constrained to repeat my own. Sir James Thornhill depicted what Sir Christopher Wren declined to construct; that is to say, he represented the inner dome pierced with a series of lofty arches, through which the observer is supposed to see a tableau illustrative of the life of St. Paul, painted on the walls of the intermediate cone which sustains the lofty stone

lantern surmounted with the gilded ball and cross.

Now, it cannot be questioned that the continuation of a great picture round the lower half of the dome was a fine idea, and one surpassing all others from a pictorial point of view. But the obvious falseness of the architectural environment was unworthy of a palace of truth, and is objectionable to the taste of an age wherein the real is daily becoming more popular than the unreal.

Moreover, it would be shirking the problem and confessing our failure to compass it. While to assert that the nineteenth century can do no better than the seventeenth, and that, therefore, we should be content to sit at the feet of Sir Christopher (whose opportunities of study were comparatively limited), and be afraid to act upon the increased knowledge and artistic power of our time—to assert, I say, that this is what we are to learn from the example of the Renaissance architects, is a most singular conclusion to arrive at.

The Mediæval architects would have scorned to repeat in the fourteenth century the efforts of any preceding century; they trusted to themselves, and looked for inspiration from within or from above, to excel all that had been previously done, which is characteristic of true genius. But this was before the new birth of literature, when we were supposed to have gained all knowledge of good and evil; and straightway lost our power of independent action in the fine arts.

The late Mr. Stevens has, however, left behind him suggestions for the treatment of St. Paul's dome, which we may now see worked out in the rival designs exhibited on opposite sides of the dome itself,—both of which embrace his idea based on the fact that every plain section of a sphere is a circle. And this suggestion expressed Stevens's desire to preserve the representation of the true form of the great concavity. Mr. Stannus has carried forward Stevens's idea with the same object, and has knit together the circles by ribs, rising from the blocking over the unpierced piers of the peristyle. These ribs also express the form of the dome, and diminish proportionately as the circles diminish as they reach the summit of the cupola. Raised mouldings may be implanted on the ribs and the frames or stiles of the circular panels, provided always that their flat treatment is maintained, but no painted cornices or false construction is admissible.

The conditions of the problem have never been more nearly met, or more effectively and reasonably rendered, than by the design thought out by Mr. Stannus. Nevertheless, there is room for further study of the details and accessories, of the tone of the colouring, and the scale of the pictures, which can only be settled satisfactorily *in situ*.

It is imperatively required that whatever is designed shall be treated broadly, and be suited to the position it is to take in scale and colour. It is much more an architect's province than a painter's to determine the leading lines and framework of the composition, and to prescribe the limits and scale of the decorations and pictures.

The plain wall below the peristyle, or podium behind the gallery-railing, seems to call for more decidedly flat treatment, in warm secondary colour. The ornament in relief and in bright colours would be better replaced by a band of figures, like that surrounding the Albert Hall externally, with seated figures at the four points of the compass, their broad outlines being well seen from below, their low-toned details being appreciated from the gallery.

The blocking-course over the peristyle is too much cut up and too low, especially when compared with that over the main order below, from which spring the domical ribs of the eastern apse.

The angle at which the light strikes the upper part of the cupola causes the gold mosaic to look brightest there, and so brings down the centre and dwarfs the total height, and apparently flattening the apex of the dome. This will have to be overcome, but, for my own part, I would rather see the whole done in marble mosaic: this would lower and soften the whole tone of the decoration, and give distance and haziness.

But in all these points the accomplished architect of the cathedral, Mr. Penrose, will doubtless be eventually consulted, whatever is done.

Edwd. C. Robins.

Sir,—Mr. Clayton's special pleading must not divert us from the main object of the contention, and that is, to preserve Thornhill's admirable general arrangement from being overlaid and effaced by a scheme that will not bear critical analysis, and which, if carried out, would ruin the dome as an architectural feature. To carry out the complete decoration of St. Paul's, it may be admitted that Thornhill's monochromes cannot be retained intact. But when their utter annihilation is threatened, I say, no! We are bound upon principle, not only out of respect to the artist, and to the architect, but also in recognition of the general appropriateness of Thornhill's scheme, with some admissible alterations, to retain them. I never contemplated that process of effacement by overpainting, which so exercises Mr. Clayton's imagination: my proposal is to use Thornhill's works as *cartoons* for mosaic, just as it is proposed to use the experimental designs. Would Mr. Clayton consider the translation into mosaic of the work of Sir Frederick Leighton and Mr. Poynter, as the effacement and ruin of those eminent painters' designs? Would not the mosaics be virtually their designs still?

In so far as the preservation of early work is concerned, Mr. Clayton must very well know that, in the progress of sculpture in Greece and of painting in Italy from their infancy to their maturity, the earlier, imperfect works were, in the main, preserved, or we should have been in ignorance of the characteristics of that evolution. A few exceptions do but prove the rule. We moderns, too, are bound to cultivate a similar kind of reverence for the disproportions inevitable in the past, and of this virtue we should have expected to find Mr. Clayton an exemplary exponent.

W. Cave Thomas.

*October 10th*, 1884.

## "CROSIER" AND "PASTORAL STAFF."

Sir,—An editorial note to above relating to the curved summit of the Sacramenta-Häuslein at Nuremberg draws a distinction between an "archbishop's crosier" and a "bishop's pastoral staff." May I be permitted to say that this is an error? The archbishop's processional cross is quite distinct from his crosier. This latter, which belongs to him as bishop, not as primate, is nothing more than the crook or pastoral staff common to all his episcopal brethren.

This erroneous distinction, which is very prevalent, is based on false etymology. The connexion between "crosier" and "cross" is apparent only, not really, except so far that both words are ultimately derived from the same root. "Crozier," or "Crosier," is really synonymous with "crook," and is derived from the Celtic root, *krog*,—a hook, a bend, an angle,—from which also a considerable number of very familiar words descend, *e.g.*, crotchet, crochet, croquet, cricket, crutch, crouch, encroach, &c.

Edmund Venables.

*The Precentory, Lincoln.*

*** When the difference of opinion lies between two such learned authorities as Dean Hook, whose words were quoted in the note referred to, and the Precentor of Lincoln, the controversy must be approached with due deference to each. The latter, however, admits that "cross" is ultimately derived from the same root as "crosier"; in order, therefore, to avoid confusion amongst the many derivatives from "krog," there may be some convenience in distinguishing the pastoral office of a bishop by speaking of his "pastoral staff." The French have somewhat similar, but distinct, words for crook, crosier, and cross, namely, *croc*, *crosse*, and *croix*.

It would certainly seem that there was in Mediæval times a distinction between the archbishop's crozier and the bishop's pastoral staff. Dr. Lee, in his *Directorium Anglicanum*, describes the archbishop's crozier as a cross borne on a staff, the lower end of which is pointed (as in the pastoral staff). He goes on to say, however, that it is never carried by the archbishop himself, but by one of his chaplains. No authority is quoted for this negative assertion, whereas in MSS. of the thirteenth century we find drawings of archbishops who are represented as holding in their hands croziers exactly answering to Dr. Lee's description. This seems to prove the existence of a cross-headed staff peculiar to archbishops, and distinct from the pastoral staff as well as from the processional cross.

## EGHAM SCHOOL BOARD COMPETITION

Sir,—In response to the advertisement inserted in your issue of the 13th of September, I received applications from 103 architects and other persons desiring further information *re* new schools, in order to prepare designs. Of these applicants, forty-nine have forwarded complete sets of plans and specifications. As the larger portion of these have evidently been prepared at considerable cost, the Board consider that it will be only just towards the competitors that a corresponding amount of pains should be expended, and competent assistance sought in making a selection. This will, of course, involve some little delay in adjudication of premiums. Will you allow me, through the medium of your widely-circulated paper, to inform those gentlemen who have sent in designs that arrangements have been made for the plans to be exhibited in the large hall of the Egham Literary Institute, for the better examination of the designs by the Board, and that on the 24th and 25th of October, between the hours of ten a.m. and four p.m., the plans will be open, under certain restrictions, for the inspection of any ratepayer or other person interested in the education of the young. Should any of your readers, including the competitors, like to avail themselves of this privilege, I shall be pleased to hand them admission tickets to the hall on their communicating at once with me.

Benjamin Tice,
Hon. Clerk, Egham School Board.

## SEA-SAND FOR MORTAR.

Sir,—Will any of your readers be kind enough to inform me whether any objection exists to using sea-sand in mortar for house-building purposes? I am now building a house at the sea-side, and being under the impression that the mixing of sea-sand with the mortar tended to produce dampness in the walls in damp weather, I specially requested the architect to insist on the contractors using other than sea-sand with the mortar. The architect, however, does not share my prejudice against sea-sand, and assures me that it is not open to the objections above stated.

A reply from any one having experience on this question will greatly oblige. F. L.

*** Our correspondent does not state whether the architect compelled any process of washing or cleansing the sand from salt. It turns mainly on that. Mechanically, sea-sand is often one of the best sands that could be used for mortar, owing to its sharp and crystalline character; chemically, it is always hazardous at the best, owing to the difficulty of clearing it from salt, a very small percentage of which is sufficient to prevent the mortar setting properly, and to cause dampness and efflorescence on the walls.

## SCREW-DRIVERS.

Sir,—In the last number of your journal [p. 511, *ante*] I noticed an interesting description of a novel screw-driver.

The many years that screw-drivers have been in use I have never seen one that has been properly adapted to fit the modern screws; they either have a tendency to split the head of the screw, or to slip out of the saw-cut. The form that I have made for my use is one with the end rounded and more flat.

The groove in screws as now made is cut with a small circular saw; and I have found that a screw-driver made to fit the screws is all that can be desired. The screw-driver can be used at any angle with the screws, and will always bite, and is always inclined to keep in the centre of the cut.

W. R. Bousfield.

## LIQUID REFUSE.

Sir,—An injunction has been served upon a client, restraining him from turning liquid refuse from printing and dye works into the public sewers.

Can you, or any of your readers, suggest any method of clarification, or point out any examples of successful treatment in such cases? A. B.

**A Festive Gathering.**—On Monday evening last, Mr. James Forsyth, architectural sculptor, Finchley-road, gave a supper to the men in his employ, on the occasion of the majority of his eldest son, Mr. James Forsyth, jun. On the cloth being removed, Mr. Meadows, foreman of the wood department, rose and said he had a very pleasing duty to perform, which was to call upon Mr. Williams, foreman of the stone department, who acted as vice-chairman (Mr. Forsyth himself acting as chairman), to present to Mr. Forsyth, jun., on behalf of the men, as a token of the respect and esteem in which he was held by them, a handsome dressing-case. Mr. Forsyth, in acknowledgment, said he regarded the kindly feeling which had prompted the gift, not only as a great compliment to himself, but also to his father. A very pleasant evening was passed.

# The Student's Column.

## ON THE CONSTRUCTION OF FLOORS.

III.

THE *girders* of a *framed floor* have to carry the whole weight of the floor on one, two, three, or more points, according to the number of the binders framed into them, and the distance apart of the binders, as described in a former article, so that the load can hardly be said to be uniformly distributed along the beam. When the girders are placed 10 ft. apart the scantling may be found by the following rule, which will be found sufficiently near to suit all cases. Divide the cube of the length (in feet) by the breadth (in inches), and multiply the quotient by 6 for ordinary floors, and by 18 for those of warehouses, the result is the cube of the depth (in inches).

For example, if the length of bearing is 20 ft. we have the cube of 20 is 8,000, and if we assume the breadth to be 10 in., 8,000 divided by 10 is 800, which multiplied by 6 gives 4,800 as the cube of the depth, the cube root of which is nearly 17 in., the depth for ordinary floors; if multiplied by 18 we get 14,400 as the cube of the depth for warehouses, the cube root of which is nearly 24½. If the breadth is 12 in. then, by this rule, the cube of the depth is 4,000 for ordinary floors, of which the cube root is about 15⅞ the depth; for a warehouse floor the cube of the depth is 12,000, the cube root of which is about 22⅞ the depth required.

With a bearing of 30 ft. let the breadth be 15 in., the cube of 30 divided by 15 gives 1,800, which multiplied by 6 gives 10,800 as the cube of the depth, or 22⅛ in. for the depth of a girder for ordinary floors; and 32,400 as the cube of the depth for a warehouse, or 32 in. for the depth. In this case it would be almost impossible to obtain a solid beam of fir of the required depth, and a built-up one might be used of the pattern described in a former article and shown by fig. 6; or a trussed beam of less depth might be used of the description shown by fig. 5. (See p. 475, *ante*.)

Girders should be made to rest at their ends upon stone templates not less than 2 ft. long by the full thickness of the wall, on which they should bed at least 9 in., so as to distribute the load over as large a portion of the wall as possible. A space of 1 in. or 2 in. should be left round the ends to allow a free circulation of air and prevent dry rot.

With very long timber girders that have to carry a heavy load it is advisable to introduce a support in the middle, by which its strength is more than quadrupled, and a smaller depth of timber can be employed. The weight that a pillar placed at the centre will have to support may be taken as half the load which rests upon the girder, and the sectional area of a long square pillar may be found by the following rule:—Multiply the weight in tons by $\frac{2}{3}$ for fir, and by $\frac{10}{11}$ for oak; multiply the square-root of the product by the length in feet; the result is the sectional area of the pillar. For example, suppose a girder 30 ft. long has to support a load of 45 tons, and that half of this, or 22½ tons, is thrown upon a central pillar of oak, whose length is 12 ft.; 10-11ths of 22½ is 20·45, of which the square root is 4½, and this, multiplied by 12, gives 54 square inches for the sectional area, or nearly 7⅜ inches square. The girder ought not to rest immediately on the head of the pillar, as it is liable to be bruised thereby, and a 3-inch *template* of oak, about 2 ft. long by the width of the girder should be placed on the top of the pillar, which should also be tenoned into the template.

Timber girders may be greatly strengthened by the addition of a plate of iron in the following manner:—The beam is sawn down the middle and reversed, as described in the former article, and a thin plate of rolled iron, the exact depth and length of the beam, is placed between the two halves or *flitches* as they are called, and iron bolts are passed through the timber and iron, which has previously had holes drilled to receive them, so as to hold them all firmly together. This is termed a *flitch-girder*, and, if the flitches are each 5 inches thick and the iron ⅜ inch thick, the strength of the composite beam will be about double that of the timber without the iron plate. This arrangement enables us to reduce the depth of the girder while retaining the required strength, and the cube of the depth need only be half what it should be when there is no iron plate, for the same breadth and length. Thus we have just seen that for a length of 20 ft. and breadth of 10 in., the cube of the depth is 4,800, or the depth nearly 17 in.; but, with a ½-inch iron plate, the cube of the depth will be 2,400, or the depth 13½ inches, the proportions being as 4 to 5.

Where there is not sufficient depth to allow of a double-framed floor with timber girders, binders, and joists, the space can be economised by using rolled iron beams of I section, as G in fig. 7, in place of the timber girders, the ends

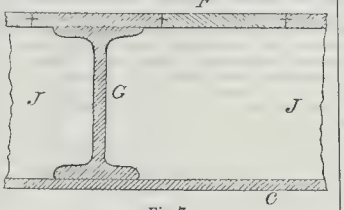



*Fig.* 7.

of which may be made to rest upon stone templates in the walls at intervals of 10 ft. or 12 ft.; the joists, J, are cut the same depth as the iron beams, and their ends fitted into the space between the flanges and resting on the lower flange, as shown in the figure. The floor, F, can be laid on the top of the joists in the usual manner, and the ceiling laths, C, nailed to their underside. For ordinary floors a rolled iron beam, 12 in. deep and 5 in. wide, weighing 42 lb. to the foot, will form a girder sufficiently strong to carry a floor over a span of 20 ft. For warehouse floors two such beams placed one on the top of the other and riveted at the flanges, as in fig. 8, should have



*Fig.* 8.

four times the strength of the single beam; the greatest strength of the girder is, however, in this arrangement placed at the middle of the depth where the strain is the least, so that there is a considerable waste of material which adds to the load without increasing the strength; and such a beam can hardly bear more than three times the load of the single beam. As, moreover, its depth of 24 in. might prove inconvenient, a better arrangement is to place the two beams side by side with a ½ in. plate 12 in. wide riveted on the top and bottom, as shown by fig. 9,

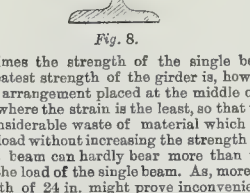


*Fig.* 9.

where the same strength is obtained with little more than half the depth; the greatest strength in this form of beam being placed at the top and bottom where the principal strains are exerted.

Instead of letting the joists rest upon the lower flange of the iron beam, as at J in fig. 7, it would be better to use binders rather less than the depth of the girder, and lay light joists across them to carry the floor and ceiling as shown in fig. 4 of the last article. This plan would require less timber, and the depth would be nearly the same.

Hitherto we have confined our attention to the use of timber in the construction of floors, since by far the larger number of dwelling-houses, as well as other buildings, have their floors made of that material. The use, however, of iron as a constructive material has of late years so greatly extended, that its application as a support for the floors of buildings claims a large share of our attention. The form in which iron is now most commonly employed for flooring purpose is that of the rolled joist of I section, as described in our last article, and shown in figs. 7, 8, and 9. These joists can be obtained in a great variety of sizes and weights, from 3 in. to 20 in. in depth, and weighing from a few pounds up to nearly 1 cwt. per foot of length. Joists of ⊥ pattern are also made, but these do not possess so much strength for the same weight of metal as those of I section, although in some cases they are more convenient to use.

The load in tons that can be safely distributed over the length of a rolled iron joist of I section, can be approximately calculated by the following rule, where the length between the supports is taken in feet, and all other dimensions are to be expressed in inches:—Multiply the cube of the full depth by the breadth of the top or bottom *flange*; then multiply the cube of the depth in the clear between the *flanges* by the breadth less the thickness of the *web* or vertical part; deduct the latter quantity from the former, and divide the *remainder* by one and a half time the product of the full depth into the length of span. The quotient is the safe distributed load in tons that may be laid on the beam; but if the load is all placed at the middle, the strength will be reduced one-half. For ordinary floors we reckon the load at 1 cwt. to every square foot of surface, or half a ton to every foot length of a girder, where the girders are placed 10 ft. apart. For warehouses, three times the above must be taken as the load. For example, we will take the case of a rolled beam of I section having a span of 20 ft., and carrying the joists directly on its lower flange, so as to distribute the load uniformly, as described in fig. 7 of the last article; the depth being 12 in.; the width, 5 in.; the thickness of web, ½ in.; and the clear depth between the flanges, 10½ in. Then the first quantity, by the above rule, is 5 times 1,728, or 8,640; the second quantity is 4½ times 1,158, or 5,211; the difference of these two quantities is 3,429; the third quantity is 1½ time 12 times 20, or 360; and 3,429, divided by 360, gives 9½ as the number of tons that can be safely distributed over its length of 20 ft., which is very nearly half a ton to each foot of length. For a warehouse floor, we may use two such beams placed one on top of the other, as shown on fig. 8 of the last article, by which means the strength is increased threefold, and the stiffness to a still greater degree; or we can place two joists side by side, and rivet a plate on the top and bottom, as shown at fig. 9 (see last article). The same rule will apply in this last case as in the former one for calculating the strength.

For example, let the span be 20 ft., and two joists, 12 in. by 5 in., placed side by side, with a ½ in. plate 12 in. wide, riveted on top and bottom. The full depth is 13 in.; the breadth, 12 in.; the clear depth, 13½ in.; and the clear breadth, 11 in. Then the first quantity, by the above rule, is 12 times 2,197, 26,364; the second is 9 times 1,158 or 10,422, plus twice 1,728, or 3,456, making altogether, 13,878. Their difference is 12,486, which, divided by 1½ time 13 times 20, or 390, gives 32 tons as the safe distributed load, or a little over 1½ ton per foot of length.

As it is important that we should know the amount of deflexion a given load will produce on a beam, we can calculate it by a rule similar to that given above for the strength, only the quantity there used as the numerator is inverted and becomes the denominator in this case. Multiply the cube of the length (in inches) by the load to be laid on the middle of the beam (in tons); divide this by the *remainder* found in the last rule multiplied by 40,000; the quotient is the deflexion in inches. But if the load is uniformly distributed the deflexion will be five-eighths of the above.

Thus in the example given above of the I joist 12 in. by 5 in. and 20 ft. long, with a load of 9½ tons, the dividend is 9½ multiplied by the cube of 240; the *remainder* is 3,429, which multiplied by 40,000, is the divisor; the quotient

is ·96 the deflexion in inches when the load is all at the centre; but, as in this case, the load is supposed to be distributed over the length of the beam, we take five-eighths of the above, or ·6 in. as the deflexion in the middle, which is rather more than one-fortieth of an inch to every foot as prescribed by Tredgold for the maximum deflexion of floor beams, being, in fact, one thirty-third of an inch for every foot length of the beam.

In the example of the double-beam, given above, we have 32 multiplied by the cube of 240 for the dividend, and the remainder 12,486 multiplied by 40,000 for the divisor; the quotient is ·88 in. as the deflexion if the load was all at the centre, five-eighths of which is ·55 in. when the load is distributed, or nearly one thirty-sixth of an inch to every foot of length.

A girder suitable for a warehouse floor of 30 ft. span can be made with two beams of **I**-section, each 16 in. deep and 6 in. wide, and weighing 62 lb. to the foot, placed side by side, and connected with a ¾-in. plate 14 in. wide at top and bottom, or else two ½-in. plates at the top, and one ½-in. plate at the bottom. By the rule given above it is found that this girder can be safely loaded with 45 tons distributed over its entire length, or 1½ ton to each foot.

For a warehouse floor of 40 ft. span we should require to use two beams of **I**-section, each 19¾ in. deep and 7 in. wide, weighing 100 lb. per foot, placed side by side, and united by a 1-in. iron plate 15 in. wide riveted to the top and bottom flanges, the thickness of the web being ¾ in., and of the flanges 1¼ in.; such a beam will be found by the above rule to be capable of bearing a distributed load of 60 tons, or 1½ ton per foot of length.

When the span of the warehouse exceeds 20 ft. it will generally be found economical to support the middle of the girder on a cast-iron column, by which means the strength is increased fourfold, while the stiffness is increased in a much greater degree; so that beams of much lighter weight can be employed. With a span of 30 ft. we may consider that the column has to bear a load of 22½ tons; if the length of the column is 12 ft., then the diameter must be at least 5¼ in. if solid, and 7 in. external diameter if hollow, with ½ in. thickness of metal. If the length of the column is 18 ft., its diameter if solid must be at least 6¼ in., and 8½ in. external diameter if hollow with ½ in. thickness of metal.

## MEETINGS.

MONDAY, OCTOBER 20.

*Plumbers' Congress* at International Health Exhibition. 11 a.m.

FRIDAY, OCTOBER 24.

*Architectural Association.* — The President's Address. 7.30 p.m.

## Miscellanea.

**Architecture in relation to Landscape Gardening.**— Mr. G. Richards Julian delivered the second of his course of lectures at the Crystal Palace on Wednesday afternoon last. The subject of this lecture was "Roman and Romanesque Architecture." The lecturer commenced with an explanation of the relative positions of the Etruscans and the infant Rome, drawing attention to the fact that the Romans derived the semicircular arch and the circular plan for temples and tombs from the ancient Pelasgic inhabitants of Etruria, or Tuscany. The absence of any architectural development during the existence of the Republic, and the enormous activity of the Roman emperors in building, not only in Rome itself, but in all her subject provinces, were then pointed out, notice being taken of the fact that while almost all the remains of Grecian architecture are to be found in temples, the Romans have left behind them not only temples, but baths, amphitheatres, basilicas, forums, and triumphal arches and columns. The effect on the Romans of the conquest of Greece, in the adaptation of the Greek orders as decorative features applied to the arched construction derived from the Etruscans, was described, and a detailed account of the various modifications made in the orders followed. Passing to Romanesque architecture, the characteristics of the early Christian basilicas were noted, and a short digression to point out the rise of the Byzantine style in the East, and some of its leading features, was made. After this the lecturer glanced at the round-arched architecture of Lombardy, of the Rhine valley, and of France.

**Liverpool Engineering Society.** — The ninth meeting of the session was held on the 8th inst., at the Royal Institution, Colquitt-street, Mr. R. R. Bevis, jun., in the chair, when a paper, entitled "Inland Navigation Works Abroad," was read by Mr. R. L. Tapscott. The author, in treating of his subject, dwelt on the accomplishment of the great canal works of recent years as a result of the improvements in the various mechanical appliances now substituted for hand labour, and the benefits thence arising; instancing the successful maintenance of the Suez Canal as the forerunner of the many suggestions for inland navigation now brought forward. Admitting the difficulties of the Panama Canal to be considerable, he held that they were yet of a similar nature to what have been overcome before; but, all taken together, presented an unparalleled series. Whatever the cost, however, the work had every appearance of proving a financial success. Passing on, the Amsterdam Canal was instanced as illustrating the surmounting of difficulties which the early part of this century dare not approach. Amongst the other works and schemes mentioned were the entrance to the Mediterranean by means of the Garonne River, the flooding of the Sahara, the draining of the Zuyder Zee, the improvement of the Neva, and the piercing of the isthmuses of Malacca, Florida, and Corinth.

**The Operation of the Artisans' Dwellings Act** was discussed at the last meeting of the Board of Works for the Whitechapel District, when replying to the Rev. Mr. Billing, Mr. Munro (of the Metropolitan Board of Works) said the delay in covering the cleared areas under the Improvement Schemes arose from the land being unmarketable under the conditions attached. As regarded the areas in Spitalfields, new plans were now being submitted to the Home Secretary, and awaited his approval. The Metropolitan Board would, in fact, be glad to let the land at almost any price so as to get the spaces rebuilt over. There had, probably, never been an Act of Parliament so differing in intention and operation. Intended to be a benefit to the poor, it had been a source of misery to them; and of all the people evicted from the Whitechapel District, probably not ten had returned to the new homes built for them at so enormous a cost. The Dwellings' Improvement Act was, in fact, a measure for benefiting certain portions of the middle-class, and the tenements in such places as Royal Mint-street were occupied by persons for whom they were never intended.

**Enlargement of the Wimbledon Sewage Farm.**—In consequence of the rapid rate at which the population of Wimbledon is increasing, the Wimbledon Local Board have found it necessary to increase the area of their sewage farm for the disposal of the constantly-increasing sewage of the district, which they have found to be very profitable as applied to the land. The area of the Board's farm at present under cultivation is upwards of sixty acres in extent, and to this about nine acres is about to be added, land for the purpose having been purchased by the Board immediately adjoining the present farm. This land is situated on the main road from Merton and Wandsworth, lying between the River Wandle and the South-Western Railway. It has for some time past been occupied as the Wimbledon and Wandsworth brickfields, and last week, in consequence of the Local Board requiring immediate possession of the land for their sanitary works, the whole of the brickmaking plant and machinery on the ground was sold by auction. In illustration of the expansion of the district within the area of the Local Board, it may be stated that during the present year upwards of 1,000 new houses have been erected, whilst in addition large numbers are now in progress. Several land companies have recently purchased estates in the locality, including the British and the Birkbeck companies, and the last-named company has just laid out upwards of one hundred building sites in Queen's-road, South Wimbledon.

**The Plumbers' Congress.**—As will be seen by an advertisement in another column, arrangements have been made for the holding of a conference in connexion with the Plumbers' Congress, at the Technical Institute, Health Exhibition, South Kensington, on Monday next. The mayers of forty of the principal towns in England have already accorded their co-operation to this object, and many of the leading practical plumbers in and about London are giving their assistance.

**Lifts.**—Judging from the frequency with which we receive particulars of new lifts and lifting machinery, that branch of mechanical engineering is in a prosperous condition. That it is likely to remain so may be inferred from the ever-increasing height of town-buildings, which renders the use of lifts an absolute necessity. Among the firms who have "laid themselves out" for lift-work are Messrs. Archibald Smith & Stevens, of Queen's-road, Battersea, and the American Elevator Company, of 38, Old Jewry. Messrs. Smith & Stevens have just completed two sets of hydraulic lifting-machinery in connexion with the Hydraulic Power Company's mains,— one at Messrs. Spencer Wicks & Co.'s new premises in Watling-street, E.C., and the other at Mr. A. Steddall's premises, Addle-hill, E.C. This new system of public supply of hydraulic power is, we are told, finding very extended application. The same firm have also in course of construction for the Mont Doré Sanatorium, Bournemouth, two hydraulic passenger lifts upon Stevens & Major's patent suspended principle. America is renowned for its lifts, which were in general use in the States while they were only to be occasionally met with in this country. The development of lofty buildings used as residential flats, in New York especially, would probably never have been attained to without the aid of the system of lifts which is in vogue in America. The American lifts differ in some essential points from those in use in this country, and the American Elevator Company, believing that its productions will commend themselves to English architects, are introducing them here. The Company has lately received an order for one of their "Standard" hydraulic lifts for passenger service, and especially for the use of invalids, to be erected in the London Temperance Hospital, Hampstead-road. The American Elevator Company claim that their New York and Chicago houses (Messrs. Otis Bros. & Co. and W. E. Hall & Co.) have produced more than half of all the elevators "running" in the States.

**The last of Sion College Buildings.**— In a few days the last remaining buildings in connexion with old Sion College will have finally disappeared. The hall has already been taken down, as well as several other buildings belonging to the college estate, and the whole of the site of the college having now been let on building leases, Messrs. Fox & Bousfield last week sold the materials of the library, and the ancient gatehouse in London Wall,—the sale of the library, in addition to the building itself, including the bookcases, book-shelves, and fittings. In taking down the library, arrangements have been made for the preservation of the stone in the Philip-lane frontage which records the circumstances under which the college was originally founded, together with the re-erection of the college buildings after their destruction by the Great Fire of London. We understand that this stone is intended to be placed in the new college buildings now in course of erection on the Thames Embankment. We also learn that the valuable collection of books forming the library will be deposited in temporary premises in Aldersgate-street, pending the completion of the new hall and library. The new buildings to be erected on the site now being cleared are all of a commercial character with frontages in London-wall, Philip-lane, and Aldermanbury-avenue.

**Surrey Archæological Society.**—At the ordinary monthly Council meeting of this Society, at 8, Dane's Inn, held last Wednesday, the 15th inst., two new members were duly elected, viz., Colonel de Cetto and Mr. John Pettit Griffith. After the Council meeting was over, a special general meeting of the members of the Society took place, Mr. Granville Leveson Gower, F.S.A., presiding, when the following resolution was unanimously adopted:—"That Rule 13 be altered in such a manner that the annual general meeting be hereafter held in the month of January or February, instead of the month of June or July, as at present."

**The Fine Art Society.** — The following exhibitions will be held by the Fine Art Society during the autumn:—(1) Sketches in France, Italy, Spain, and other countries, by Ernest George (to open on Monday next); (2) The works of Linley Sambourne; (3) Venetian and Italian Drawings by the Russian painter, Count Roussoff; (4) Pictures and Drawings by J. D. Linton.

**Messrs. Farebrother, Ellis, Clark, & Co.'s New Premises in Fleet-street.**—For several months past the premises in Fleet-street, nearly opposite St. Dunstan's Church, which for some years were occupied as the West-end offices of the Norwich Union Insurance Company, have been undergoing extensive alterations. The building, which contains five floors, with an elevation to Fleet-street upwards of 60 ft. in height, is faced with grey and red polished granite and Portland stone, in which a profusion of carving and sculpture is introduced. The whole of this frontage has been cleaned, and, where necessary, re-faced and restored. Internally the building has been re-constructed and entirely re-arranged, and enlarged in the rear by the construction of new buildings about 100 ft. in depth, extending to the boundary of Goldsmith's-court and the Temple Church. The whole of the interior has been fitted and arranged for Messrs. Farebrother, Ellis, Clark, & Co., the well-known auctioneers, surveyors, and estate agents. The ground-floor, extending from the Fleet-street entrance to the rear of the building, has been arranged in several separate departments, and contains, amongst others, the general office, also the office for the sale and letting of houses and estates, cashier's office, accountants' office, estate and drawing office, London and Country Sales offices, waiting-room, and other offices. Sir J. W. Ellis's private office and waiting-room are on the first floor, facing Fleet-street, and at the rear of this floor are the architect's office and the drawing-office. The second floor is appropriated to agency in connexion with landed estate and estate sales. The third and fourth floors are set apart as the housekeeper's residence. In the basement are several strong-rooms and lavatories, also a gas-engine for working the dynamos for the electric light by which every apartment in the establishment is lighted.

**The Steel Square.**—Pliny says that Theodorus, a Greek of Samos, invented the square and level, but this cannot be, for the square figures in the represented designs of the Tower of Babel, one of the earliest known structures. The city of Babylon was a perfect square, and the bricks used in its buildings and walls were square; so probably were those in Babel. Now, to form small squares correctly, and to introduce them in endless combination into buildings, it needed a guiding instrument of some kind. So the square, as a constructive tool, came into use. Among the ruins of Babylon, Nineveh, and Petra, it is said to have been found represented. There are pictures and sculptures from the ruins of Thebes, in Egypt, showing the square in the hands of the artisan. Evidence of its use are also to be seen in ruins in India, which are thought by some to ante-date those found in Egypt. Among the ruins of the Aztecs, or the people before them, in Peru and Brazil, it has also been found; and though tools of stone and flint, such as axes, hatchets, hammers, &c., were the first used by primitive man in these ruins that date back beyond history, the square is found, and specimens may be seen in the British Museum.—*Iron.*

**Building at Tulse Hill and Dulwich.**—In connexion with many other suburban localities, building has been proceeding at a rapid rate during the last few years in the neighbourhood of Tulse Hill and Dulwich, and with the view of still further developing building operations in the district, a new company has just been formed for the purpose of purchasing the Tulse Hill Park Estate, and also the Manor House Estate at Dulwich, consisting of several acres, and stretching a considerable distance in the direction of Sydenham. Some two or three years ago this estate was laid out for building upon, when the old Manor House was demolished. The capital of the new company is 150,000*l.* in 10*l.* shares.

**The Association of Municipal and Sanitary Engineers and Surveyors** is to hold a Northern District meeting this day, Saturday, the 18th of October. The members will assemble at the Town-hall, Stockton, at 10.30 a.m., so that the ordinary business may be transacted in time to leave the Corporation Wharf by steamer, at 11 o'clock sharp, to inspect the lighthouses, breakwater, and other river works at Tees Mouth. Mr. John Fowler, M.I.C.E., Engineer to the Tees Conservancy Commissioners, will explain the river works.

**New Bridge at Bedford.**—The works in connexion with the construction of the new iron roadway bridge and approaches over the River Ouse, for the Corporation of Bedford, are now nearly completed, and preparations are being made for the opening, which will take place on Tuesday next, October 21st, the Right Hon. Earl Cowper, K.G., performing the ceremony. The works have been designed and are being carried out under the superintendence of Mr. John J. Webster, A.M.I.C.E., of Stephenson-chambers, Liverpool, the contractors for the masonry and brickwork, &c., being Messrs. S. W. Pilling & Co., of Manchester, and for the ironwork Messrs. Goddard & Massey, of Nottingham.

**Ensilage at Eastwell Park.**—The ice house silo of H.R.H. the Duke of Edinburgh was opened about three weeks since. The result has been in every way satisfactory, and a very marked increase has been noted in the yield of milk from those cows fed on the silage. The patent mechanical pressure of Messrs. F. W. Reynolds & Co., of Acorn Works, Edward-street, Blackfriars-road, London, was used in this silo.

**Akeley.**—The four-light east window of Akeley Church, near Buckingham, has just been with Munich stained glass by Messrs. Mayer & Co. It represents the Birth of Christ, His Baptism, the Angel at the Tomb, and the Supper at Emmaus.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Pier and Landing-stage, Ventnor | Ventnor Local Board | ..... | Dec. 8th | i. |
| Drainage | Bexhill Local Board | ..... | Not stated | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Sewers, Gullies, &c. | Commissnrs. of Sewers | *Official* | October 21st | ii. |
| Guernsey Granite | Staines Local Board | ..... | do. | ii. |
| Warehouse, Winchester | Not stated | Thos. Stopher | October 22nd | ii. |
| Garden Wall, Leatherhead | H. Parr | ..... | October 23rd | ii. |
| Granite Kerb and Tar Paving | Sutton Local Baard | J. P. Curtis, C.E. | do. | xviii. |
| Asphalte Paving | Commissioners of Sewers | *Official* | October 24th | ii. |
| Sinking Well | Teignmouth Local Brd | Geo. Crow | October 25th | xviii. |
| Drainage Works | do. | do. | October 27th | xviii. |
| Enlargement of Post-office, Yarmouth | Commissnrs. of Works | *Official* | October 27th | ii. |
| Paving | Camberwell Vestry | do. | do. | ii. |
| Portland Cement | Ramsgate Town Council | do. | October 28th | ii. |
| Granite Siftings | do | do. | do. | ii. |
| Construction of Sewer | Kensington Vestry | do. | do. | ii. |
| Making-up Roads | Wandsworth B. of Wks. | do. | do. | ii. |
| Stoneware Pipe Sewers | Swansea U. S. A. | R. H. Wyrill | October 29th | xviii. |
| Paving | Greenwich Bd. of Wks. | *Official* | do. | ii. |
| Road Making and Paving | Fulham Board of Wrks | do. | do. | ii. |
| Road Making | Dartford Local Board | do. | do. | xviii. |
| Public Baths, &c., Ealing | Local Board | Chas. Jones, C.E. | Nov. 3rd | xviii. |
| Boundary-Walls and Railing, &c. | Waltham Holy Cross Burial Board | C. W. Wiggs | do. | ii. |
| Farmhouse, &c., Fulstow | Trustees of A. H. Alleuby | E. W. Farebrother | do. | ii. |
| Drainage, &c., of Infirmary | Chelsea Guardians | ..... | Nov. 4th | ii. |
| Extension, &c., of Infirmary Laundry | do. | ..... | do. | ii. |
| Cast-Iron Work | Commissnrs of Sewers, City of London | *Official* | do. | ii. |
| Concrete, Brick, and Pipe Sewers, &c. | Romford R. S. A. | Brundell, Simmons, & Brundell | do. | ii. |
| Roads and Sewers, Bournemouth | Bscmbe Con. Land Soc. | R. G. Pinder | Not stated | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Surveyor, &c. | Wantage Improvement Commissioners | Nov. 1st | 100*l.* per annum | xvi. |

## TENDERS.

For painting and sundry repairs at 18, Cleveland-gardens, W., for Mr. Henry Rose. Mr. R. Groom, architect, 171, Queen Victoria-street:—

| | | | |
|---|---|---|---|
| Appleton | £210 | 18 | 0 |
| Knight | 210 | 0 | 0 |
| Woodman | 187 | 0 | 0 |
| Nash | 175 | 0 | 0 |
| Buckeridge (accepted) | 167 | 0 | 0 |

For a new Wesleyan Chapel at Winchcombe, Cheltenham. Mr. Herbert J. Jones, architect, Bristol:—

| | | | |
|---|---|---|---|
| E. & T. Hatherly, Bristol | £2,360 | 0 | 0 |
| W. Church, Bristol | 2,330 | 0 | 0 |
| Eastabrook & Sons, Bristol | 2,290 | 0 | 0 |
| A. King, Gloucester | 1,948 | 0 | 0 |
| Wingate & Sons, Gloucester | 1,865 | 0 | 0 |
| W. A. Green, Clevedon | 1,857 | 13 | 0 |
| T. R. Lewis, Bristol | 1,850 | 0 | 0 |
| C. Caines, Cheltenham | 1,786 | 0 | 0 |
| W. Veals, Bristol | 1,750 | 0 | 0 |
| H. Johnson, Bristol | 1,743 | 0 | 0 |
| G. Drew, Chalford | 1,700 | 0 | 0 |
| C. Malvern, Cheltenham | 1,610 | 0 | 0 |
| G. Essex, Cheltenham | 1,468 | 17 | 10 |

For the erection of a dwelling-house and shop in Queen's-road, Hastings, for Mr. E. Hawes. Mr. Alfred W. Cross, architect, Hastings:—

| | | | |
|---|---|---|---|
| Cruttenden | £1,040 | 0 | 0 |
| Phillips | 1,035 | 0 | 0 |
| Avis | 1,030 | 0 | 0 |
| Coussens | 1,025 | 0 | 0 |
| Rodda | 1,000 | 0 | 0 |
| Harman | 955 | 0 | 0 |
| Woodall | 920 | 0 | 0 |

For the erection of coach-houses, stables, &c., Rockleaze, near Bristol, for Mr. C. J. Lewis. Mr. Joseph W. King, architect, 39, Broad-street, Bristol:—

| | | | |
|---|---|---|---|
| G. Daltry | £997 | 5 | 0 |
| P. H. Taylor | 920 | 0 | 0 |
| T. Baker | 916 | 0 | 0 |
| W. Tarr | 788 | 0 | 0 |
| G. E. Burton | 743 | 16 | 0 |
| W. Podger | 740 | 0 | 0 |
| E. Clarke | 716 | 0 | 0 |
| J. Hayes | 700 | 0 | 0 |
| E. T. Hatherly | 697 | 0 | 0 |
| J. E. Davis | 696 | 0 | 0 |
| J. Wilkins | 690 | 0 | 0 |
| C. A. Hayes | 679 | 0 | 0 |
| J. Tucker | 669 | 0 | 0 |
| W. Veals | 664 | 0 | 0 |
| E. Mason | 638 | 0 | 0 |
| E. W. King | 627 | 16 | 0 |
| J. Thomas | 600 | 0 | 0 |
| R. J. Cridland* | 600 | 0 | 0 |
| Williams & Prosser | 599 | 0 | 0 |
| J. James† | 589 | 0 | 0 |

* Accepted. † Too late.

For a pair of semi-detached residences at Crewkerne Somerset, for Mr. Thomas Palmer. Mr. Herbert J. Jones architect, Bristol:—

| | | | |
|---|---|---|---|
| D. Hitching, Parkstone | £2,295 | 4 | 10 |
| J. Bastow, Bristol | 1,958 | 0 | 0 |
| Lye & Sons, Crewkerne | 1,950 | 0 | 0 |
| W. Church, Bristol | 1,827 | 0 | 0 |
| E. & T. Hatherly | 1,800 | 0 | 0 |
| J. B. Hann, Beaminster | 1,798 | 0 | 0 |
| T. R. Lewis, Bristol | 1,760 | 0 | 0 |
| Cowlin & Son | 1,760 | 0 | 0 |
| W. A. Green, Clevedon | 1,648 | 18 | 4 |

[All net, after allowing for old materials.]

For the erection of houses at Barcombe, Sussex. Mr. George Fuller, architect, Lewes :—

| | | | |
|---|---|---|---|
| Andrews, Lindfield | 3,417 | 13 | 2 |
| Cheesman & Co., Uckfield | 2,940 | 0 | 0 |
| Longley, Crawley | 2,750 | 0 | 0 |
| Wright, Brighton | 2,617 | 0 | 0 |
| Ditto ditto | 2,557 | 0 | 0 |
| Huggett & Coster, Eastbourne | 2,500 | 0 | 0 |
| Berry & Bussey, Lewes | 2,270 | 0 | 0 |
| Baker, Seaford | 2,147 | 0 | 0 |
| Woolger, Newhaven | 2,100 | 0 | 0 |
| Donovan & Son, Eastbourne | 2,094 | 11 | 8 |
| Pledge, East Grinstead (accepted) | 1,990 | 0 | 0 |

For the erection of proposed Parochial Infant School, Balham, and repairs to present school, for "The Committee." Mr. W. Newton Dunn, architect, Bucklersbury :—

| | | | |
|---|---|---|---|
| Maxwell Bros., Brixton | £1,031 | 0 | 0 |
| J. Smith & Son, Norwood | 1,007 | 0 | 0 |
| J. B. Gerrans, Lee | 997 | 0 | 0 |
| T. Potterton, Balham | 954 | 10 | 0 |
| A. Wing & Co., Norwood | 905 | 0 | 0 |
| W. Dean, Clapham | 847 | 0 | 0 |

For alterations and repairs at No. 15, Park-row, Greenwich, for Coffee Tavern, for General de Havilland. Mr. W. Rickwood, architect and surveyor :—

*First Contract.*

| | | | |
|---|---|---|---|
| Howell & Son | £180 | 0 | 0 |
| Holding & Son | 179 | 15 | 0 |
| Lonergan | 179 | 0 | 0 |
| Staines & Son (accepted) | 178 | 0 | 0 |
| Avard | 159 | 0 | 0 |

*Second Contract.*

| | | | |
|---|---|---|---|
| Proctor | £631 | 5 | 10 |
| A. White & Co. | 575 | 0 | 0 |
| Mower | 554 | 0 | 0 |
| Staines & Son | 527 | 0 | 0 |
| E. Stafford | 519 | 0 | 0 |
| Holloway | 513 | 0 | 0 |
| Holding | 495 | 0 | 0 |
| Lonergan | 488 | 0 | 0 |
| Pack Bros. | 485 | 0 | 0 |
| A. & E. Evans (accepted) | 449 | 0 | 0 |

For alterations, &c., to Mount House, Dorking. Mr. Frederic W. Ledger, architect, London :—

| | | | |
|---|---|---|---|
| F. J. Hammond, Dorking | £297 | 10 | 0 |
| Burdett & Son, Guildford (accepted) | 259 | 19 | 3 |

For stables, Beech Hill Park, Hadley Wood. Mr. Edwin T. Hall, architect, 57, Moorgate-street :—

| | | | |
|---|---|---|---|
| Woodward | £815 | 0 | 0 |
| Marriott | 780 | 0 | 0 |
| Lynde (accepted) | 696 | 0 | 0 |

For billiard-room, &c., for Mr. H. W. Hunt, Dulwich. Mr. Edwin T. Hall, architect. Quantities by Mr. G. A. Pryce-Cuzson, Westminster-chambers :—

| | | | |
|---|---|---|---|
| W. L. Lynde | £970 | 0 | 0 |
| J. & C. Bowyer | 932 | 0 | 0 |
| Fish, Prestige, & Co. | 930 | 0 | 0 |
| J. Woodward | 910 | 0 | 0 |
| H. S. Foster (accepted) | 875 | 0 | 0 |

For residence for M. G. J. Brescoby, Chatham. Mr. Edwin T. Hall, architect —

| | | | |
|---|---|---|---|
| Leathley | £980 | 0 | 0 |
| Batchelor, Merton (accepted) | 950 | 0 | 0 |

For machinery, &c., for olive oil and corn mills, Mitylene, Turkey, for H.S.H. The Princess de Lusignan. Mr. Edwin T. Hall, architect :—

| | | | |
|---|---|---|---|
| Appleby Bros., London (accepted) | £3,970 | 0 | 0 |

For bar fittings at the Albany public-house, Rodney-road, Walworth, for Mr. Hughes. Mr. George Treacher, architect —

| | | | |
|---|---|---|---|
| Turtle & Appleton | £375 | 0 | 0 |
| Jackson & Todd | 348 | 0 | 0 |
| Drew & Cadman | 324 | 0 | 0 |
| J. Beale (accepted) | 310 | 0 | 0 |

Accepted for a dwelling-house and outbuildings for Mr. Thomas Huley, at Carleton, near Pontefract. Mr. William Shackleton, architect, Pontefract :—

*Excavator, Bricklayer, and Mason.*

| | | | |
|---|---|---|---|
| Thomas Taylor | £138 | 19 | 6 |

*Carpenter and Joiner.*

| | | | |
|---|---|---|---|
| William and Charles Wilcock | £129 | 0 | 0 |

*Plasterer.*

| | | | |
|---|---|---|---|
| John Binns | £21 | 0 | 0 |

*Ironmonger, Plumber, and Glazier.*

| | | | |
|---|---|---|---|
| Caleb England | £22 | 6 | 6 |

*Slater.*

| | | | |
|---|---|---|---|
| William Stewart | £30 | 0 | 0 |

For the erection of St. Andrew's Church, Birchills, Walsall. Mr. J. Edward K. Cutts, architect :—

| | | | |
|---|---|---|---|
| Enoch Evans, Walsall | £5,030 | 0 | 0 |
| Restall & Son, Bisley | 4,965 | 0 | 0 |
| William Winstance, Walsall | 4,336 | 8 | 0 |
| G. & F. Higham, Wolverhampton | 4,113 | 0 | 0 |
| H. Knight, Walsall | 3,980 | 0 | 0 |
| Storey & Son, Bourne | 3,824 | 0 | 0 |
| Trow & Sons, Wednesbury | 3,647 | 0 | 0 |
| Jones & Sons, Sedgeley | 3,447 | 0 | 0 |
| Lowe & Sons, Burton-on-Trent | 3,408 | 0 | 0 |
| A. Lynx, Walsall | 3,325 | 0 | 0 |

For building a residence, "Kingsclear," Camberley, for Major Charles Cooper-King, R.M.A. Mr. James H. Money, architect, Newbury :—

| | | | |
|---|---|---|---|
| T. H Kingerlee, Oxford | £2,595 | 0 | 0 |
| W. H. Simmonds, Reading | 2,590 | 0 | 0 |
| Charles Claridge, Banbury | 2,495 | 0 | 0 |

For works of underpinning at Glentworth House, Orpington, for Mr. E. G. Allen. Mr. E. P. Loftus Brock, F.S.A., architect :—

| | | | |
|---|---|---|---|
| W. Bailey | £320 | 5 | 0 |
| J. Hocking | 275 | 0 | 0 |
| J. Laslett | 250 | 0 | 0 |

For converting three private houses into shops near Clapham Junction. Mr. Thomas Spearing, surveyor :—

| | | | |
|---|---|---|---|
| Samuel Steel | £750 | 0 | 0 |
| Jones & Edwards | 690 | 0 | 0 |
| Robinson & Miller | 475 | 0 | 0 |
| Howard | 441 | 0 | 0 |
| Cook & Co. | 439 | 0 | 0 |
| Saunders & Co. | 405 | 0 | 0 |
| Charles Rudd | 400 | 0 | 0 |
| Thompson & Co. | 393 | 0 | 0 |
| W. Ellis | 390 | 0 | 0 |
| R. Warr | 375 | 0 | 0 |
| Stewart & Co. | 369 | 0 | 0 |
| Hughes & Davis | 336 | 0 | 0 |
| W. G. Baker | 330 | 0 | 0 |
| Scharien & Williams | 317 | 10 | 0 |
| Rand | 225 | 0 | 0 |

For painting, decorating, and sundry repairs at 68, Acacia-road, St. John's Wood, for Mr. Weston. Mr. James Millar, architect :—

| | | | |
|---|---|---|---|
| Adams | £173 | 0 | 0 |
| Struggle | 170 | 0 | 0 |
| Conway | 135 | 0 | 0 |

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### TO CORRESPONDENTS.

C. & C.—P. H. N.—A. N., Chicago.—C. L.—J. H. (will produce paragraph with the diagram another week).—G. R. D.—R. A. M. C. (next week).—W. H. W. (shall be attended to).—R. T. C.—W. T. W. —E. Van C. (will reply by letter).—W. W. L.

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# The Builder.

VOL. XLVII. No. 2177. SATURDAY, OCTOBER 25, 1884


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### *The Hellenic Society.*

THIS Society, whose full title is "The Society for the Promotion of Hellenic Studies," has now been in existence for, we believe, something over four years, and held its first meeting for the present autumn session on Thursday afternoon last. Though the Society includes in its list of members not a few distinguished names, and has put forth a Journal which, for weight of matter and beauty of illustrations, stands high among European archæological publications, its existence and its doings seem in England to attract but little notice beyond the circle of those specially-informed people who make up its not too numerous ranks. A report of its annual meeting appears, perhaps, periodically in the leading daily paper, and the "general reader" wonders why people should get together and discuss with such apparent interest the paintings on an ancient jar, or an unexpected discovery of an inscription in some out-of-the-way corner in Asia Minor. And had there always been Hellenic Societies and British Museums, we should not so much require them now. But whole centuries passed away, during which it was forgotten that people called Greeks ever lived on European soil, and left behind them the brightest legacy of perfection in art and literature that any race of men has left. Their exquisite buildings have been allowed to go to ruin, or have been wantonly defaced and destroyed by violence; much of their glorious literature has disappeared, never to be recovered; and now, when it is all but too late, the modern educated world has awakened at last to the fact that all remnants of that age of joyous artistic insight and achievement are precious, either for their intrinsic beauty, or, in the case of archaic work, for the light which they may throw on the early history of Europe, on the development and race-connexions of the Greeks themselves and of contemporary peoples, on doubtful points of philology and archæology, and on the genesis of the European art of which the Greeks are the founders; and the cry among those who appreciate the interest of such relics is, "Gather up the fragments that remain," that at least nothing be lost of what remains to find, which may prove to be more than we can at present estimate.

The objects of the Society for the Promotion of Hellenic Studies, as stated in their "Rules," are (1) to advance the study of Greek language, literature, and art, and to illustrate the history of the Greek race in the ancient, Byzantine and neo-Hellenic periods, by the publication of memoirs and un-edited documents or monuments in the journal of the society; (2) to collect drawings, transcripts, photographs, &c., of Greek inscriptions, MSS., works of art, and ancient sites and remains, inviting the co-operation of travellers in communicating notes of what they have observed; and (3) to organise means by which members of the society may have increased facilities for visiting ancient sites and pursuing archæological researches in countries which at any time have been the sites of Hellenic civilisation. A considerable portion of this programme, as the Journal and illustrations for the past year sufficiently prove, is in the way of being realised. A further object which the society has much at heart, and which was specially referred to by the President, the Bishop of Durham, at the annual meeting in June last, is the establishment at Athens of a British school or institution for Hellenic research. Until, the President observed, there was such a centre of work established on Greek soil, Hellenic studies in England would be at a decided disadvantage. In an article not long since we referred to the melancholy fact that at Rome the archæological visitor knew only too well that it was to the German Archæological Institute that he must betake himself to have the latest and best news of archæological exploration. The want of interest in such subjects evinced by the English Government is but too well seconded, in the negative sense, by the indifference of the British public. Men who are supposed to represent both culture and wealth will spend disproportionate sums on curiosities in china ware, which are of comparatively recent date and inferior artistic worth, but can find nothing to bestow in assisting such a research as that of Mr. Wood at Ephesus, after the poor pittance granted by the Government had been exhausted. An increased membership of the Hellenic Society, a wider circulation of its publications, and a more general public recognition of its objects and of the work it is doing, might do something to break through the apathy of even the educated portion of Englishmen on this subject. The increased attention which has of late years been paid to archæology in our universities, more particularly at Cambridge, will no doubt have its effect in time; and, as Mr. Newton said at the annual meeting before referred to, the hope is that young men are now being trained at our universities who will be in time competent to carry out the work of exploration. For twenty years past, he observed, there had been in France and Germany a constant succession of young scholars, first sent to the schools at Athens, then upon special missions, and in course of time promoted to chairs of archæology at the different universities; and it is a significant fact, as was observed in our columns not long since, that German is now almost the recognised language of archæology.

Looking through the last volume of the Society's Journal, we observe that architectural subjects do not at present occupy a very large portion of its attention; and in connexion with this fact we may observe that the name of the author of the most valuable work on Athenian architecture that has ever appeared is not on the list of members. Whether this is because the Society does not know Mr. Penrose, or that he does not know the Society, we cannot say; but either way the omission is to be regretted. But we rather fear it is with Greek archæologists as it is with other people,—architecture is one of the last subjects connected with the arts in which interest is felt. It may be added, perhaps, that Greek architecture has been a great deal studied and illustrated already, while the systematic study of Greek sculpture is only of recent date, and there are many very interesting problems connected with it at present demanding solution. There is a passage of arms in the Journal between Professor Sayce and Dr. Jebb in regard to Hissarlik, in which the latter sums up to the effect that while the large pre-Ilian settlement, of which remains exist at Hissarlik, "*may* be that town the capture of which at an unknown date gave rise to the legend of Troy, the data of the Homeric poems for the *site* of Troy cannot be really reconciled with any one site in the Iliad. Some of them suit Bunâr-bashi only; others suit Hissarlik best. The *town* adumbrated in the Iliad is, in all its architectural details, purely poetical. . . . Homer's Troy, in the sense of an actual town, described by a poet recording historical fact, has *not* been found at Hissarlik, and will never be found anywhere." To which we may say, with Sancho Panza,—"God bless me, did I not tell you so?" But the contributions on subjects specially architectural are interesting, though brief. One is a description, accompanied by very full drawings, of a small prehistoric building near Salamis, which has been measured and drawn by a German gentleman, Herr Ohnefalsch Richter. It is a chamber of about 35 ft. by 20 ft., of Cyclopean masonry, and with a circular barrel-vault and a small chamber leading out of it cut in the rock, which latter has been roofed by an immense monolith, flat in the first instance, but from which a sloping roof, gable-shape, has been worked half out of the soffit of the stone and half out of the rock on which it rests. Though the main chamber is rectangular, the resemblance of the whole construction, in general idea and plan, to

those of which the "treasury of Atreus" is the best-known example, is certainly striking. It has been supposed by some to be a tomb, but there is a hollow cut inside in the ponderous stone lintel, communicating with a kind of portcullis groove in the lintel and jambs, which was evidently a provision for closing the opening with some kind of door from inside; and, as Herr Richter pithily says,—"Dead men cannot close a door." A communication by Dr. Waldstein, curator of the Fitzwilliam Archæological Museum, on "Views of Athens in the year 1687," is of considerable interest. It is in relation to two sketches in the library of the late Sir Thomas Phillips at Thirlstone House, Cheltenham. These views, from an old book of sketches done by some unknown Italian visitor, show the distant Parthenon in the fourth period of its consecration, as a Turkish mosque,* with a tall minaret added, which figures conspicuously in both sketches. The Parthenon was a mosque from 1458 to September 26, 1687, the ill-fated day when the Venetian mortars succeeded in sending a shell into the temple and igniting the powder stored there. There are letters extant showing that among the officers concerned in the attack were some who had an interest in art, and it is conjectured that the drawing published in the Journal was a sketch from a distance by one of these officers before the event of the bombshell. The larger sketch is a kind of half plan, half view, of Athens, with the fortification of the Acropolis shown, and the city on the sloping ground below; the Temple of Theseus, the Piræus, and the long walls, are indicated. The vignette from the same book of sketches is also given, showing a kind of picture-frame design, with a roughly-sketched head-piece in which are represented the owl in the centre, and Athene and Poseidon seated on the slopes of the frame on either side; below, in the square centre-space, is the sketch of the Acropolis alone, from nearly the same point of view as the other. The sketch is on a very small scale, but there is an attempt to indicate something on the roof, more than mere straight lines, which is deserving attention. Dr. Waldstein refers to a drawing by Herr Von Duhn in the *Mittheilungen* of the German Archæological Institute at Athens, in which three small "opaia" are visible in the centre of the roof, and refers to the possible bearing of these indications on Mr. Fergusson's theory of the lighting of Greek temples. There are on the little frontispiece sketch published in the Journal certain dots along the roof, to which Dr. Waldstein does not refer, but which must mean something. They may be only an attempt to indicate the effect of the *antefixæ*; but it seems a question whether the antefixæ could be prominent enough, at the distance from which this sketch must have been taken, to attract the notice of a draughtsman making a rough sketch on a small scale.

Among the most interesting of the papers bearing on ancient art generally, in one on two archaic sarcophagi found at Clazomenæ in 1882, the designs on which are reproduced both by cuts in the text and by a finely executed monolithograph among the larger separate plates; and there is a paper by Mr. Percy Gardner on a very beautiful statuette of Eros, of gilt terra cotta, which was presented by the King of the Hellenes to the Princess of Wales, and which Mr. Gardner believes to be probably a copy of a modification of a design of Praxiteles. A very interesting and thorough article by Miss Harrison, on "Monuments relating to the Odyssey," deals with certain representations in vase paintings of the escape of Ulysses and his companions from the cave of Polyphemus. Miss Harrison is proposing, we observe, to classify the existing illustrations of "the whole series of myths of the Trojan cycle"; such a compilation from so thorough an investigator will have a lasting value. The finest illustrations published among the separate plates are, however, the chromolithograph reproductions of the paintings of the sarcophagus found at Corneto in 1869, and now in the Egyptian and Etruscan Museum at Florence. The lithographs are by Steinbock, of Berlin, and are alone sufficient to make the album of plates worth possessing; the figures, though all partly obliterated, are very fine and powerful in action and expression, and the execution of the plates is splendid. Plate xxxvi., where a very beautiful Amazon turns round on her horse to strike at the man behind her, is especially noticeable. These paintings, which belong to a late period of Greek art (probably about 300 B.C.), are far more pictorial than the conventional and more decorative vase paintings which are generally associated with the idea of Greek painting; the features and figures being delicately modelled and shaded.

Since the previous remarks were written we have learned that the Committee for Promoting the Formation of an English Archæological School at Athens, which is officially a separate body from the Hellenic Society, have received a free grant of a piece of land for the purpose from the Greek Government, the enclosure of which will be carried out immediately, and that they have collected 4,000*l.* towards building and enclosing the proposed institution. This, of course, is not a fifth part of what will be required, but we have got thus far on the way; and it is to be hoped that others who are able to do so will give speedy and substantial assistance to enable England to take as honourable a place in the strife for knowledge as Germany has already taken.

Of the meeting of the Society on Thursday afternoon we can necessarily only speak very briefly. Mr. Newton occupied the chair, and a very interesting paper was read by the head-master of Eton, the Rev. E. Warre, on the raft built by Ulysses to escape from Calypso's island. Mr. Warre, who joins a knowledge of boats and boat-building to Greek scholarship, went, in a very detailed and practical manner, into Homer's workmanlike description of the construction of the raft, and illustrated his remarks by a model, showing the conjectured shape and method of construction, and by some copies of Egyptian drawings, showing certain forms of tools, of which also models had been made, reproducing the ancient tools in actual working form. This paper was followed by one from Mr. Ernest Gardner on some of the objects found in tombs at Kertch, and now in the new museum at Oxford. The special value of these is that they serve to represent, to those who have not been to St. Petersburg to inspect the rich collection of archæological treasures from Southern Russia, the type of work which is mainly characteristic of the Hellenic remains in that part of Europe. The paper was illustrated by several pages of lithographed plates, which will, we presume, eventually form a portion of the Society's Journal, and which represent a good many beautiful bits of decorative work in the way of personal ornaments (found in the tombs of women), almost purely Greek in style and feeling, though presenting some special peculiarities which added to their interest. Mr. Gardner remarked on the extreme delicacy of the gold-work in many of these ornaments, the gold being only a thin sheet *repoussé*, and in some cases ornamented with minute spirals of gold wire made separately and applied to the surface. Of course all who are familiar with Greek gold work are aware of this characteristic of the sparing and delicate use of the metal, and we have often commented on the contrast between this and the goldsmith's work of to-day, when the object seems to be to have as much bullion in proportion to the real art work as possible.

We hope the Society for the Promotion of Hellenic Studies will ere long enlarge its borders, and also that it will be able to take up and throw additional light upon some of the interesting questions concerning ancient Hellenic architecture, which should receive its due proportion of attention among the other branches of archæology which are included in the field of Hellenic study.

* As most of our readers know, the Parthenon has been successively a temple of Athene, a Greek church, a Romish church, and a Turkish mosque.

## THE LIFE OF SIR HENRY COLE.*

HALF a century of genuine work is something for the doer of it to look back upon with satisfaction, and it must be conceded that Sir Henry Cole was fairly entitled to indulge in this feeling. There may be more than one opinion as to the character of some of his work, but all will agree that it was executed with energy. Energy, indeed, when it shows itself in the form of restless desire to set things and people straight, is apt to make a man fussy and self-important, and if, in addition, he be a little too conscious of his own merits and a little too fond of the smile of the great, the shafts of hostile criticism are likely to fall pretty thickly around him. But, happily for himself, Sir Henry had not the sensitive nature of a poet, and so the remarks in which Saturday Reviewers indulged, and which were often "tartarly" enough, seldom ruffled his temper and never provoked a retort.

> "Populus me sibilat, at mihi plaudo
> Ipse domi."

He went his own way, displaying ever a cheerful optimism which neither hard words nor hard work could impair.

Cole had done substantial service to the State in more than one department before the Great Exhibition of 1851 brought him into public notice. He helped to organise the Public Record Office, and was associated with Rowland Hill in the reform of the General Post-office. Quick to see anomalies and abuses, and fertile in plans for their removal, his aid was most acceptable to those who were fighting the battle of progress. He knew, too, the value of ridicule, and,—notably in the contest about Railway Gauges,—employed it with signal success. A good cartoon or a page of pungent satire from the pen of a Thackeray could, he thought, influence public opinion a hundredfold more than infallible figures or the most logical arguments.

The special work, however, with which Sir Henry Cole identified himself from an early date was the application of the Fine Arts to the manufactures of the country. He saw that while English productions had a high reputation for cheapness and intrinsic excellence, they were deplorably deficient in beauty of design, in symmetry of form, and harmony of colouring. What, then, he set himself to do, and what he urged the Society of Arts to take in hand, was,—in his own words,—"to wed high art with mechanical skill, or to bring about the union of the artist with the workman." It was in furtherance of this idea that the International Exhibition of the products of industry was set on foot. At the outset very little else was proposed than a merely National Exhibition, but Prince Albert very quickly saw that the object which they had in view would be best secured by gathering together under one roof the productions of all countries, thus bringing into high relief our neighbours' excellences and our own defects. The marvellous success which attended the execution of the idea has been somewhat lost sight of in the crowd of events that have since happened. It is one of the advantages of this memoir that it brings together, in very readable fashion, contemporary records of all that occurred in connexion with the Great Exhibition of 1851. We may, perhaps, demur to Sir Henry's statement that "no event comparable to it in its promotion of human industry is to be found in the history of the world," but at least it must be allowed that it gave an impetus to English manufacture which is still felt, and did much to promote that union between "high art and mechanical skill" on which the enlightened mind of the Prince Consort was largely set. It is amusing at this distance of time to read of the various panics which the scheme created in men's (and women's) minds. The public were assured by the Astronomer Royal that Paxton's glass house must by demonstration infallibly fall to pieces.

* "Fifty Years of Public Work of Sir Henry Cole, K.C.B., accounted for in his Deeds, Speeches, and Writings." Two vols. London: G. Bell & Sons. 1884.

The Duke of Wellington brought 10,000 additional troops into the neighbourhood of the metropolis to deal with apprehended disturbances. Colonel Sibthorpe, in the House of Commons, prayed that hail or lightning might descend from heaven to defeat the ill-advised project. Telegraphic arrangements were made between the Executive Committee and the Police Commissioners, to deal at any moment with the unruly mob; but, adds Sir Henry Cole, "these curious devices were never employed; and it may be said that the great building, even with 93,000 persons in it at one time, was never so crowded as a lady's successful *soirée*."

As to the results of the Exhibition we have Cole's own opinions, as given in a lecture delivered in December, 1852. He expressed his belief that in the domain of art England had learned most from the Eastern exhibits, while in mechanical appliances America had taught her some valuable lessons. Insular prejudices had been lessened, competition in new fields of labour had been suggested, and the inter-communication between countries by a general postage system had been largely promoted. The lecturer would have done wisely if he had contented himself with these conclusions, and abstained from the perils of prophecy. Unfortunately, he went on to say that the Reform of the Patent Laws would be a speedy result, that open councils would be substituted for secret diplomacy, and that nations would be kept back from going to blows as hastily and foolishly as they have been accustomed to do. From the last and happiest result we seem to be as far off as ever, but its realisation then seemed possible to many minds. Lord Macaulay expressed the prevailing opinion when he said,—"This will long be remembered as a singularly happy year of peace, plenty, good feeling, innocent pleasure, national glory of the best and purest sort."

With the later exhibitions of a similar kind both at home and abroad Cole was necessarily much associated. He advocated the adoption of an arrangement of "like objects with like objects" as being more scientific and technically useful than the geographical system. But it involved more cost and labour, and was neither so picturesque nor so popular. The exhibitions held in 1871 and the three succeeding years were financial failures, though each was, so far as manufactures were concerned, an improvement upon its predecessor. But as the quality improved, the novelty wore off, and, however technically instructive they may have been to the few, they ceased to be attractive to the many.

Sir Henry Cole's services at the Science and Art Department and South Kensington Museum were of a more enduring character. The former was rather the consolidation of a number of existing institutions than the creation of an absolutely new one. The oldest of these institutions,—the Royal Dublin Society,—had been in the receipt of an annual public grant from the year 1800, and elsewhere there were numerous schools and museums which were practically without control, though nominally under the Commissioner of Public Works or the Board of Trade. All these, re-organised and developed, were placed under the Committee of Council of Education, and no little credit is due to Henry Cole for the share which he bore in carrying this arrangement into effect. A genuine interest in technical training, immense industry, a clear head for details, and excellent health, were the chief qualifications which Sir Henry possessed for the posts wh ch he occupied, and that they were occupied with credit to himself and with advantage to the State these interesting volumes abundantly testify.

As an artist and an architect Sir Henry will not be remembered; indeed, if the "Brompton Boilers" were in any degree his work,—and his son assures us that they were not,—it were well that he should be forgotten. His letters and lectures on architecture, which are republished in these volumes, are chiefly useful for certain practical suggestions, but whether the appointment of a Council of Taste to advise on public buildings be one of these is, to say the least, a question to be asked. The establishment of a permanent Minister of Arts we have often advocated; but that is not quite the same thing.

## WHAT THE HOUSEKEEPER REQUIRES FROM THE ARCHITECT.

THE rapid increase in the number of inhabited houses in England is a fact as noticeable from a financial as it is from a pictorial point of view. As to the latter, the up-growth of houses in many districts traversed by our great railway lines is such as to force itself even on the attention of the traveller, who may, perhaps, be limited to an annual survey from the windows of a flying train. Land which a few years ago was waste is now dotted with houses. Villages are growing into towns. Towers, and spires, and cupolas pierce the sky; and red brick "Queen Anne" houses are toning down so as to assert an imaginary antiquity. The gross estimated annual rental of England, for 1881, as valued for the poor-rate, exceeded that of 1880 by no less than 4,894,000*l.*; and although this was an exceptional spring, due in part to new valuation, the rental of 1881 exceeded that of 1871 by upwards of 38,000,000*l.*

Activity of all kinds concurs in this rapid planting of brick and mortar. Here we see the commodious mansion, reared, regardless of cost, under the eye of some magnate of the architectural profession. There we see the questionable, or even the unquestionable, work of the speculative builder. Distinct from either of these, in very different parts of the country, rise what may perhaps best be described as amateur houses,—that is to say, dwellings reared, often by retired or well-to-do tradesmen, either for their own abode or as a means of investing their savings. Many of these are built with scant aid from the architect. Sometimes a young man may be induced to act on reduced terms. Sometimes a succesful foreman will develope into a builder, who asks no advice but his own. Sometimes a clerk of the works is employed by the owning builder.

It is chiefly in cases of this kind that a very serious inconvenience is arising, and in some places rapidly increasing. This is the practical unacquaintance of the builder with the requirements of family life on different scales. In every well-ordered establishment, great or small, a certain organisation exists, which ought to find its counterpart in the plan of the house. Probably the best scale by which this organisation is to be determined is that furnished by the number of servants. A house intended to be kept in order by two or three servants is not to be converted into one proper for the employment of seven or eight merely by adding two or three sleeping-rooms. The whole theory of the building differs. And in the amateur houses to which we refer, not only is there a want of keeping in this respect, but very often two or three good reception-rooms are combined with such stinted accommodation for offices of all kinds as to make a house, for which the rental proper for a family of some considerable *status* is asked, totally unfit for the daily requirements of such a family.

We are no believers in the hand-book system, when it is regarded as the means of enabling the purchaser to act for himself, without taking proper advice. Quackery in architecture is likely to be little less disastrous than quackery in medicine. The well-known qualification of the man who is his own lawyer may generally be taken to apply to the man who is his own architect. But with that caution, we cannot but think that there is room for some such guide for the builder as that which the Italians have devised for the railway engineer. The normal dimensions of platforms, ticket-offices, refreshment-rooms, and other station accommodation for railways of different capacities for traffic are now laid down, on the Italian lines, with accurate prevision. It would be of no little use to the young architect if he could refer to a like outcome of experience as a guide to the plan of a house.

As to the rooms that come *en évidence*, dining-room, drawing-room, study, or morning-room of some kind, sleeping chambers, hall, staircase, and kitchen, there is, probably, little to be said. Every one,—or, at least, every one who can "drive a gig," may, perhaps, have a right to indulge his or her own taste so far. But the above-named apartments do not form a house, though they often compose what goes by that name. First we should be disposed to rank among neglected specialities the arrangement of nurseries. A certain elasticity, no doubt, is here proper. But then the need for that elasticity should be kept in view from the first. Leaving an ordinary bed-room unfurnished is not the way to provide that essential to the healthy growth of children,—a light, airy, sweet, dry nursery. A room may be suitable for a servants' bed-room which will be very unsuitable for a night nursery. The combination of the two, that is to say allowing the children to live and to sleep in the same room, is a source of permanent mischief, which would be well avoided at the cost of sacrificing a boudoir, a study, or a morning-room.

Again, the want of a servants' hall is a very serious defect if (say) more than three servants are kept. So is the absence of a second staircase. So of the want of housemaid's pantry, china-closet, butler's pantry, linen-room, laundry, dairy, box-room, knife-room, coal and wood stores, scullery, and all the other requirements of the inmates of the kitchen. Health, economy, and comfort are as much involved in the ordering of this series of domestic conveniences as in the arrangement of those rooms of which the number and size are duly advertised.

A sort of rough normal specification, based on the number of servants that the house demands for its thorough keeping, might be so constructed as to be of no little value. In this not only the actual number of rooms required, but some rules for their convenient area, might be given. Thus a distinct step should be made when it is intended to lodge men-servants within the house. The size of the servants' hall should be in proportion to the number of servants. Of stable and coach-house we have not spoken, as they should not come under the general roof; but here proportionate accommodation should be indicated. And if the actual arrangements of houses known to be fully adequate to the comfort of their occupants were cited as examples, we think that a very valuable work might be written on the theme of "What the Housekeeper requires from the Architect."

## NOTES.

THE verdict in the case of the disastrous gas explosion in Bermondsey seems to us a remarkably feeble one. The Coroner, indeed, appears to have commented strongly on the conduct of the Board of Works in not sending any representative to the inquiry, as it had been stated that the leakage of the gas-main was in the first instance due to the insufficient support over their own sewer works; and the jury "censured" the gas company for not seeing that the main had been properly replaced by the sewer contractor,—a matter in which their interest, as well as their duty, might have been thought to be concerned. But when we come to the direct cause of the explosion, viz., the search for the place of escape by the gas company's servant with a naked light, a proceeding the rashness and folly of which has been condemned over and over again, and is apparent to the commonsense of even untechnical persons, mere "censure" is far below what the case calls for, and a verdict of "accidental death" is what we call little short of a miscarriage of justice. How can we expect that such gross carelessness and stupidity can be put a stop to, when death caused thereby is regarded by the law as an "accident"?

A CORRESPONDENT asks the meaning of "prime cost" as mentioned in specifications. Paperhangings are troubling him as they have so often troubled others. He

wishes for decisive information,—whether the price marked at the back of the pattern by the manufacturer, or the net price charged to the trade at the warehouse is really the "prime cost." It is to be feared that the answer cannot be given as desired. In view of this difficulty architects,—who do make prime cost provisions in their specifications for stoves, chimney-pieces, gasfittings, ornamental glass, ironwork, &c., — generally put an explanatory sentence of this sort: "prime cost prices are to be understood as the actual cash payments made by the contractor to the manufacturers, and the contractor is to make his own provision for profit, carriage, packing, &c., and fixing, in the preparation of his estimate." Frequently, in order to make things very clear, the paperhangings have a special note in addition. The discounts, amounting to one-third or one-half (and even three-fourths in the case of old machine-made papers), are answerable for this amplitude of explanation; and the note probably runs thus, "the prices of paperhangings are to be understood as being the current nominal retail prices of good manufacturers." Without these precautions the question is sure to be raised, and to be slurred over in a spirit of compromise, or decided by an arbitrator who tries to gather from the documents and by evidence the real intention of the parties to the contract. Many architects dislike such explanations, looking on them as cumbrous, and, in the case of prime cost being defined as actual cash payment, having a tendency towards looking unduly behind the scenes, and controlling the contractor's skill in buying and paying, and denying him the little advantages which he can secure by special bargains and cash payments. These architects, therefore, content themselves with providing sums, and the goods selected will cost those sums at retail prices; the contractor may then make his own terms and pay accordingly. If the architect finds that the employer is not likely to get good value at a place selected by the contractor, another place will be selected, and better value obtained,—always for the retail prices. Unfortunately the system of trade discounts is much misunderstood. Judges on the bench have in our hearing protested against the discounts, thinking them the same thing as "secret commissions," and thus looking on them as one might on the receipt of a consideration to do evil. They are, in fact, allowances to constant customers who do a fair amount of business, and are served at less cost, and with more satisfaction, than chance customers who buy one thing and never come again.

THE interesting and varied series of water-colour sketches by Mr. Ernest George, which are now being exhibited at the rooms of the Fine Art Society in Bond-street, should be attractive alike to architects and amateurs. They represent many phases of Mediæval architecture on its picturesque side. The work of an able architect, the drawings will be regarded with confidence by architects as likely to be trustworthy in detail, while to the amateur they represent that view of architecture which all persons with a cultivated taste for what is characteristic and picturesque can appreciate, even without any knowledge of architectural history and construction; though, of course, such knowledge will add very much to the interest of the collection. In one sense only the drawings differ from what a painter, as distinguished from an architect, would have produced; for Mr. George, looking mainly to architectural form and character, works with a restricted palette and with apparently little regard to effect of climate and atmosphere, so that the Scotch and Spanish subjects, which are side by side, seem to belong to the same climate. The drawings, which number nearly 300, and are, we understand, only the work of brief holiday periods, show a remarkable facility of work, in addition to the artistic power and effectiveness of many of them. They afford also a very interesting comparative view of the characteristics of picturesque architecture in the various countries of Europe. We come from the Château de Chambord (25), with its mixed expression of refinement and tyranny, to the old street at Vitré (43), with its piers and beams made before the day of competition estimates; from San Gemignano with its brutal chimney-like towers, emblems of ferocious warfare only, to the elegant campanile of the Renaissance and the octagon towers of Spain; and so on through a score of significant contrasts. All architectural students should look at the collection.

MR. RUSKIN commenced last Saturday at Oxford his series of lectures on "The Pleasures of England," which, in other words (for Mr. Ruskin happily never says anything like other people,—"for which relief, much thanks"), means a sketch of the art history of England, regarding art from the people's side, as representing what they really took "pleasure" in at various times. Of course Mr. Ruskin looks at the subject from a moral and not from a merely "art-critical" point of view. His opening lecture was on "the pleasures of learning," by which we presume he means the period when early Saxon England was slowly learning an art from the vague and half-forgotten hints which had made their way from the fields of the dead Classic art. Curious, as Mr. Ruskin suggests, to consider what we might have been "if no Roman missionary had ever passed the Alps in charity and no English king in pilgrimage; what the clay of the Isis might have yielded if it had never been touched by the spear of Pallas and the rod of Agricola." The course of lectures will probably be of great interest and full of brilliant suggestions, but we regret to observe that the concluding one, on the mechanical age of to-day, is entitled the "Pleasures of Nonsense." It is regrettable that any one of Mr. Ruskin's earnestness and eloquence should deliberately refuse to see how much of greatness, of energy, of healthy influence there has been in that era of machinery which he despises, partly because he does not understand it.

FEW artists, even among those of marked ability, will bear the trial of having a large number of their works exhibited together, and Mr. Ernest Parton is not one of the few. A number of oil studies from nature by this artist are now on view at Messrs. Dowdeswell's. Seen separately, they would impress us, as Mr. Parton's finished pictures do, as the work of an artist with a true feeling for nature, and a style at once broad and delicate in its translation of natural beauty through the medium of oil painting. But the collection of 100 of his studies together shows that, beautiful as they are in style, the artist's powers move within rather narrow limits. Nature is always the same colour to Mr. Parton, whatever scene he paints, and at whatever time of day; and except one or two sunsets (rather crude), he seems practically to have only one effect. It is a very good one, but—*toujours perdrix*. Some small drawings by Mr. Chas. Robertson, of coast scenery, in the same room, are worth attention. In some of them Mr. Robertson seems to have been emulating the style of small finished water-colours, pictures in miniature, which Turner did for engraving.

WE regret to hear that Mr. G. H. Birch, who designed and superintended the erection of the old London Street which has unquestionably been the central attraction to an immense number of those who have visited the Health Exhibition, has had but a very meagre recompense for his labours, having had to pay out of his own pocket the clerk of works' salary and other incidental expenses, amounting to more than 25 per cent. out of a fee somewhat inadequate to begin with. Surely the committee for carrying out the work should have been aware that the clerk of works' salary, at least, is always paid by the building owner, not by the architect. Mr. Birch has further had the pleasure of seeing an illustrated guide to the "street" brought out by a large publishing firm, without any consultation with him, swarming with mistakes and describing houses that are not in the street at all. Mr. Birch has every right to feel proud of his work, which has given pleasure and interest to many thousands of people, but, apparently, virtue is mainly its own reward in this case.

MR. DOBBS, the champion of the consumer against the water companies, has published an audited statement of accounts of the money subscribed by public bodies and private individuals to arm this modern St. George for his conflict with the dragon. The costs have been somewhat heavy, but, says Mr. Dobbs, "Bearing in mind that not only the annual income, but the capitalised amount to be paid under any compensation, is affected by the case; and considering that this has been accomplished by an expenditure of less than 800*l.*, I think the result will be satisfactory to London; and I may look back on my three years' work and anxiety without regret." Mr. Dobbs proceeds to draw attention to the still unsatisfactory state of several matters connected with the metropolitan water supply, such as the increased charges lately made for water rate on business premises, the want of any decision of the Courts of Law as to the proper method of supply to such premises, the state of the law as to charges for stable and coach-house supply, the regulations as to fittings for constant supply, and, of greatest importance, the unregulated power of cutting off supply as the readiest means of compelling acquiescence in doubtful claims.

AMONG stray exhibits at the Health Exhibition which deserve mention is a model showing "Quayle's Patent" for a new way of connecting guard-bars with window-sashes, the bars being attached to the under-side of the bottom bar of the sash and rising through the sill when the sash is raised. A simple means of disconnecting the bars at pleasure is provided, but this can also be locked by a key working in the sash bar, so as to prevent any but the master hand from disconnecting them. This provision for the security afforded by bars, without their unsightly appearance as a permanent screen to the exterior of the window, ought to be very useful in such buildings as lunatic asylums and hospitals, and also in the nurseries of private houses.

FROM a Melbourne paper we notice that an interesting lecture was given before the Adelaide Chamber of Commerce, by Mr. T. W. Chambers, hon. secretary to the River Darling Navigation Company, on making the Darling navigable all the year round, and that a committee had been formed to co-operate with that company in their endeavour to carry out the project. It appears that the New South Wales Government is desirous of diverting the trade of the district of Riverina from Melbourne and Adelaide to Sydney, whereas its natural outlet is by the rivers Darling and Murray; but owing to an insufficiency of water, the former is often closed for more than six months in the year. It seems that though this state of things has repeatedly been brought to their notice, the New South Wales Government refuse to apply any remedy. Mr. Gordon, "the well-known Victorian hydraulic engineer," reported that it would be possible to lock the Darling from Wentworth to Wilcannia, so as to make it permanently navigable, for 310,000*l.*, and that the annual cost of maintenance would be only 7,250*l.* The scheme, if carried out, will yield, it is estimated, a return to the shareholders of 8 per cent., and be of immense advantage alike to Riverina, Victoria, and South Australia.

PREVIOUSLY to 1829 the angle formed by the north transept and choir at St. Giles's Cathedral, Edinburgh, was occupied by a building of several stories, having a domestic aspect, and which may have been the residence of the sacristan. In order to make this building correspond in outward appearance with the chapel of St. Eloie, which occupies a similar position to the west of the transept, Mr. Burn caused large three-light traceried windows to be inserted in the outward walls to the north and east, although internally there was only a room of about 11 ft. square cut off from the choir by a solid wall. This room was

fitted with a flat plaster roof, and was used as the vestry up to the time of the restoration undertaken by the late Dr. William Chambers. The architect of the restoration, Mr. W. Hay, proposes to open up this chamber towards the choir by forming a boldly moulded arch, stripping off the lath and plaster from the walls and substituting a stone groined roof for the plaster one. The walls would be faced with stone, the floor paved with marble and screened off by a wrought-iron railing similar to those of the other chapels. It was suggested that the chapel thus formed should serve as a memorial of and be occupied by a recumbent figure of the restorer. Instead of the effigy the Lord Provost's Committee have expressed a preference for filling the windows of the chapel with stained glass, but this it is thought might be left to private donors, who, as experience has shown, are ready to undertake this part of the work.

THE "Union Centrale des Arts Décoratifs" continues with varying success its course of meetings and lectures. After M. Baudot on ceramic art, followed M. Appert on glass-work, and M. Ph. Burty with another critique on ceramic art, but on that of Japan and the far East more particularly. A lecture by M. Paul Sédille on contemporary architecture in France and the rest of Europe is expected to be given shortly.

THE annual public meeting of the "Académie des Beaux-Arts," in Paris, which took place last Saturday, went off with more than usual *éclat*. The musical performances, consisting of an "Ouverture Symphonique," composed by M. Broutin, a "pensionnaire" student at Rome, and a "scene lyrique" by M. Debussy, the holder of the first "Grand Prix" for musical composition, are spoken of as exhibiting qualities beyond those of students' compositions generally. In the discourse of the President, M. Guillaume, the unity and relationship of the arts seem to have been especially recognised in a passage which is in other respects sufficiently suggestive for quotation:—"Le point essentiel est toujours de savoir si ce que l'on peint, si ce que l'on sculpte, si ce que l'on chante est l'exacte expression de ce qu'il y a de plus profond dans le sentiment, si l'on ne sacrifie rien de cette vision, invisible à tout autre, que l'on porte en soi, si on ne lui donne pas une forme mensongère, si l'on ne se trahit pas. Cas de conscience perpétuel, dirai-je, travail d'honneur que l'artiste doit faire sur lui-même, et qui, dans l'élaboration mystérieuse de son œuvre, est le seul dont il ait le secret."

THE Metropolitan Board, at their meeting on Friday last, declined to grant a certificate under the Metropolis Management and Building Act (Amendment) Act, 1878, in respect of the large concert-room (to be called Connaught Hall), at the west end of the Albert Exhibition Building, Prince of Wales's-road, Battersea Park, on the ground that the building does not comply with the Board's regulations with regard to places of public entertainment. The building in question has, however, been licensed by the Surrey magistrates apparently without waiting for the Board's certificate.

THE Joint Committee of the Metropolitan and Metropolitan District Railways have sent us a formal announcement that in consequence of numerous suggestions they have altered the name of "Eastcheap" Station on their new length of line to "Monument Station." One name seems to us as good as the other for practical purposes, and "Eastcheap" goes much further back in the history of London than "Monument." It would be more to the purpose if the directors would direct their minds to the "numerous suggestions" they have received as to the necessity of accelerating the traffic on the line. That we should arrive at a station in decent time is of more importance to most of us than what name we shall find it called by when we do arrive.

## NEW LIGHT ON THE HERMES OF PRAXITELES.

THE German excavations at Olympia are long since closed. It is scarcely possible that the deserted plain will give up a new statue by Praxiteles, or even a fresh fragment of a pediment by Pæonios. But when the actual discoverer,—the excavator,—ceases from his labour a new work sets in scarcely second in importance. Discovery is over, interpretation begins. Only a few can discover, the field of interpretation is open to all. The mass of material remains the same, but from time to time this or that monument is lighted up with fresh light,—an unexpected link binds the known to the unknown,—an unmeaning, isolated detail wins by a right juxtaposition its right significance. Dr. Purgold, in his "Olympische Weihgeschenke," has made no new discovery; but, in a wonderfully ingenious way, he has seen the meaning and relation of two or three old ones, and by so doing has incidentally given us a more secure foothold for dating the famous Hermes of Praxiteles. His ingenuity, though equally great, might have won him less applause had it involved any statue less widely popular.

We all know where the statue was found, and what Pausanias said of its surroundings when he noted it in the Heraion. In this ancient sanctuary, "more museum than temple," as it has been happily called, his admiration was aroused by the great number and beauty of the archaic works of art there gathered together, the old chest of Cypselus and a host of other curious works in gold and ivory. But, as he passed out of the Heraion, he noted three other works standing within the cella, works which *had been added later*. These were the well-known Hermes and an Aphrodite by Kleon; and, further, in front of the Aphrodite, the statue of a naked boy gilt over, which, Pausanias adds, was the work of Boëthos of Carthage. The Aphrodite we may dismiss, only noting that it was the work of Kleon. We know that he made another statue for an Olympian shrine about 384 B.C., so that he may quite naturally have been still at work about 360 B.C., the date we shall seek to establish.

It is on this other statue of the naked golden child or babe *παιδίον* that Dr. Purgold has expended his ingenuity. It has puzzled archæologists a good deal. The fact that Pausanias leaves it unnamed and unexplained has led many to suppose that it was a mere *genre* composition of no mythological significance, and, relying on this theory, Dr. Overbeck has sought to identify it with the famous Capitoline "Boy extracting the Thorn." But Dr. Purgold has something better to offer us. He starts naturally from the assumption that a statue, occupying an important place in a shrine so important as the Heraion, would have some well-defined and weighty significance. He happily recalls that in a terrible crisis of the affairs of Olympia a very significant part was once played by a naked child. Pausanias himself tells the story (vi. 20, 4 and 5). But he tells it not *apropos* of the child in the Heraion, but when describing the sanctuary of Sosipolis (saviour of the State). The Eleans, the proper owners and defenders of the Olympian plain and its sacred games, were hard pressed by the Arcadians; the boy Sosipolis was as yet a child at his mother's breast, and the mother dreamed that the child should save the Elean host. They placed the child naked in front of their battle array, and as the Arcadians came up, the child was changed into a snake, and, panic-stricken at the omen, the Arcadians broke and fled. The Eleans consecrated a shrine in their capital to their deliverer, Sosipolis, building it near to the temple of the goddess Tyche (Fortune). In the shrine was a *picture* of Sosipolis,—he was represented as a child dressed in a chlamys, spotted with stars (no doubt to indicate the metamorphosis into a snake), and in one hand he held the horn of Amaltheia. Another picture of him was exhibited on the actual spot where he was said to have appeared.

No record is left us of a statue of the saviour-child, and yet what more probable, what more almost certain, than that such a statue existed. And if it did exist, what place more likely for its exhibition than the Heraion? The shrine proper of Sosipolis was only accessible to the priestess. It stood on the Kronion-hill, at the foot of which lay the Heraion, ready to hand for a commemorative statue.

The question of the identification of this child statue by Boëthos with Sosipolis is in itself of great interest, but it gains double interest from the fact that it forms one of the group of statues "added later," to which the famous Hermes belongs. If we can date this Boëthos statue, and if it be Sosipolis, it follows that we can date the Hermes.

But supposing we grant that the child statue represents Sosipolis, how do we securely date it? When by the help of the child Sosipolis, the Arcadian host was driven back, the Eleans in their gratitude dedicated not only the shrine we have mentioned, but also a colossal bronze statue of Zeus himself, the largest that the sacred altis contained. Its height was 70 ft. The statue has, need we say, perished; but near the east front of the Temple of Zeus, on the north side, a fragment of a huge bathron, or statue basis, has been found, the dimensions of which would suit just such a colossal statue, and happily the inscription remains in part. "Of the Eleans, concerning their treaty (*ὁμονοίαρ*)." In this inscription the retention of the digamma, and the irregular characteristic form of the letters, specially the N, lead epigraphists to date it as not later than the first half of the fourth century B.C. It is just at this time that the event falls to which almost without doubt the inscription refers, *i.e.*, the Arcadian invasion. The terms of the inscription are peculiar, and can scarcely refer to any other event; the colossal bronze statue was not an anathema of the ordinary sort, not made out of the spoils of a conquered foe, but it was *περὶ ὁμονοίαρ*, concerning a union or treaty only temporarily disturbed. The Arcadians themselves felt that the struggle was an impious one,—religious scruples led to dissension in their camp. The sacred festivals could only prosper when conducted by the chosen tribe of the Eleans. Accordingly, the war ended rather in treaty than defeat, and the bronze Zeus may have been even a joint offering to symbolise unity restored.

Gathering together, then, the scattered threads of our evidence, we shall not be far wrong if we closely associate together the little group of statues added later, which Pausanias saw in the Heraion, and add to them the inscribed basis of the Zeus colossus. About 360 B.C. occurred the Arcadian disaster. The invasion had devastated a great part of the altis, and from the position of the memorial temple we may suppose that the Heraion suffered exceptionally. Architecturally, it is plain enough that before the statue of the Hermes was set up the building had undergone restoration, the cella had been rebuilt, and the statues *added later*, *i.e.*, the Aphrodite, the Sosipolis, and the Hermes, are placed with a view to the new restoration. Immediately after the repulse of the Arcadians we may then picture to ourselves an energetic restoration of the devastated altis and an eager dedication of new temples and statues. The Heraion is rebuilt, and in the restored building is placed the Aphrodite, possibly a successor of some destroyed statue; the Sosipolis, in honour of the saviour of the State; and the Hermes, carrying the child Dionysos. Dionysos was a child held in special reverence by the victorious Eleans,—his childhood was thus represented in the Heraion, while by the same artist Praxiteles, and, probably, in honour of the same victory, there was set up at Elis a statue of Dionysos full-grown. It seems possible, though Dr. Purgold does not suggest this, that the *infant* Dionysos in the Heraion may have been suggested by the *infant* Sosipolis.

Not only was the old Heraion restored, but the new shrines to Sosipolis and Tyche were built, and possibly to the same date belongs the Metroon.

Such a period of restoration, religious enthusiasm, and artistic activity would well accord with the political unity and strength brought about by the Theban supremacy. Anyhow it gives to a statue which has hitherto stood somewhat solitary in its fame, a background and a fitness of circumstance which, once conjectured, we should be loth to forego. It also accords well with Professor Brunn's view that the Hermes belongs to an early period of the activity of Praxiteles.

Dr. Purgold's ingenious essay forms a very fitting part of the birth-day volume dedicated to the great Olympian discoverer, Professor Ernst Curtius, on his seventieth birthday,—a work we may notice on another occasion.

## LONDON WATER SUPPLY.

The fourth annual statement* by Mr. Alfred Lass, comprising an analysis of the accounts of the Metropolitan Water Companies has just been published, and will, no doubt, be scanned with interest by not only those who are interested in their welfare, but by many who feel that the prosperity of the companies is obtained at the expense of their customers. As it may not be in the power, however, and still less in the inclination of many to pay 15s. for a copy of the statement, we propose making a short abstract of the principal facts and figures recorded in it. The public generally are little aware of the enormous duty which the several water companies have to perform in order to supply the wants of the metropolis. During the past year 654,102 houses have been furnished with an average of 226 gallons daily, and a population of 4,913,513 persons have received 30·31 gallons each per day, the supply varying from 42 gallons by the Chelsea works to 26·11 gallons in the West Middlesex district, inclusive of all purposes, while the consumption per head for domestic purposes only has ranged from 30·41 gallons in Chelsea to 20·89 gallons in the Middlesex district, giving an average of 24·25 gallons. Of the 654,102 houses 237,826, or a little over one-third only, are furnished with a constant supply, notwithstanding that during the year 35,383 houses have received that boon; but, as during the same period 20,688 additional houses have had to be supplied with water, it must necessarily take some time before the constant supply can be made general. The aggregate quantity of water contributed throughout the twelve months by the several companies amounts to the enormous volume of nearly 53,000 million gallons.

The finance of the companies stands as follows:—Of the total authorised capital of 14,483,774*l.*, nearly 13,297,000*l.* have been raised, leaving a balance of 1,375,328*l.* yet to be called up. The total sum expended amounts to 13,317,582*l.*, giving as the capital cost for the supply of 1,000,000 gallons 248·52*l.*, or nearly 5s. per 1,000 gallons.

The gross income is comprised of receipts under the two main heads of water-rates and miscellaneous items, the first of which amounts, after allowing for empty houses and bad debts, to over 1,611,000*l.*, yielding a rate of from 9·84 pence in the New River system to 4·48 pence in the East London works, and an average rate of 7·21 pence per 1,000 gallons, or 12 per cent. on the capital outlay. The cost of maintenance, inclusive of all items, is stated to be 2·05 pence per 1,000 gallons, or 28·19 per cent. of the gross income; but of this 8·36 pence are on account of pumping and filtration, which are scarcely items of maintenance, as that is a term more generally implying the outlay necessary for an effective upkeep of the various parts of a system together with the cost of supervision. The maintenance of the reservoirs and mains amounts to 5·17 per cent. of the gross income, and the salaries of engineers, &c., to 3·36, rates and taxes to 7·41, while the balance is made up of miscellaneous charges. To these expenses has to be added the cost of management, which includes the fees to directors, auditors, secretaries, and other officials, to collectors, the general establishment, and law and Parliamentary charges, the total amounting to 123,522*l.*, or 7·60 per cent. of the gross income. The combined expenses of maintenance and management reach the large total of 581,708*l.*, and form a charge of 35·79 on the gross income, thus leaving a sum, inclusive of a few other sundry items, of 1,049,438*l.* as "gross profit." From this latter sum has to be deducted interest on loan capital, Debenture and Preference Stocks, amounting to 151,481*l.*, leaving a net profit of 897,957*l.*, equal to 4d. per 1,000 gallons, and yielding an average dividend of 9·35 per cent. on the stock and share capital. The West Middlesex and New River Works produce the highest dividend, viz., 11·50 and 11·29 per cent., while the Chelsea Works yield only 7·24. The net profit per 1,000 gallons is greatest in the New River and Kent Companies, being over 5d., while that on the East London and Southwark and Vauxhall is less than half that sum. The rates charged by the same companies are 10·64d., and 7·64d. in the one case, and 4·6d. and 6·5d. in the other. These figures tend to show the inequality in the rating, while the great excess of profits accruing to the companies which charge the higher rates shows that such rates are not necessarily called for by any increase of first cost or subsequent maintenance. The prices charged are unquestionably much higher than should be levied for such an absolute necessary of life, but, until the question of water supply is taken up and dealt with as a whole by some central authority, the public must continue to suffer from the loose legislation which placed such great powers in the hands of the metropolitan companies, from whose exactions not even the judgment delivered in the Dobbs case seems likely to afford much relief. The preparation of the statistics contained in Mr. Lass's pamphlet must have involved a vast amount of time and labour, but it is to be regretted that its price has been pitched so high; for it cannot but limit the sale considerably amongst a numerous class of householders to whom the information it contains would be very acceptable.

* Analysis of the Accounts of the Metropolitan Water Companies, 1883-84. By Alfred Lass, F.C.A. London: Walter King.

## STOVES, GRATES, AND GAS STOVES AT THE HEALTH EXHIBITION.

We this week conclude our notice of the contents of the East Arcade, but, before referring to the exhibits of firms which have not yet been mentioned, we revert for a moment to our former notice (p. 487, *ante*), in which we inadvertently omitted to call attention to a grate shown by the Coalbrookdale Company which, in the opinion of some architects who have seen it, possesses qualities that are likely to secure for it a foremost place among the best types of ventilating grates. It is claimed for it that without infringing any patent it is so constructed as to combine all the advantages of the best-known grates, including the "slow-combustion,"—*minus* the "fire smothered in its own ashes." This grate is named "Crane's improved ventilating grate."

Stand 619 is occupied by Messrs. Smith & Co., of Osborne Works, Blackheath, who exhibit a kitchener, the "Blackheath," which possesses some good points.

Gas cooking and heating stoves are shown in great variety and abundance, and in many of them marked improvements are visible. The great convenience and cleanliness of most of these appliances will, without doubt, as time goes on, do much to make their adoption general for at least a portion of the year. In them the supporters of the smoke-abatement movement will find much help in the crusade against soot and dirt. Among the exhibitors of gas stoves are Messrs. John Wright & Co., of Birmingham (Stand 620), who show their "Eureka" gas cooker, which is very conveniently arranged. By lining the interior with a non-conducting substance, the consumption of gas is diminished, it is asserted, by as much as 40 per cent.

Stand 621 is occupied by Mr. J. B. Petter, of Yeovil, with his very ingenious "Nautilus" grate, which has now been before the public for some time, and has met with much approval. In cross-section the grate, which gives a pleasant open fire,—resembles a nautilus shell. In summer the grate may be lifted out and the fireplace recess filled with plants and flowers.

Mr. Edward Bingham (Stand 622) exhibits dog-grates, slow-combustion stoves, and ventilating and warm-air chamber stoves.

At Stand 623 Messrs. Fredk. Edwards & Son, of Great Marlborough-street, exhibit their "Economic" slow-combustion tiled kitchener, with loose ash-plate for stopping the supply of air to the under-grating, and with plate to close in front of the fire, so that the fire could be kept in continuously if required. The same firm also show their improved slow-combustion and smoke-abatement grates.

Mr. T. J. Constantine, of Fleet-street (Stand 624), shows his "Treasure" ranges, and utensils used in connexion therewith.

At Stand 627, Messrs. Benham & Sons, of Wigmore-street, show (besides their ventilating globe-light as improved for use in hospitals), the "Wigmore" range, Edwards's smokeless grate, and Benham's ventilating kitchener.

Messrs. H. & C. Davis & Co., of Camberwell (Stand 628), are exhibitors of a very good gas cooking-stove, the "Metropolitan," which appears to be both convenient and economical. The same firm are exhibitors of the patent "Thermo-hygienic" heating and ventilating stoves, in which gas is the heating agent; the heat is utilised in the most economical manner, and the products of combustion cannot pass into the apartment to be warmed.

Mr. James Keith, of Arbroath (Stand 629), exhibits his "open-fire hot-water apparatus," and his patent sectional "Challenge" boilers for hot-water heating. These boilers are constructed of sections placed one above another in such a manner as to give about ten times the heating surface of ordinary saddle boilers, and they are complete in themselves, requiring no brick setting, the fire being wholly "water-jacketted." The construction is very ingenious, and the arrangement and form of the sections are such as to ensure the minimum amount of fire to produce a given effect. An interesting exhibit at this stand is a model of the oil-gas apparatus which Mr. Keith is now erecting for Ailsa Craig Lighthouse, upon the recommendation of Messrs. D. & T. Stevenson, the engineers to the Commissioners of Northern Lighthouses.

At Stand 631 Messrs. Brown & Green, of Luton, exhibit a smoke-consuming kitchener burning common coal.

Messrs. Martineau & Smith, of Birmingham (Stand 632), exhibit some useful steam kettles or water-boilers, as used by the Birmingham Coffee-House Company. By the aid of one of these kettles, 20 gallons of water can be boiled in three minutes from the time the steam is admitted to the steam jacket.

At Stand 633, Messrs. W. & S. Deards, of Harlow, exhibit the "Princess Louise" open-fire coil-grate, in which the fire-bars form parts of coil-circuits which pass round the room. It appears to be well adapted for warming school-rooms, &c.

Messrs. Deane & Co., of King William-street (Stand 634), exhibit a variety of gas cooking and heating stoves, patented by Mr. Fletcher, of Warrington, with his "solid-flame" burners for boiling. These will repay examination, and the same may be said of the numerous workshop stoves made by Mr. Fletcher for use in various technical processes.

At Stand 636 Mr. John Bell, of Southwark-street, exhibits asbestos as applied in gas-stoves, &c.; he also shows an asbestos fire-proof plaster.

Mr. William Hellier (Stand 637) exhibits a "water-heater," as well as a simple arrangement for heating conservatories, greenhouses, &c., by gas or oil fuel, without the possibility of the fumes of the gas or oil escaping into the apartment to be warmed.

Stand 638 is occupied by Jaffray's Patent Grate Company, of Charing-cross. The grate which they exhibit is constructed to burn ordinary coal, and has an arrangement for consuming its own smoke. The fire produced by it is very bright and cheerful, and radiates a considerable amount of heat, while it is economical in its consumption of fuel. It will burn either bituminous coal or anthracite.

At Stand 651, Messrs. Wm. Sugg & Co., Limited, show their "Charing-cross" Gas Kitchener,—a convenient apparatus combining facilities for roasting, boiling, frying, grilling, and baking.

Messrs. Davis & Sons, of Bath (Stand 653), exhibit some well-made gas cooking stoves.

Dr. W. H. Stephenson, of Blackburn (Stand 654), exhibits his portable gas-heating water coils, which are constructed of a series of double copper tubes, 4½ in. in diameter, placed one above the other, and connected at each end. An ingenious automatic heat-regulator is shown in action by the same exhibitor.

At Stand 655 Messrs. Pugh Brothers, of Highbury, show a new gas-fire fitted with prepared asbestos fuel.

Mr. R. E. Cox, architect, of High Holborn (Stand 656), exhibits his patented improvements in grates. These improvements are well worthy of notice, for it is claimed that in virtue of them an ordinary grate can be converted into a smokeless slow combustion stove at little expense. We have not space to describe them in detail, but we may say that they are shown applied to a common register stove, so that if Mr. Cox's invention be all that Professor Ayrton's report upon it would seem to indicate, there is hope of obtaining efficiency and economy in our domestic fireplaces.

Mr. H. H. Hazard (Stand 657), of Knightsbridge, exhibits some gas cooking stoves of novel arrangement, patented by M. Chabrier, of Paris. One of these stoves is specially designed to be placed on the top of a disused coal-burning kitchener during the summer months. All these stoves appear to possess considerable merit, the roasting and broiling burners giving

a bright radiating flame, whilst the burners for boiling (which are on the atmospheric principle) exhibit novelty of arrangement and construction, whereby they can be instantaneously taken out and washed.

At Stand 660 Messrs. Edward Davis & Son, of York-street, Westminster, exhibit some gas-cooking stoves which have their ovens lined with white tiles.

Messrs. Charles Wilson & Sons, of Leeds (Stand 661) exhibit gas-cooking and heating stoves, bath-heaters, and a new patent gas-fire.

Mr. J. G. Wagstaff, of Dukinfield (Stand 662), shows some patent saddle and cylindrical boilers, coils, coil-cases, &c.

Messrs. Musgrave & Co., of Belfast (Stand 663), exhibit one of their admirable slow-combustion ventilating double-chambered stoves, which will burn for several hours without attention. The fireplace is lined with fire-clay, and holds sufficient fuel to last for from eight to twenty-four hours. It is fed through a door on the top or front, and there is another door in front which admits the air for combustion, and allows the ashes to be removed. It is also provided with a hot-air chamber, through which the cool air of the apartment passes. This stove, if placed in the hall, will keep up a supply of warmed fresh air for the whole house.

Mr. Alfred Churchman, of Fulham (Stand 665), exhibits a new asbestos gas fire stove, with a special arrangement for regulating the amount of heat.

Messrs. J. Nettleton & Co. (Stand 666), of Sloane-square, exhibit their patent open and close fire heating-stoves, constructed with a view to supply warm fresh air to buildings. It is claimed that by the use of these stoves the warm air supplied is unburnt. The stoves will burn for from six to nine hours without attention.

At Stand 670, Messrs. Geo. Wright & Co., of Queen Victoria-street, exhibit Dyer's patent front fire-bars for domestic stoves. The improvement consists in arranging the bars louvre-fashion, the lower edges of the bars being towards the fire, so that the bars slope upwards and outwards. It is claimed for them that by their use fireguards are rendered unnecessary, that cinders and dust cannot fall out in front, and that the radiation of the heat of the fire is much improved.

The Eagle Range Company (Stand 671), of Regent-street, show their speciality, which has been mentioned by us on previous occasions.

Messrs. Beynon & Cox, of Torquay (Stand 672), exhibit gas-cooking stoves so arranged as to prevent the fumes of the gas from coming in connexion with the food placed in them.

At Stand 674 Messrs. Adams & Son, of the Haymarket, exhibit Captain Warren's patent cooking apparatus, as adopted by H.M. War Department.

Mr. D. O. Boyd (Stand 678), of Maddox-street, shows his patent Hygiastic "Fisheries" grate, so named, we presume, because it was used at the "Fisheries" Exhibition. It affords an admirable means of warming and ventilating hospitals, schools, and all large rooms requiring an abundant supply of warmed fresh air.

Messrs. Hearder & Son, of Plymouth (Stand 679), exhibit a slow-combustion improved Arnott stove.

Mr. Henry Masters, architect, Bristol (Stand 681), exhibits a method of heating by gas tubular condensing and evaporating apparatus. The apparatus consists of two hollow pedestals connected together by twenty horizontal tubes, all made of sheet metal, and it is so arranged that the products from two gas-burners, one at the base of each pedestal, shall circulate through the pedestal and the whole of the tubes, backward, then forward, and then pass out of an aperture or chimney. The distance travelled by the gas in this apparatus is about 15 ft., and the heating surface about 40 ft. The inventor says that, in his experience, he has found that if the products of burned gas be made to pass through a horizontal tube 16 ft. long, the quantity of moisture deposited upon the inside of such tube at its end checks the flow of the gas products,—so much so that it becomes nearly stagnant, and the difficulty of carrying off the fumes by a flue or pipe is retarded. He therefore allows the products in his apparatus to be checked at about 14 ft. by striking against a plate, which he names a condenser; the moisture is here partly collected and passes through tubes which convey it to evaporating troughs,—one over each burner, and it is dried up and leaves a deposit in the troughs which may be cleared out readily.

At Stand 683 Mr. Harry Hunt, of Newington Green, exhibits the "Crown Jewel" stove and the "Hygiene" ventilating hall stove. They are both American productions, the latter being an improvement upon the former. The stoves are made to burn coke or any kind of smokeless fuel, anthracite in particular. The "Hygiene" stove can be left without attention for twenty hours. The same firm are exhibitors of what are called "the patent gas-fumes neutraliser stoves,"—a very awkward name,—in which it is sought to neutralise the fumes or products of combustion by means of layers of silicated cotton and carbon. It is claimed for them that as no flue is required the whole of the heat generated is utilised. A cooking-stove on this principle, which is shown, consists of two separate parts, the top or hob, and the oven, either of which can be used independently.

In conclusion, we would only refer to the unsatisfactory lighting of this important section of the exhibition by night.

## THE PLUMBERS' CONGRESS.

This Congress was opened on Monday at the Technical Institute, South Kensington, under the presidency of Mr. George Shaw, Master of the Plumbers' Company. There was a very large attendance.

The Chairman, in commencing the proceedings, recapitulated what he had said at the preliminary meeting at the Guildhall (reported in the *Builder* three weeks ago, p. 472). He referred to the old ordinance of Edward III., which nearly covered the whole of the subjects they were to discuss, and said that they should endeavour to discover means by which the public would be protected from the serious evils arising from defective plumbing, by enforcing personal responsibility against those doing bad work. This could only practically be done by establishing a standard of excellence in work and material. He hoped their deliberations would tend in this direction. The Court of the Plumbers' Company were fully disposed to take action in the matter; and it was satisfactory to find that at last such a general movement was taking place.

Mr. Ernest Hart read a paper in support of the extension of the existing statute law as to house drainage in order to provide for the more efficient regulation and registration of plumbers. He referred to the carelessness of householders generally with the question of drainage until the matter was brought home to them by the occurrence of disease in their houses; and he pointed out that many cases of ill-health short of actual disease had their origin in the exhalation of sewer gas. After summarising the existing laws on the subject, he quoted Mr. Rogers Field's statement that he had only found three sound drains in the course of his eight or ten years' experience, and the figures recently announced by the London Sanitary Protection Association, as proofs that as a matter of fact the number of houses that could be regarded as safe from the irruption of sewer-air was very small indeed. Our public buildings did not set a good example in this respect, for one of the most flagrant cases of bad drainage ever seen had been observed at the office of the Local Government Board, the chief sanitary authority in the kingdom. He thought that much might be done by encouraging lectures to plumbers on the plan recently adopted by the National Health Society, and by affording opportunities for the systematic instruction of plumbers in their craft through the Plumbers' Company, or in some other authoritative way. His suggestions as to legislation were, that the powers of rural and urban authorities should be assimilated; that the principles of the Model By-laws as to new streets and buildings should be embodied in a Building Act to have universal application. All drainage works should be executed in accordance with plans and specifications previously approved by the local authority. No drainage works should be covered up until passed by the surveyor, and all drains should be tested before being passed. No new house should be allowed to be inhabited before being passed and certified by the surveyor. All plumbers should be registered and licensed, no work being allowed to be done by unlicensed plumbers, and no licence to be given except after examination. The licences should be renewed from year to year, and a list of licensed plumbers published annually. The reasonableness of these regulations he supported by what was being done in the chief American cities.

The first subject for discussion was "The Technical Instruction of Plumbers." On this subject,

Mr. W. Eassie, C.E., read a paper in which he contended that plumbers were often to blame for having fallen from the high position which the craft occupied in ancient times. The healthy conservatism of the trade had degenerated into unhealthy radicalism. Mere manual skill was not sufficient to make a finished workman, and he would not honour with the name of technical education the mere use of tools. It was to be regretted that the bulk of the literature of the trade had been of too elementary a character. In his opinion a technical knowledge of plumbing should consist not simply of using certain metals for certain purposes, but of a knowledge why they were so used. It should consist of being able to apportion the metals in case the plumber found himself in a new colony; of being able to sketch in minute detail any appliances; and of not only being able to execute work, but also to measure it up. There should also be sufficient knowledge to tell whether work would fail if carried out in the manner directed, and to provide a remedy. Architects and clerks of works were sometimes to blame in dealing with plumbing work, and showed a total lack of technical knowledge. The inexperienced architect specified that a soil pipe should be fixed inside the house, when it was usually to be found outside; the clerk of works passed it; the builder erected it; the surveyor measured it up; and yet the arrangements betokened a lack of the necessary knowledge. So things would continue until the status of the trade was raised, and until the plumber reached a stage which would enable him to become a teacher of his craft, and to refuse any ill-conceived work. The manual education of the plumber would be secured during his apprenticeship, and much practical work learned besides, but there was a great want of technical education, and the question was how this could best be imparted. It must be derived more or less from books. The mere seeing and handling of lead would not teach all its properties and applications, any more than a knowledge of the bones taught the practice of surgery,—hence the institution of the City and Guilds Institute, and of the various technical schools. There should be not only a written but an oral examination, besides a practical demonstration of the capabilities of the metals. He would be inclined to follow more or less closely the system adopted by the National Health Society in the plumbing competition inaugurated by Mr. Shaw; and would accord no medal in the first year to any but those who passed the ordeal with commendable credit. It would repay the candidate for coming a long distance to receive such a medal, as it would place his thorough competency beyond cavil.

Mr. C. T. Millis (of the Technical College, Finsbury) read a paper on the same subject, in which he urged that the instruction requisite for the plumber of the future should be divided into the following heads:—Mechanical drawing for the trade; practical work of the trade; and physics of the trade. Under the first head he would place practical geometry appertaining to the trade, including pattern-cutting, or the development of surfaces, and the making of working drawings from dimensioned rough sketches, to be done by the student from models of plumbing appliances and fittings. The second head included the manipulation of sheet-lead, elementary sheet metal work, and instruction in the various kinds of joints; while the third head comprised instruction in the physics of the trade, with laboratory work, by the aid of lectures and experiments. This latter would include the properties of metals and alloys, the composition of solder and the like, and the action of air and heat on molten metals. It was not to be expected that men who had reached middle age, or who had family or other ties, would take up the course of instruction put forward by him as needful for the plumber of the future. By the very words "of the future," young men were necessarily indicated, and it would be no heavy call on a young man to attend a course of instruction spread over (say) two years. When this was done, a plumber

would be as much trusted and praised as he had been abused of late years.

Mr. J. W. Clarke, a teacher of plumbers' work under the City and Guilds Institute, read a paper in which he contended that the meaning of technical education was not clearly understood by the London plumbers. No man could learn a trade by reading books or attending lectures. Technical education, as commonly understood, was not practical experience, and would never take its place. At the same time it was often asked, what was the good of a knowledge of technology? It might as well be asked, what was the good of brains? The plumber who knew something of the nature of the metals he used would take the precaution of protecting the public from injurious contact with noxious matters, and would know what should be used for each special purpose. A knowledge of hydraulics and hydrostatics, however elementary, was of great help to the plumber. He had never known an architect who gave detailed drawings for the plumber to work to, and the remedy for this was that the plumber should educate himself so that the architect would have confidence to advise with him personally. The plumber should know how to make drawings so as to be able to submit them to those in authority. It was necessary also that he should educate himself to prevent his being pushed aside by the sanitary engineers. The best solution of the problem was the establishment of trade scholarships. Through the munificence of the rich City Companies, schools could be opened in any place where a few plumbers were got together; but the plumbers themselves had not taken up the subject as they might.

Mr. E. G. Mawbey (Borough Surveyor of King's Lynn), in a paper read by him, stated that it was frequently found more difficult to convince the plumber than the owner of the necessity for modern sanitary arrangements. Plumbers, instead of opposing, should, in their own interests as well as for the benefit of the public, support the suggestions of experienced surveyors and sanitary inspectors. There was not so much difficulty in securing the technical education of plumbers in large cities and towns as in small towns and districts. This might, however, in the latter cases be effected to a great extent by holding plumbers' district meetings for the reading and discussion of papers, and the medical officers, local surveyors, and sanitary inspectors might be invited to take part therein, and the papers, &c., printed and circulated. The example of the Sanitary Institute might with advantage be followed by instituting examinations for plumbers and granting certificates to competent men.

In the discussion which followed,

Mr. Smeaton (London) maintained that the plumbers knew very well what they had to do. They had to get a living. A specification was put into their hands by a person who knew little about plumbing. The plumber was ordered to carry out his instructions and to mind his own business. The honest plumber was too often put on one side, and any one who could write on sanitary science came to the front. Competent plumbers only should be employed in connexion with technical instruction for the trade.

Mr. P. J. Davies (London) said that what was required was a number of duly registered instructors of the plumbers' trade. There should be an examiner in each district, and then there would be no difficulty in getting good plumbers. He was certain that members of the craft would never tolerate licences.

W. P. Buchan (Glasgow) contended that no man could learn the plumbing trade out of the shop. When a journeyman he had often to refuse to answer the questions of clerks of works, when under the master's order he had put on 5-lb. lead piping instead of 6 lb. lead. A knowledge of drawing lay at the root of the whole question of the education of the workmen.

Mr. Matkin was in favour of licensing plumbers.

Mr. Scott-Moncrieff (London) thought that the meeting should do something in the way of passing a resolution in favour of technical education. The day had nearly gone by when any plumber could take refuge under the failure of other tradesmen in connexion with the sanitation of a house.

Mr. Humphrey (Nottingham) considered that plumbers' work was not of the offensive character that should necessitate its being buried out of sight. The work should be open for inspection, and be thoroughly good work of its kind. The architect should be the ruling spirit in building work, but he should consult the men who had devoted their lives to particular branches of trade.

The chairman here suggested that some such resolution as the following should be passed:—

"That, in the opinion of this Congress, it is desirable that in future architects should not include plumbers' work in builders' contracts."

This was received with great applause, and was proposed by Mr. Clutterbuck, who said they had a right to protest against builders taking every kind of business in hand. Contracts should be divided, and so should the responsibility. The plumber would then receive 10 per cent. more for his work and the public be better served.

Mr. Firth (Kensington) seconded the resolution.

Mr. F. C. Penrose (architect) expressed his adherence to the separation of the plumbing work from builders' contracts.

Mr. Lane opposed the resolution, believing that divided responsibility would end in no responsibility.

Mr. Wandsborough contended that the action of the architects in including plumbers' quantities in building contracts had done more than anything to damage the trade. The architects would be serving the public better by conferring with practical men in their various spheres of work. If the work were divided it would open up facilities for the development of education, which masters at present could not afford to carry out.

The resolution was carried with one dissentient.

The next subject discussed was "Apprenticeship, the duration and condition of indentures suited to the present state of the plumbing trade, and to the modern system of technical instruction."

Mr. W. R. Maguire (Dublin) read a paper, in the course of which he said that the apprenticeship of plumbers should not be reduced to a shorter period than seven years, as of old time. The object should be not so much to induce apprentices to come in, as to insure that when they went out they should take with them a well-taught, well-learned, and well-practised handicraft for public benefit. Payment to apprentices should be formed more in accord with their value to their masters, than was now the case. Even if paid little in the first year there should be a tangible payment and steady advance of wages year by year. Employers being as different in character as workmen were, the Congress might frame some suggestions on the subject which would be accepted as a good guide by both employer and employed.

Mr. Frederick Fell (Worcester) followed with a paper on the same subject. Never in the history of the mechanical trades had so great a necessity existed for an apprenticeship of long duration and strict in its terms. Where the master confined his business strictly to plumbing, all that was needful might be learned in six years. He would like to see introduced into the indentures clauses compelling the apprentices to attend classes at properly-constituted Science and Technical Schools, and to pass at least two examinations during their term. The first of these should be simple and mainly practical, and the second one of a more searching character. No tradesman should be allowed to assume the responsible position of master, unless qualified to be one.

Mr. Smeaton in a paper contended that apprenticeship should be for at least five years, the most suitable time for which would be between the fifteenth and twentieth year. One or two evenings a week should be devoted to the study of the theory of plumbing, including drawing, geometry, water supply, heating, drainage, and the roofing of dwellings. The apprentice must be allowed, by mutual consent or arbitration, to have one master, and finish his term with another for the purpose of improving his knowledge of the trade. It would also be well if the indentures were endorsed as to the conduct and ability of the apprentice.

Mr. Scott-Moncrieff thought that five years would be a good period, with perhaps another two years as a term of probation in other workshops. He moved:—

"That, in the opinion of this Congress, it is desirable that the apprenticeship system should be continued, and modified, if necessary, to suit the improved course of technical education."

This was seconded by Mr. Stolder, and agreed to.

The third question discussed was, "The establishment of Metropolitan and Provincial Boards of Examiners of Plumbing Work."

Mr. P. J. Davies opened the subject with a paper, in which he advocated that a Metropolitan Board of Plumbers should be established, with head-quarters at the offices of the Plumbers' Company. The duty of the Board would be to examine plumbers both in theoretical and practical plumbing, and to grant to successful candidates a certificate and registration, which latter should qualify for the office of district examiner of sanitary plumbing work. If necessary, sub-committees should be established in large provincial towns to carry out the work in uniformity with the laws and regulations established by the Metropolitan Board of Plumbers, or by Parliament. The Committee should be made up of certificated plumbers.

Mr. E. Knight (Southwark) maintained that by the establishment of such boards, owners of houses would obtain certificates as to the proper sanitary condition of their dwellings. The advantage of this was manifest in connexion with the letting and selling of houses, and it would at once strike at the root of defective sanitation. The Board of Examiners should, if possible, be invested with some local authority, and should at all events hold a well-defined and acknowledged position. They would work in connexion with the parochial authorities, being careful at the same time not to usurp the duties of the inspector of nuisances. The charge for reports should be a small one. A board might be formed in the first instance from members of the Court of the Plumbers' Company, assisted perhaps by one or two professional gentlemen.

In the discussion which followed, Messrs. Moore, Underwood, and others took part. Dr. Vacher proposed:—

"That this Congress is of opinion that in the event of the establishment of Provincial Boards of Examiners of Plumbing work, such Boards (firstly) should be affiliated with a Metropolitan Board; (secondly) should consist chiefly of trained working plumbers; and (thirdly) should be in connexion with the provincial schools of plumbing."

Mr. A. B. Clarke seconded the resolution, which was carried.

The fourth subject was "The Registration of Journeymen Plumbers."

Mr. R. Smith (Bermondsey), who read a paper, was opposed to the proposed registration, as it would open up a field for many abuses, and ultimately do great harm to the trade. Any board of examiners would consist largely of members with theoretical qualifications, and such a class of judges would in time exclude the practical men. There were means in their midst for obtaining properly-qualified plumbers, viz., the trade societies. There was a prejudice against these, but he would ask what were the Plumbers' Company and the other guilds but trade societies? Plumbers were the only competent judges of plumbing, and the young man who joined a trade society had the benefit of the experience of the older workmen.

Mr. Smeaton advocated the granting of some such certificate as was given in America.

Mr. Houghton thought that if the masters were registered first it would have the effect of keeping linen-drapers and others from undertaking plumbing work.

The Chairman remarked that the registration would be a mark of high honour, showing that the person registered was a competent craftsman.

Mr. Swales said that in Melbourne plumbers had to pass an examination.

The Congress then rose for the day.

On re-assembling on Tuesday, again under the presidency of Mr. Shaw, the following resolution in continuation of the previous day's business, was passed:—

"That, in the opinion of this Congress, the registration of master plumbers and journeymen plumbers is expedient."

Mr. Webb read a paper on "The suitability of materials used in plumbing, and particularly of those materials recently introduced as substitutes for lead." There was, he said, no known substance to equal lead for wear. Properly laid, not condensed, well dripped, and with all the expansion possible, he contended it was the best. But they must adapt themselves to circumstances. In model dwelling-houses,

with drying-grounds at the top, it would be entirely out of place to use anything else but asphalte or cement and coke breeze. Turning to another substitute, viz., zinc, although much improved in the laying, it had no superiority over lead, being a hard metal without expansion, and liable to crack from the action of the acid in the process of soldering. With regard to cisterns he gave the preference to galvanised iron ones. In lead cisterns, and especially in certain districts, the action of water affected the weakest point of the cistern, viz., the outside of the soldering, and when the cistern was not frequently cleaned out small portions of the lead were liable to be imported into the system. Slate cisterns, as a substitute, would not stand the test; he had found in cleaning them out a slimy vegetable matter adhering to the sides, and there was a liability to leakage from vibration. With respect to soil-pipes he gave his allegiance to lead, and asked whether it was possible to make a caulked joint with iron lasting for any length of time? Shrinkage would occur in the cement of the joint, and the smell would exude. Turning to the question of closets, some good-looking pieces of porcelain had been introduced, but these were complicated in construction, and dirty from a sanitary point of view. He still adhered to the valve closet adopted by Bramah, but very much improved, for all private dwellings where supervision reigned. A very old servant, the pan-closet, had been harshly treated of late. Though long since condemned, it was still to a large extent in use, and would live as long as some of its contemporaries as a hard-wearing closet.

In the disussion which followed,

Mr. Davies said he considered the ordinary pan-closet was the filthiest thing in buildings.

Mr. Stolder affirmed that no cistern should be left for more than three months without cleaning.

Mr. Smith was not opposed to iron soil-pipes if they could be made sound. Iron and lead pipes did not always join well together; in a comparatively short time there was a crack in the joints, and the foul air would escape.

Mr. T. H. Court thought that plumbers should be allowed to use their discretion very much as to which was the best material to be used.

Mr. Underwood believed there was a great opportunity for plumbers to push lead as against zinc. For internal soil-pipes a good strong lead was the best, fitted neatly and well.

Dr. Vacher remarked that glazed earthenware was suitable for cisterns in country districts.

Mr. Smeaton was of opinion that lead was the most suitable material for soil or any other pipes, because good lead would stand the action of any amount of acids or air. He did not believe glazed earthenware used in water-closets or urinals would last more than twenty years. He had seen portions of the lead piping of the ancient conduit in Cheapside, and which was as good as on the day it was laid down. In the case of Glasgow, the engineer would not allow anything but lead to be used for the water-pipes, except for the large mains. He believed they all agreed that lead was the best material.

Mr. Buchan (Glasgow) read a paper on "The desirability of fixing upon a system by which uniformity in the quality of materials used in plumbing may be insured." In the course of it he said that the idea of enforcing uniformity in the materials used in plumbing was not new, as articles in connexion with the water supply of London and Glasgow had to bear an official stamp. No regulations, however, existed for roofing materials or soil-pipes. The practice of fixing thin cast-iron rain-water pipes inside houses, and especially to do duty as soil and waste-water pipes, should be prohibited. In many cases it was customary to discharge hot-water waste-pipes for baths and wash-basins into the soil-pipe for the closets. This was a bad plan, causing the soil-pipe to stink worse than with only cold water going through it. In addition to condemning thin iron pipes he objected to the way in which their joints were often made, viz., by merely plastering a little putty round the top of the joint. When the joints were not caulked and run with lead or sulphur, they should be rubbed with red lead, and the joints made with hemp dipped in red lead and twisted round the spigot end of the pipe. When in position the hemp should be rammed down and the joint run full with red lead.

In the discussion which followed, Mr. Coles remarked that a standard of the quality of materials should be fixed upon, to be specified in the tender.

An extra paper by Mr. Poole, of Norwood, on the same subject having been read,

Mr. Tidmas proposed,—

"That the Congress is of opinion that it is expedient that the system of sealing or marking lead and solder of standard weight and quality be revived by the Plumbers' Company, and that the Plumbers' Company should be requested to consider whether the materials used in plumbers' work as substitutes for lead are suitable, and whether standards of quality for such materials could be advantageously fixed on and verified by a recognised mark."

Mr. Smeaton seconded the resolution, which was carried.

Mr. F. Wells (Worcester) opened the question of "the formation of district associations of plumbers to investigate and secure, as far as practicable, correction of evils and abuses arising in connexion with the trade." If the formation of such associations would correct the evils of insanitary plumbing it would be a strong argument in their favour, and would effect a lasting good. Insanitary plumbing was the cause of a great amount of illness and death, and yet this sort of work was not only accepted, but sought after on the plea of cheapness. If district associations could be formed to correct these abuses, and carried on effectively, they would in the first place be the means of securing wholesome dwellings, and would give the honest tradesman his legitimate place in his trade.

Mr. Emptage (Margate) in a paper said that though much had been done through the labours of sanitarians and sanitary societies, it was small in comparison with what would be accomplished. Our American cousins had grappled ingeniously with the evils, and by the aid of a stringent plumbing law had almost regenerated the trade. In some places the law was carried out with great rigour, and he found that a plumber in New York was fined fifty dollars for putting in a dummy vent-pipe to a trap in the basement of a house; a master plumber was fined 150 dollars for allowing two dummy vent-pipes to be fixed; while another was fined 250 dollars for bad plumbing work in new buildings. An unregistered plumber lost the day in an action against a builder to recover his account for work done, because he was not registered, and was therefore working contrary to law. On the other hand, the permissive nature of our laws in regard to sanitary matters too frequently resulted in the presence upon our local boards of unscrupulous builders, and interested parties who used their position to silence the surveyor. The American law had been in force for more than three years, and seemed to work well. It protected the plumber to a great extent from dangerous competition, and enabled him to do honest work. There would be considerable difficulty in getting such a stringent law passed in England, but they might, with a good chance of ultimate success, aim at obtaining Parliamentary powers whereby all plumbing work in connexion with sanitation would be carried out under the strict supervision of properly appointed and duly qualified persons, upon certain fixed and sound sanitary principles.

Mr. John Bailey thought it would be better to form associations to remodel their craft, than to allow it to dwindle into mere tinkership. He would call attention to the fact that the general public when they had cause of complaint against the trade were not aware that the plumbers did not design their own work, but were in reality carrying out other people's ideas of sanitation. It was his opinion, after forty-five years' experience, that it was necessary to form metropolitan and provincial associations, not simply for themselves, but for the registration of journeymen plumbers.

Mr. T. H. Court, in a paper, referred to the necessity which existed for an investigation of plumbers' work. Architects in some instances, and the medical profession, were now giving more time and attention to the laws of sanitary science than at any previous period. He was sorry to say he had been compelled to condemn a large portion of the work he had seen in different parts of the country. They would all agree that there was the greatest necessity existing for a thorough investigation of plumbers' work, for the correction of evils and abuses. This should be done by associations formed for the purpose. It would tend to raise a trade which was second to none in importance, for upon the plumber's work more than upon that of any other trade did the health of the nation depend. The associations should be composed of plumbers, as the work to be inspected would be plumbers' work.

Mr. Allam (Eastbourne) proposed:—

"That the resolutions and conclusions set forth in the preceding paper be referred to the Plumbers' Guild, with a request that they will confer thereon, with a view to take such action as may seem best."

Mr. J. Murrell (Norwich) seconded the resolution, which was agreed to.

The Chairman, in summing up the work of the Congress, expressed the hope that it would result in the formation of a representative committee to carry out the recommendations and suggestions that had been made. He congratulated those who had attended the sittings on the practical character of the discussions and the genial manner in which they had been carried on, and thought it would only be the beginning of what would be an ultimate and general success.

A cordial vote of thanks to the chairman and to the Plumbers' Company closed the proceedings.

## GLASGOW INSTITUTE OF ARCHITECTS

The annual general meeting of this Institute was held on Wednesday, Mr. Jas. Thomson, F.R.I.B.A., president, in the chair. Mr. William Maclean, the secretary, read the annual report of the council.

The report contained the following passages:

"The Committee (Mr. Sellars, convener) appointed to consider the Rules and Regulations for the Measurement of Mason-work in this district, or wherever the Glasgow mode of measurement is adopted, have completed their work, and reported to the Council. They had before them the draft Rules prepared by the Institute, those prepared by the Institute of Measurers, and by the Master Masons' Association. After careful consideration of the three sets of Rules, the Committee found that, except in a few instances, there are no serious differences in the rules as prepared by the three bodies, and they recommend that representatives of the two Institutes and the Master Masons' Association should meet to discuss and, if possible, agree on one set of rules, so that uniformity of practice in regard to this important matter may be secured in the future. In order to facilitate the work of this proposed conference, the Committee prepared a statement showing in parallel columns the rules applicable to the measurement of each department of mason-work as suggested by the three bodies. Representatives from the Institute have been appointed, and the Institute of Measurers have been communicated with, but their reply has not yet been received. The Table of Fees issued by the Glasgow Institute of Measurers has also been considered and reported on by the Committee of Council,—Mr. Sellars, convener,—appointed for that purpose, and a communication has been sent to the Institute of Measurers." . . . .

"At a meeting of the Alexander Thomson Memorial Trustees, held in October, 1884, it was reported that a suitable investment had now been found for the Trust funds, and Mr. John Shields was appointed Factor and Secretary to assist the Trustees in the administration of the Trust."

Mr. William Landless, the treasurer, submitted the financial statement.

On the motion of the president, seconded by Mr. M'Gibbon, the report and treasurer's statement were unanimously approved of, and ordered to be printed and circulated among the members. On the motion of the president, seconded by Mr. Campbell Douglas, the following gentlemen were unanimously elected to be members of council for the ensuing year, viz., Messrs. James Sellars, jun., William Landless, Hugh Barclay, John Gordon, John Murdoch, Robert Turnbull, T. L. Watson, David Thomson, James Thomson, Alexander Skirving Wm. F. M'Gibbon. On the motion of Mr. Campbell Douglas, a cordial vote of thanks was awarded to Mr. James Thomson, the retiring president.

At a meeting of council, held after the general meeting, the following were elected as office-bearers, viz., Messrs. James Sellars, jun., 265, St. Vincent-street, president; Hugh Barclay, 135, Wellington-street, vice-president; William Landless, 227, W. George Street, treasurer; John Burnet, 167, St. Vincent-street, auditor; William Maclean, 81, Bath-street, secretary.

**Amsterdam Exchange Competition.**—We have already noted the constitution of the jury for deciding this important competition, and that Professor Kerr had been appointed to represent England. We regret to learn that in consequence of recent ill-health Professor Kerr has been obliged to relinquish the appointment. The Municipality have appointed in his stead Mr. R. Phené Spiers,—one of the best substitutes they could have chosen.

**The Late Archbishop of Canterbury.**—Messrs. Young & Co., of the Eccleston Works, Pimlico, have just completed a bust in bronze of the late Archbishop Tait, by Mario Raggi, sculptor, to be placed in the Edinburgh University. It has been subscribed for publicly.

## Illustrations.

### BAS-RELIEF: "THE SONS OF CYDIPPE."

BY MR. GEORGE TINWORTH.

THIS bas-relief, executed in terra-cotta by the artist, and which has been exhibited, along with other terra-cotta work from Lambeth, at the Health Exhibition, is interesting, to those who know Mr. Tinworth's previous work, as a work in a style entirely different from what he has previously done. Hitherto Mr. Tinworth has treated mainly Biblical subjects, in a manner which may be called Gothic; high relief,—often throwing the figures entirely up from the ground,—energetic action, and force of light and shade, having been the characteristics of his design. Here we have a purely classic subject treated in delicate bas-relief, a style, we may observe, not so well suited to clay as to marble or bronze. The work represents, of course, the well-known story of Cleobis and Biton, the pious sons of Cydippe, the priestess of Juno, who themselves drew her car to the temple when the sacred oxen were not forthcoming or were recusant, and for whom the mother implored the greatest blessing the gods could grant, a prayer which was answered by their falling presently into a deep sleep from which they never awoke. Mr. Tinworth varies a little from this version of the legend, as he represents Cleobis and Biton as falling in death at the moment of their mother's prayer, and on the very steps of the temple. The work was produced, we understand, with direct reference to a poetical version of the legend by Mr. Gosse, the prayer of Cydippe, at the moment of action chosen by the sculptor, being thus rendered by the poet:—

"Hear me! and grant for these, my pious sons,
Who saw my tears, and wound their tender arms
Around me, and kiss'd me alm, and since no steer
Stay'd in the byre, dragg'd out the chariot old,
And wore themselves the galling yoke, and brought
Their mother to the feast of her desire;
Grant them, O Hera, thy best gift of gifts!"

In a later replica of the work, Mr. Tinworth has draped the right arm of Cydippe, which, as in the original design here shown, stands out rather harshly, and seems to need something to connect it with the adjacent parts of the composition.

### DESIGN FOR ADMIRALTY AND WAR OFFICES.

MESSRS. MALCOLM STARK AND J. LINDSAY, ARCHITECTS.

WE give a small view and some details of this design, and one plan only, the authors having preferred the publication of the sheet of details to that of the second plan. The plan appears to us inferior to most of the nine, but the design is a pleasing and graceful one in general grouping. The following are the architects' notes, sent to us in explanation of their views:—

"The authors have adopted architecture of a Palladian type, as being best adapted for a large public building, and being in perfect harmony with the surrounding structures, while it also in its treatment admits of ample light. The block-plan of the buildings has been carefully studied, and with a view to give the maximum of light and air, and direct and dignified entrances from Whitehall to Spring-gardens. It was the opinion of the authors a T-shaped form of quadrangle was most convenient. In the arrangement of corridors, a plan of the most direct and simple form was adopted. On each flat the arrangement would be repeated. One of the features of the design is one large staircase for the War Office and one for the Admiralty for the principal departments, entering from the grand quadrangle. Entering from Whitehall, one large public staircase for the War Office and one for the Admiralty was considered necessary.

The use of Portland stone was recommended for all the external walls, and Scotch granite for the basement walls to the level of the base course."

*Key to References on Plan.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. " Supplies.
  B 3. " Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. " " "
  C 2. " " "
  C 3. " " "
  C 4. " " "
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

### HOUSE NEAR TUNBRIDGE WELLS.

THIS house has been erected from the designs and under the personal superintendence of the architect, Mr. James Neale, F.S.A., of Bloomsbury-square, London. The lower story is of red brickwork, with cut brick sills, arches, and dressings. The upper story is of half-timber work and tile hanging. The roof is of red tiles.

### ST. JOSEPH'S R.C. CHURCH, MAIDENHEAD.

THIS church, the nave of which is now being erected, stands on a commanding site on the Cookham-road, and will, when complete, with presbytery, &c., form a pleasing group, harmonising agreeably with its site and surroundings. The materials of the neighbourhood are as far as possible being used in the construction of the building, flint and brick forming the walls, with Bath stone introduced where necessary in windows, buttresses, &c., and red tiles for the roof. Inside the building the walls are of red brick, with stone bands, and the roof is an open-timber one, with double principals. The screen at the west end supports an organ, and will also form an internal porch. There is to be, as shown on the plan, a chapel on each side of the chancel, also two sacristies, one of which will communicate with the presbytery. The works now in progress are being carried out by Messrs. Silver, Sons, & Filewood, of Maidenhead, under the superintendence of the architect, Mr. Leonard Stokes, 31, Spring-gardens, London.

### SKETCHES BY A DISTRICT SURVEYOR.

II.

THE old church Notre Dame sous Dol, which has been much ill-used and mutilated, is finished with square chevet. The bays of the nave date from the eleventh to the twelfth century, the tower the fourteenth century. The building is now used as a corn-market.

The courtyard of the Hôtel Notre Dame is more attractive on paper than in reality. The external galleries, on to which the room doors open, are reached by a large wooden staircase fixed in what is now used as a kitchen. Wooden huts are said to be more healthy than buildings of brick or masonry as air cannot be excluded, a truth I experienced when in residence at this ancient fabric.

*St. Malo* has fortifications of great strength, and in the midst rises up the horse-shoe shaped tower (illustrated), which Queen Anne of Brittany caused to be constructed. There is a tradition that she directed her engineer to adopt as his model for the highest forms of this tower the driving-box of a coach with a seat on each side, the mast and ropes doing duty, I suppose, for whip; and as the lady appears to have had a will of her own, after her little quarrel with the Bishop Bricourt about her legal rights, and the placid-tempered motto she had engraved in relief on one of the towers flanking the entry to the château,—"Qui qu'en grogne, ansi sera c'est mon plaisir,"—it may very well be taken to express her regal determination to drive through all obstacles.

The other sketches are from Dol, and were generally referred to in last week's number.

T. E. KNIGHTLEY.*

*War and Admiralty Offices.*—In reference to a note on their report in our last, Messrs. Maxwell & Tuke write to say that "Messrs. Inigo Jones's hotel" was a copyist's error. Of course we did not suppose it was the architects' own mistake; but the deliberate insertion of the "Messrs." was rather startling.

### COMPETITIONS.

*Schools, Redruth, Cornwall.*—In the competition for the new schools at Trewirgie, for the Redruth School Board, the Board have accepted the design of Mr. John Robert Nichols, architect (of the firm of Messrs. Geo. Berry Nichols & Sons), of Colmore-row, Birmingham.

*Vestry Hall, Chelsea.*—At the meeting of the Chelsea Vestry on the 14th inst., the Works Committee presented a report,—

"Recommending that three architects be invited to submit competitive designs, together with specification, and estimate of the cost, for the enlargement of the Vestry-hall, and with that object, that the same information be furnished to all three competitors. . . . .

Recommending that competitive designs be invited from the following architects:—Mr. Ernest Flint, A.R.I.B.A.; Mr. Zephaniah King, A.R.I.B.A.; Mr. J. T. Wimperis, F.R.I.B.A.; and that they be requested to submit the same by the 1st of December next.

Recommending that the architect whose design is selected be entrusted with the supervision of the works, upon the usual remuneration of 5 per cent. upon the cost of the works; and that, provided the two next best designs comply with the conditions issued to the competitors, the architects submitting them be paid a fee of 50 guineas each, the drawings to become the property of the Vestry."

After two or three amendments had been proposed and discussed, the Vestry decided to have an open competition.

### CHELSEA SURVEYORSHIP.

THERE were eighty-two candidates for this appointment. They were reduced, first to twelve, then to six, viz., Mr. George R. Strachan, of Chiswick; Mr. Charles Clegg, A.M.I.C.E., of Colchester; Mr. E. Latimer Rumble, of Plumstead; Mr. Walter G. Scoones, of Brixton; Mr. Joseph Swarbrick, A.M.I.C.E., of Withington, Manchester; and Mr. James P. Norrington, of Birmingham.

At the election on Tuesday last, these six gentlemen were seen by the Board, and voted upon by ballot, with the following result, viz., Strachan, 30 votes; Clegg, 10; Norrington, 3; Rumble, 2; Scoones, 1; Swarbrick, 0. Mr. Strachan was declared to be elected.

The salary is 400*l.* per annum.

We learn that Mr. G. H. Stayton, the retiring surveyor, will hand over his duties to his successor at the end of this month, prior to his departure for Australia on the 12th prox. A farewell dinner to him took place on Thursday evening last, at the Holborn Restaurant, when the members of the Chelsea Vestry presented him with a testimonial.

**The Nicholson Institute, Leek.**—In the list of contractors for this building given in our last (p. 539), the name of Mr. John Stones, of Ure Mills, Ulverston, who supplied the lifts, should have been included.——The wood block flooring was laid by Mr. R. L. Lowe, of Farnworth, Bolton, on his improved system. The blocks are only 1¼ in. thick, 1 ft. 3 in. long, and 3 in. wide, laid parquet-wise in Mr. Lowe's patent composition, not in bitumen. Floors laid on this principle are spoken of very favourably by those who have used them.

* The signature was omitted by mistake last week.




St. Joseph's Church, Maidenhead.

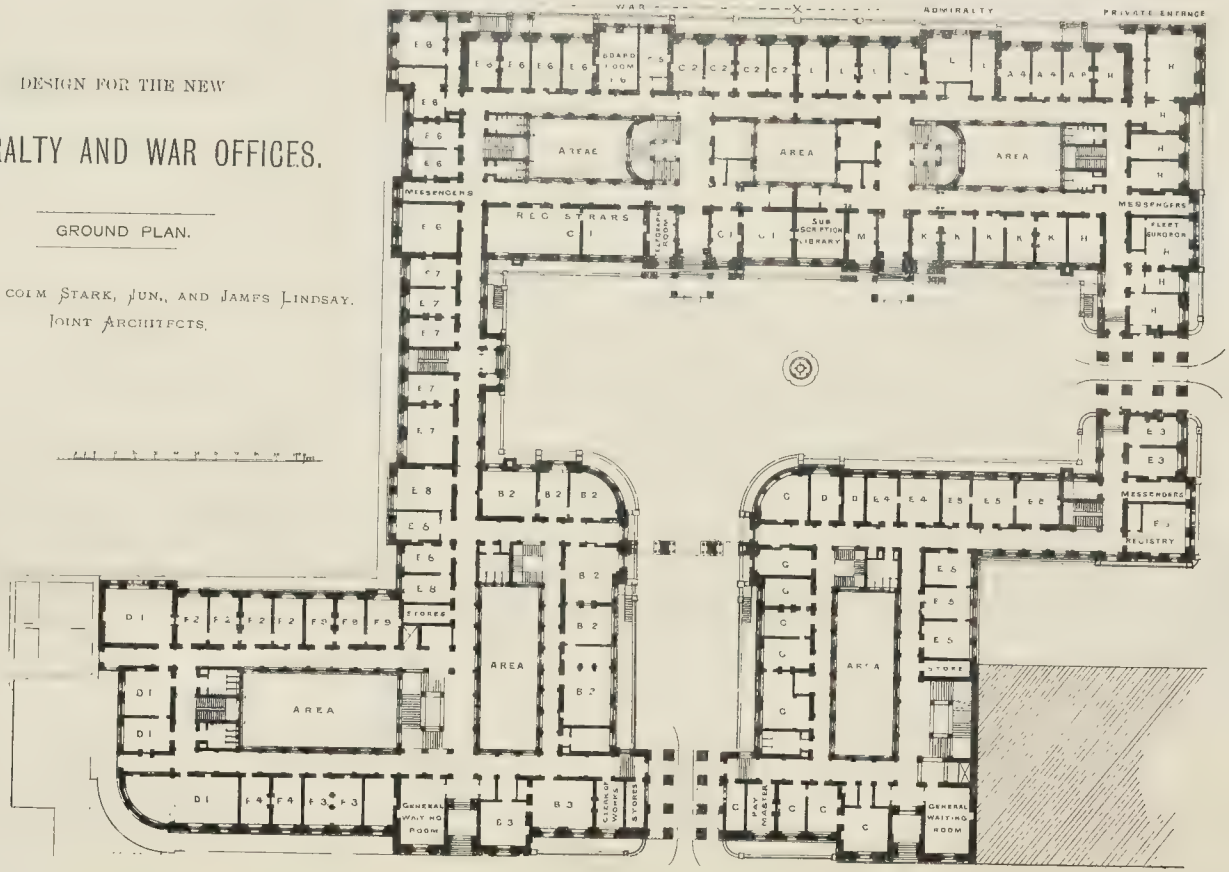
Leonard Stokes, 61 & 31, Strand, London, W.C.

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

GROUND PLAN.

MESSRS. MALCOLM STARK, JUN., AND JAMES LINDSAY.
JOINT ARCHITECTS.




Wyman & Sons Photo-Lithe



DESIGN FOR NEW ADMIRALTY AND WAR OFFICES.

MESSRS. MALCOLM STARK AND JAMES LINDSAY, JOINT ARCHITECTS.

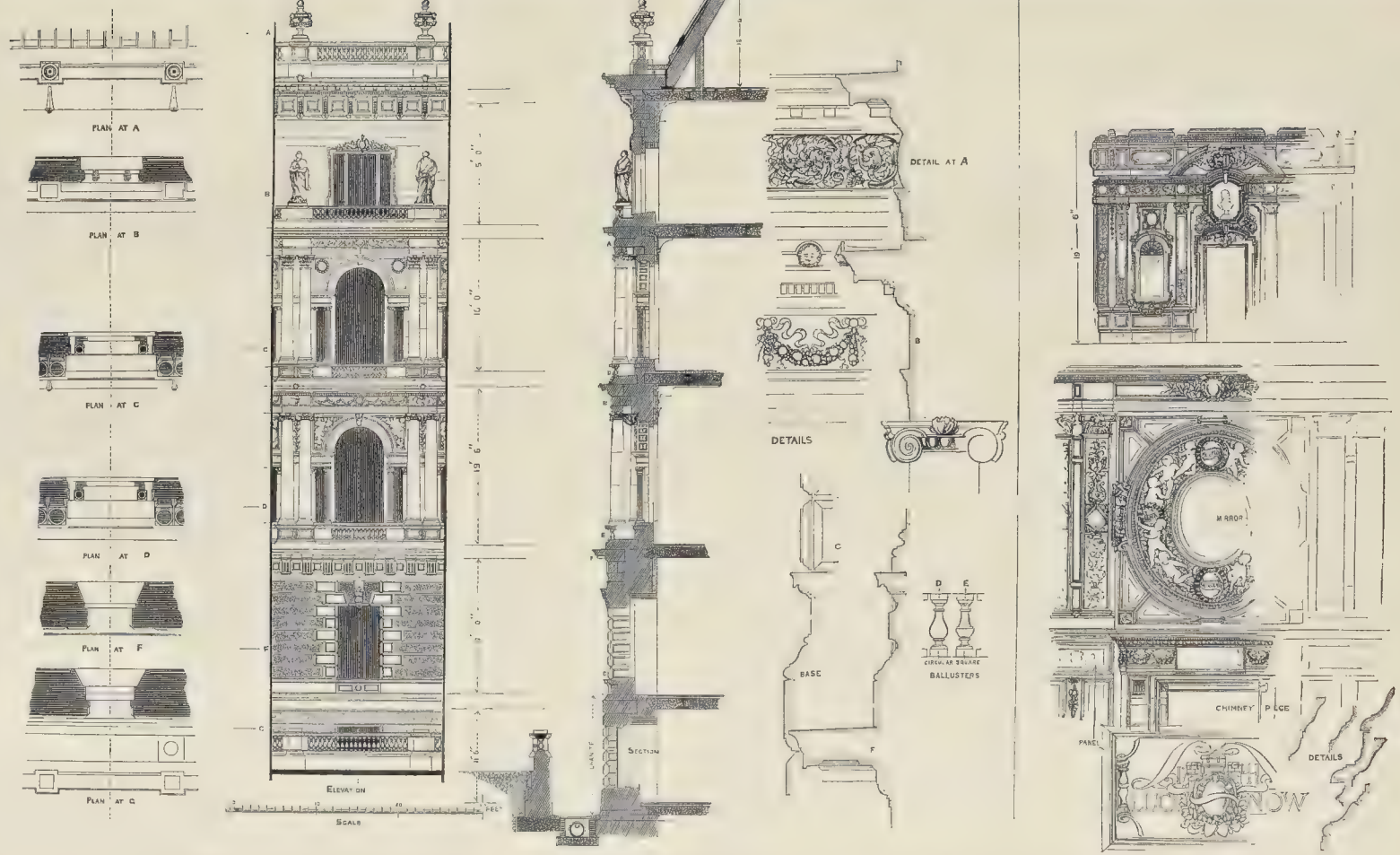
*Park Front.*



BAS-RELIEF: "THE SONS OF C



Mr. George Tinworth, Sculptor.




DESIGN FOR NEW ADMIRALTY AND WAR OFFICES: VARIOUS DETAILS.—MESSRS. MALCOLM STARK AND JAMES LINDSAY, JOINT ARCHITECTS.



HOUSE NEAR TUNBRIDGE WELLS.—Mr. Jas. Neale, F.S.A., Architect.



Fortifications St Malo. From the docks.



Dol. Disused Church now a Corn Market.



Dol.



Dol. Courtyard of Hotel Notre Dame.

SKETCHES BY A DISTRICT SURVEYOR. No 2.

## NOTES FROM BIRMINGHAM.

Few, if any, towns in the United Kingdom will be so well supplied with public buildings as Birmingham, when those which are projected and in progress are completed. In this respect, at least, the borough has well sustained its motto "Forward." Its town-hall is one of the finest-proportioned Classic buildings in the world, and although its interior is now marred by a decoration altogether foreign to the character of the building, it is to be hoped that when the time comes that this interior requires redecoration, it will be placed in the hands of a competent Classic architect. The Crompton-Winfield electric lighting of this great hall, under the direction of Mr. Lea, has been a great success, and is much appreciated. Its cost alone prevents its being used on all occasions when artificial light is required. This the promoters assure us will be much lessened when the area for which they have a provisional order, and which is bounded by New-street, High-street, Bull-street, and Colmore-row, is also lighted on their system.

The new Council-house and Art-Gallery is also a noble monumental building taken as a whole, although the latter portion, now approaching completion outwardly, is marred by one or two very decided blemishes. This building (the art-gallery part) completes the block surrounding a quadrangle, and is being built at the entire expense of the Gas Committee of the Corporation out of the profits arising from that department, and will provide offices on the ground-floor towards Edmund-street for the transaction of their business (which will then be removed from the old offices in the Old-square), and an Art-gallery and Museum above, the entrance to which will be in Congreve-street, opposite the Dawson Statue, and which is emphasised by a colonnade and pediment, to be filled with figures. Adjoining, on the angle of the building, rises a lofty square clock-tower, having pediments over the clock faces, and surmounted with a truncated pyramidal roof, with dormers, and covered with *red tiles* and iron cresting. This is blemish number one. Another consists in the indiscriminate employment of cylindrical ventilators, with conical tops, of which there are no fewer than nineteen visible from Edmund-street and three from Congreve-street. One would have thought that having a lofty tower at hand it would have been used to further the ventilation, and *that* part of an architect's business not be relegated to a patentee, whose aim would possibly be to use as many of his own productions as possible, without regard to their effect upon the elevation of the building. A third blemish is the employment of large areas of skylight in the plane of the roof which is very flat, and well seen from the street. Apart from these little matters, the building is a noble one, and reflects honour upon the architect and the town. By the terms of the contract it ought to be finished by this time, but there is probably another twelve-month's work yet to be done before it can be opened to the public.

The new Liberal Club, which is rising to the third story above the street, at the other corner of Congreve-street, will be a lofty and imposing building in red brick and red terra cotta, supported towards the Memorial-square by massive circular red granite columns on the ground floor, and having its main entrance on Congreve-street. It is in the Gothic style, and has boldly-projecting oriel windows on the angle and Congreve-street side, and balconies on the other side. Its progress has been much retarded, waiting for terra cotta.

Lower down Edmund-street, adjoining the Medical Institute, the new School of Art,—a red brick building, with red terra cotta and Horseley Castle stone dressings, also in the Gothic style,—is up to the roof, now going on. This building is another instance of the public spirit of Birmingham citizens. The land has been given by Mr. Colmore, and 10,000*l.* each has been given by Miss Ryland and the Bros. Tangye, and the latter have also undertaken to bear any additional expense incurred in completing the building. On the other side of the Medical Institute are the new offices of the Birmingham School Board, now occupied; and adjoining them is the still incomplete block of new parish offices, with its lofty clock tower a very prominent object in the view, and its main entrance below. This is a fine building in the Italian Renaissance style, having frontages to three streets, and containing, besides the necessary offices for the transaction of the business of the guardians, a large and lofty reception-room or ball-room, and its being there seems to imply that, however hard the times may be, the guardians and their friends are indisposed to allow such considerations to prevent them from enjoying social intercourse at the ratepayers' expense. So much, indeed, is this felt, that one of the guardians recently moved a resolution that the new offices be disposed of, but he obtained little support. The workhouse at Winson Green is being almost constantly enlarged, in spite of its already capacious size.

So many old-fashioned residences, which were occupied formerly by medical men, having been pulled down in this neighbourhood, a new block of residential chambers has been erected in Edmund-street, opposite the new School Board offices, and is now nearly completed. Its front is of red brick, and white terra-cotta dressings and strings (with an effect decidedly "streaky"), supported on the ground-floor by cast-iron columns, having over them small semicircular white terra-cotta arches.

Lower down Edmund-street, on the same side, and at the corner of Church-street, we have the new Eye Hospital, in red brick and stone dressings, in the Queen Anne style, recently completed and opened. This is a very imposing building, having frontages to Edmund-street, Church-street, and Barwick-street. Some considerable delay was caused in its progress by the bankruptcy of the contractor.

Another instance of the public spirit of Birmingham has recently been shown by the announcement that Mr. Jaffray, J.P., one of the proprietors of the *Daily Post*, who had taken an active part in the management of the General Hospital, and, therefore, knew well its wants, had determined to build and present to the use of the public, with the freehold, a convalescent hospital at Erdington, a very salubrious suburb, and invitations were sent out to the public to contribute to an endowment fund. This was liberally responded to, and some 23,000*l.* subscribed. The hospital is now in progress, and will be a red brick building, covered with red tiles, consisting of an administrative block, with two wings, and arranged so that two other wings may be added afterwards. The ornamental grounds will be also of considerable extent. Some extensive additions have recently been made to Oscott College in this neighbourhood, and further enlargements are contemplated.

A large block of shops and offices is now going up on the corner of Bull-street and Corporation-street for that "general provider," Mr. Lewis, of Liverpool and Manchester; and in Corporation-street adjoining, a further block for Messrs. Jevons & Mellor, in extension of their very handsome new premises just completed in the French Renaissance style. A new block of warehouse buildings on the opposite side of the street is noticeable chiefly for having all the windows above the shop rectangular in one sheet of plate glass opening on a vertical axis, and the whole of the outside of the sash gilded. Another block of shops and offices, with a frontage in the Queen Anne style, is being completed at a new corner formed by continuing London Apprentice-street (now Dalton-street) into Bull-street, by abolishing the Old Coach-yard. Here the architect has made all his bay windows the full height of the building above the shops, in wood, and painted them a pale green. Adjoining these in Bull-street, the Messrs. Southall, chemists, have had their premises remodelled, and a new front built, and at the back in the Lower Priory an extensive range of warehouse building for their wholesale trade. The old chapel at the back of the Conservative Club in Union-street is to be removed as soon as a new one can be built on vacant land adjoining the new Grand Theatre in Old Square. It is understood the architects are now preparing the plans. The new North-Western Arcade is a remarkable building in continuation of the Great Western Arcade from Temple-row to Corporation-street, and parallel to Bull-street. It is built over the tunnel of the Great Western Railway; and although a heavy and lofty building, is supported entirely on brick piliars carried down outside the tunnel to its foundation, with heavy riveted plate girders spanning the arches above on which the building rests. The shops inside the arcade have let uncommonly well, and there is a dry promenade in all weathers from Corporation-street to Colmore-row, except crossing Temple-row: the effect has been to draw off from Bull-street the folks who go shopping, and to very materially reduce the business of those shop-keepers who have their premises there.

The Midland Educational Company, who supply most of the public and private schools of the Midlands with books and school requisites, have had built for them a large and lofty warehouse in Corporation-street, extending through to Cannon-street, and have recently removed into it. It has a red brick front with Bath stone dressings in the Italian Renaissance style, and is very pleasing and effective. Another warehouse for a wholesale and retail stationer has been built in Cannon-street, with a frontage in Cherry-street, also, in the Queen Anne style. At the bottom of Cannon-street, and in New-street, the old shop property which had been there so many years has been bought by the proprietors of the *Daily Post*, and a new block of shops and offices in continuation of the *Daily Post* block has been built, and is now fully occupied.

The very large extension to New-street Station is proceeding, and the construction of the bit of new line for the Midland from Granville-street to New-street Station, and the widening of the road from Granville-street to King's Norton Junction will, it is expected, be complete, with its double line of rails, before Midsummer next. All the Midland traffic to and from Birmingham will then pass that way, leaving the old main line for local and through traffic. The New-street Station now covers 11 acres. The new bridge across the centre of the station in continuation of the old bridge is open to the public, but some improvement ought to be insisted on at its junction with the old bridge, where the undulations of the floor are like the waves of the sea. The platform for the Harborne line is being considerably widened, and a better road made from it into Pinfold-street, and a new block of booking-offices (how that name sticks) are being built for the Midland at the corner of Worcester-street next the Market Hall. A new and handsome hotel has been built and opened at the corner of Dudley-street and Station-street, and a large block for a firm of coach and cab masters is going up. A block of new warehouses had just been completed in Hill-street, and another new hotel, close by at the corner in John Bright-street, where also some extensive half-timbered buildings are going up.

In the Bristol-road, corner of Nelson-street, the new red stone Chapel in the Gothic style for the Old Meeting congregation, whose chapel was removed to make way for the new station, is going up. The large school-room adjoining is already complete, and the services are held therein temporarily. Here the contractors have in use a Scotch crane, worked by steam power, the massive jib of which fell recently, fortunately without much damage being done,—none at all to any person, but causing considerable delay and consequent loss to the contractor. Very great care ought to be taken not only to have these cranes securely fixed upon their high platforms but also to have their chains frequently tested, especially in winter.

The new fish-market, so long delayed by the bankruptcy of the contractor, is again proceeding under another contractor. Provision has been made for cold store-rooms and ice factory by going down a double cellar into the rock, under the new portion, which is to that extent an extension of the old area. It is much to be desired that no further delay will take place with this market, for the trade is an extensive and growing one, and the present accommodation, although of comparatively recent provision, is miserably inadequate for the town. It is a curious fact that Birmingham is better supplied with fish than either London or Liverpool.

The agitation against the proposed removal of the live cattle market from the centre of the town to what is known as the Rupert-street site has, apparently, along with the proposal itself, died a natural death. It is very doubtful if we shall ever hear of the proposal again. Not only was the site objectionable in itself on account of its position and surroundings, but the fact that one line of railway enjoyed a monopoly of entry to it, which it was not willing to share with the other two lines which come into the town, formed an insurmountable objection. The town would have acted unwisely to have laid out 70,000*l.* or more under such conditions. It will, probably, now

wait for its new market until the boundaries of the borough are extended, when there will be a much better choice of sites on now vacant land. The market must be within the borough boundaries to enable toll to be collected. Meantime it is intended to cover over the whole of the present market site with roofs corresponding with that over the adjoining vegetable market, and the Markets and Fairs Committee have been authorised to proceed with it. This, however, makes no provision for a meat market to replace the very inadequate present one. For this purpose it might be well for the Corporation to acquire the whole of the site bounded by Edgbaston-street, Pershore-street, Dean-street, and Jamaica-row, which is now a most insanitary area, and by cutting a street, say 60 ft. wide, through from Jamaica-row to Pershore-street and another at right angles from Dean-street to Lease-lane, and build shops on each side with cold stores below, and cover the same with a cylindrical iron and glass roof, with a dome at their junction. This arrangement would give four entrances to a spacious market, and would disturb only 60 ft. on each of the four streets for shops and entrance gates, and would leave the present miserable market intact with its adjoining slaughter-houses until the completion of the new market. E. G.

## PRACTICAL TESTS WITH WATER-METERS AT THE HEALTH EXHIBITION.

Amongst the various questions affecting the future water-supply of the metropolis or elsewhere is that of the registration of the quantity of water supplied either in bulk or to individual houses. The expediency of introducing any system of meter into the supply of a town has, as our readers know, been the subject of much controversy; indeed, Mr. Hawksley has expressed an opinion that "the effect of supplying water by measure would be exceedingly detrimental to the health of the population," and after giving numerous reasons against the adoption of house-meters, concludes by saying, "After long experience on the subject, I am utterly opposed to the often-suggested plan of supplying water for domestic consumption by measure." Whether this judgment be right or wrong, however (and we are disposed to question it very much), the recent experiments and tests with water-meters at the International Health Exhibition are of a very interesting character, and the executive Council having adopted Messrs. J. Tylor & Sons' inferential meters for the registration of the quantity of water consumed by the fountains, we are induced to give the following facts in connexion therewith.

The water for the fountains is supplied by the West Middlesex Company. In close proximity to the basin are constructed two oblong pits, lined and paved with glazed bricks, —which contain in one a nest of three 8-in. meters and in the other a 12-in. meter. The former is shown in the accompanying illustration, fig. 1. Upon the occasion of a recent visit, during a period of half an hour the three 8-in. machines registered 4,000, 4,100, and 4,000 gallons respectively, whilst the 12-in. meter recorded 8,500 gallons,—showing that in this interval of time, which is usual, upwards of 20,000 gallons of water had been projected into the air. Having had an opportunity of minutely examining the whole of the operations of these displays, both by watching the meters during play and in the operating-room under the fountains, we are able to express a confident opinion that these meters have been subjected to a very severe test, with very satisfactory results. Indeed, we are given to understand that Sir Francis Bolton has stated that he is surprised to find they have stood so well, as the recoil during the shooting of the high jets must be very great; at such periods the pressure-gauge has recorded 220 ft. It should here be stated that attached to the nest of meters at each end is fixed one of Bourdon's and Smith's pressure-gauges respectively, whose registrations are almost identical.

Only those who have visited the operating-room during a display can form any conception of the severity of these tests, and we were well repaid for the inconvenience and discomfort of the experiment; and whilst upon this subject we would suggest that if the authorities decide to continue these very popular displays at succeeding exhibitions, it would be very desirable to enlarge the operating-room, and connect it with the mainland by a subterranean passage, it would facilitate matters, as we have no doubt that large numbers of the general public would willingly pay a substantial fee to have an opportunity of witnessing the manipulation of the various appliances used in promoting their pleasure and amusement, added to which is the paramount necessity of reducing the very exhausting effects of the present cramped, inaccessible, and badly-ventilated cell.

We pass from the meters attached to the fountains to one fixed in the East Central Gallery, where may be seen the registration of the quiet and steady flow of water under small pressure. A willow ball may be observed to be sustained upon the slightest jet of water passing through a meter, attached to which (equally with those in the ground) is one of Tylor's "Patent Waste-detecting and Registering Clockwork Apparatus," as shown in the accompanying cut. It will be noticed that this apparatus consists of a pencil, A, fitted with leads or dye to mark on the paper; B, B, are rollers giving motion to the paper; C is the pendulum of the clockwork, adjustable by means of a screw; D is the dial of the clock; E, a roll of paper sufficient to last six months; F, a rim to support the metal cover; and G, a lever connecting the pencil to the meter, which is disconnected at H, when the registering apparatus is removed. By this ingenious machine the quantity of water passing through the meter is recorded every hour upon the paper strips, in illustration of which we reproduce three diagrams taken at the Houses of Parliament, upon the occasion of important debates on the 20th, 22nd, and 23rd of June, 1880, whereon will be seen that each vertical jump of the zigzag line represents 500 gallons,

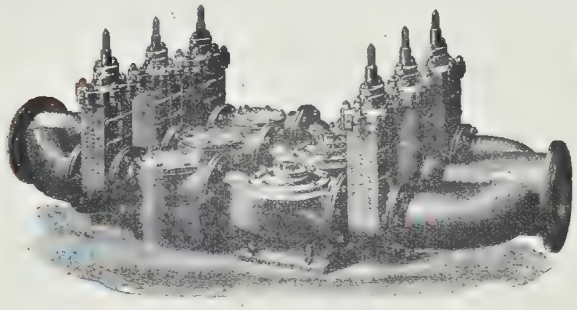


*Fig. 1.*

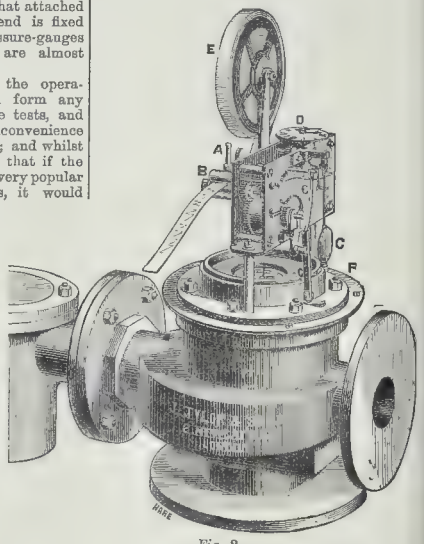
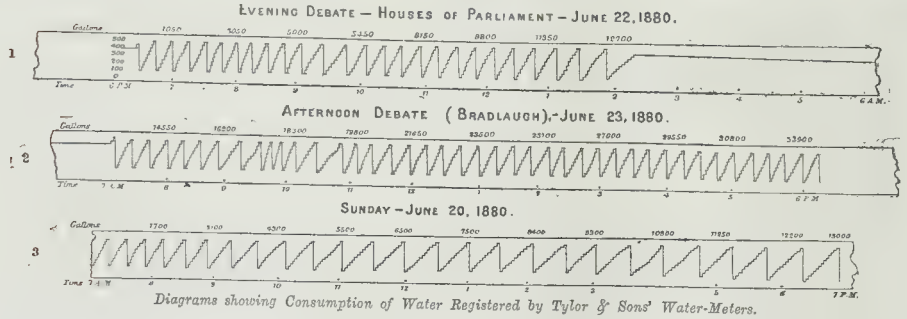



*Fig. 2.*




*Diagrams showing Consumption of Water Registered by Tylor & Sons' Water-Meters.*

so that the quantity passing during the hour will be shown by the number of jumps and fraction of 500 gallons. The water in this case is used for driving the ventilating machinery of the House, as well as for other purposes, which accounts for the large quantity registered; and it is somewhat amusing to find the heated temper which gave rise to a crowded house and a warm (in every sense) discussion, thus mechanically registering itself by meter.

## ARCHITECTURE IN RELATION TO LANDSCAPE GARDENING.

In the third of his course of lectures delivered at the Crystal Palace on Wednesday afternoon last, Mr. G. Richards Julian dealt with Norman and Gothic architecture. He pointed out that the Norman style, when once planted here, soon exhibited a growth of features by which it was easily distinguished from that form of it which prevailed in Normandy, and proceeded to enumerate in detail the characteristics of the English variety. After a few words on the domestic architecture of the period, the lecturer called attention to the Natural History Museum at South Kensington, designed by Mr. Waterhouse, of which he said that if it be not a revival of the Romanesque style, it is, although freely treated, imbued with much of its spirit, and ornamented with many of its details. He recommended the students to take an opportunity of observing the balustrades of the staircase and of the gallery in the great hall, from which excellent suggestions for the appropriate treatment of balustrades and piers in harmony with Romanesque buildings might be obtained.

Passing to Gothic architecture, Mr. Julian mentioned the various theories as to the origin of the use of the pointed arch,—firstly, that it was suggested by the Norman intersecting arcades; secondly (Mr. Fergusson's), that it was devised to lighten the weight on the crown of a barrel vault; thirdly, that it was introduced by the Crusaders, who had met with the form in Saracenic buildings in the East; fourthly, Sir Digby Wyatt's opinion that the Normans of France got it from the Normans of Sicily; and lastly, the theory (which Mr. Julian adopted) that the pointed form was introduced to overcome a constructional difficulty, namely, the tendency of large semi-circular arches to spread, and so flatten at the crown. On this view of the matter he quoted some passages from the Academy lectures of Sir Gilbert Scott, delivered in 1860.

Mr. Julian deferred until next week the subjects of the domestic architecture of the Mediæval period, and the appropriate treatment of garden architecture in connexion with Gothic buildings.

## PROTECTION FROM FIRE IN THEATRES.

### MARYLEBONE THEATRE.

The owners of the above theatre, situate at Church-street, Marylebone, were summoned by the Metropolitan Board of Works for that they, between the 28th day of February and the 9th day of July, neglected to make certain alterations necessary to remedy structural defects in the theatre by which danger from fire might result to the public, after having been served with notice to do so.

Mr. Grain, instructed by Mr. Thos. Burton, appeared on behalf of the Board; and Mr. Besley represented the owners.

Mr. Grain stated that the requisitions served were seventeen in number, and the owners had neglected to carry out ten of them, some of these being of a most important character. The proceedings were taken under the 41 & 42 Vic., c. 32, s. 11, which imposed a penalty of 50*l.* in case of default, and 5*l.* for every day during which such default continued. No notice of appeal having been served, the requisition became finding upon the owners, and Mr. Hebb, Assistant Architect to the Board, was called in support of the Board's case.

Mr. Besley, for the defence, contended that the requisition of the Board had been complied with as far as was practicable, and called Mr. Verity, an architect, in support of his statement.

Mr. De Ruzen said the Act of Parliament was a most important one, and ought to be strictly carried out. He had nothing whatever to do with deciding whether or not the requirements of the Board were necessary. His duty was merely to impose a penalty to show owners of such places as theatres that the requisitions of the Board must be complied with in the interests of the public. He should not impose the full penalty of 50*l.*, but a mitigated penalty of 10*l.*, including costs.

**The Albo-Carbon Light.**—We are asked to state that the lighting of the Brompton Oratory by the Albo-carbon light (as described in our last, p. 521, *ante*) was effected by the Sanitary Engineering and Ventilating Company, of 115, Victoria-street, Westminster. We hear that this method of lighting has also been successfully applied by the company to several West End Club-houses.

## THE DOME OF ST. PAUL'S.

Sir,—Notwithstanding Mr. Robins's own valuation of Thornhill's scheme of decoration, there is the hard-and-fast fact, a fact patent to all who have studied this question, that Sir Christopher Wren sanctioned that scheme, and that it was carried out immediately under the eye of the great architect. The architect and the painter were in favour of colour in the figure compositions, but the Puritanism of the times would not permit such blazonry; any colour would have been then exaggerated into positive scarlet, and any golden overlaying would have been rated as tinsel.

To say that we are in the nineteenth century, and that therefore we ought to do better than in the seventeenth, does, at its first statement, appear to be reasonable, but facts prove that this is not a necessary consequence. We cannot do as well as the architects and artists at a much more distant date than the seventeenth century, and, although in recent years considerable progress has been made in the refinements of art, we have not surpassed the examples of the English Renaissance architecture of the seventeenth century, and neither modern architects nor artists have had any considerable practical experience of the pictorial decoration of such buildings. As an artist who has made mural painting a study, I affirm that, side by side with the experimental projects, Thornhill's is, in architectonic arrangement, immeasurably their superior. Mr. Robins says:—"It is much more an architect's than a painter's province to determine the leading lines and framework of a scheme of decoration." Let this be conceded for the nonce; then I say Mr. Robins's condition has been fulfilled, for Thornhill's architectonic arrangement was designed under no less an architect's supervision than that of Sir Christopher himself,—which of the living architects would Mr. Robins appoint to overrule Wren's sanction?

That the new projects are based on "the fact," as Mr. Robins puts it, "that every plane section of a sphere is a circle," condemns the schemes as being designed on radically wrong principle. The only position in which a circular *plaque* can be appropriately introduced into the decoration of a dome is in the crown of the hemisphere. There are several optical reasons against the introduction of circular *plaques* elsewhere on its surface. But what shall we say to a project suggesting that no less than fifty-six of these, of various sizes, shall be distributed over its surface? Was this scheme, one almost feels tempted to inquire, designed in the interests of the spectacle-makers?

The Renaissance admits of exuberance in decorative display,—of altar-pictures in frames, and of hangings in chapels, of bold and daring flights in decoration, of a prodigality of ecclesiastical furnishing, but there must be a method in this noble rage. It is for this that our painters of interiors set up their easels in St. Peter's, and elsewhere, where they are astonished to see how art was flung about in picturesque profusion, instead of being *finicked on* in small quantities, by mere chamber decorators.

The Renaissance, then, is not a pure but a picturesque style of architecture, admitting of considerable latitude of treatment, of redundancy in decorative display. To talk about shams in reference to St. Paul's, when we know that purists are never tired of pointing out various shams in its construction, is quite useless. It is the opportunity that the style affords for a Titanic hurling of masses,—for, as it were, a reckless surcharge of treatment that conduces to its grandeur. It was the necessity for this largeness of treatment that changed the early tenor of the great Italian mural painters. Gothic proportions, and perpendicularity, were found to be incongruous with the huge developments of the Renaissance. It is for these reasons that Thornhill's arrangement is seen to be more congruous with the architecture of St. Paul's than any weaker and more subdivided project, and although Wren had never been in Italy, and may not have been able to express the reasons of this congruity, the great architect, as a born artist, felt that it was.

W. Cave Thomas.

Sir,—I had not intended again to trouble you on the subject of the St. Paul's decoration. I am induced now to do so only to reply to the question which in your last issue Mr. Thomas puts as crucial. He asks "Would Mr. Clayton consider the translation into mosaic of the work of Sir F. Leighton and Mr. Poynter as the effacement of those eminent painter's designs? Would not the mosaics be virtually their designs?"

The reply is obvious. The mosaics, thus produced, would be not virtually but actually their designs, and this for the reasons which would be fatally wanting in a like rendering of Thornhill's monochromes. The cartoons of Sir F. Leighton and Mr. Poynter are those of living men who expressly made them for mosaic, in effects of gold and colour which were, *ab initio*, part and parcel of their designs. Mr. Thomas cannot cite these or any such conditions to justify a translation of Thornhill's work into colour, which could be none of his, and into gold backgrounds, which were abhorrent to his art.

The one plea upon which Thornhill's work has been condoned, has been its generalised vagueness of effect arising from its monochrome throughout. By the proposed translation of this result into unwonted gold and colour for the pictures within the arcade, the latter would be developed into disastrous and undesigned prominence, while the paintings would become a chromatic fiasco in eight parts. This, too, in the name of Thornhill, and in homage to his memory!

John R. Clayton.

Oct. 22, 1884.

## SEA-SAND FOR MORTAR.

Sir,—In reply to the query of your correspondent "F. L." in your last number [p. 542], as to the use of sea-sand in mortar, may I say that I have often wondered why this (as I consider) important question has never, to my knowledge, been set at rest.

Speaking from a long experience in the use of sea-sand, I beg to say I should never hesitate to use it in preference to any other, either inside or outside of any building. As a matter of fact, I built four houses twenty-five years ago without using a particle of any other than unwashed sea-sand, either in brickwork or plastering, and I never had a single complaint from the occupiers about dampness. I have also frequently used it in large houses without discovering any ill-effects from its use, either under paint or paper.

Permit me to say a word as to its value for strength in brick mortar. A few months ago I had to cut away a portion of a two-brick wall in an hotel built eighteen years ago, close to the sea. This wall was built with sea-sand mortar, and I never in my life had a stiffer bit of work to deal with in regard to hardness of mortar.

I should like to see the chemical side of the question settled by a few tests. First, to ascertain the quantity of chloride of sodium in, say, a cubic foot of sand, after standing a day or so to allow the salt water to drain from it; and, further, whether the action of the lime neutralises the effect of the small quantity of saline matter left in the sand when used in the usual way.

H. L.

*** If our correspondent has used *unwashed* sea-sand with these results, our impression is that he has been very lucky.

## SUPPORT OF ADJOINING HOUSES.

Sir,—As so many of your readers are engaged in cases which involve the question of the right of support to houses, permit me to call their attention to a decision of the Court of Appeal, which gives a new and surprising illustration of the rule of law on this subject.

A, the owner of two adjoining plots of land, let one plot to B, to make a private road to his cricket-field. He afterwards let the other plot to C to build a house upon it. C built the house, and consigned the lease to D. After D had bought and paid for the house, A, at the request of B, made a drain through the private road, and close to the flank wall of D's house. The trench was considerably deeper than the foundations of B's house. No means were taken by A or B to support D's house while the trench was open, and no notice was given to D to enable him to take such means himself. The effect was that the flank wall of D's house began to slip and crack. The house was rendered uninhabitable. D was obliged to underpin the flank wall, and repair the house, at the cost of several hundred pounds. To recover this outlay, he brought an action against A. Mr. Justice Manisty and Mr. Justice Watkin Williams held he was entitled to recover, the right of support for the house being "a necessary easement," which the law implies.

The Court of Appeal has now reversed that decision and given judgment for the defendant A. The court held that D had no better title than C, and C had no better title than A, and after the lease A could not have prevented the lessee of the private road from letting down the house, as he had not in the lease "reserved" the right of support. As the

Master of the Rolls said, if the parties had been asked at the time if they intended that the house should have the right of support they would have answered in the affirmative; but this did not avail the unfortunate purchaser. The right of support was not "necessary" in the strict sense of the word, for by underpinning as deep as the drain, the house could have done without the support of the adjacent soil.

Lessees of houses which have not stood for twenty years may learn from this case that another and serious risk has been added to their property, and one which no previous inquiry or precaution would have enabled them to avoid.

The freeholder who builds his house close to the boundary knows that he runs the risk of his churlish neighbour letting it down; but up till the present time few lessees have been aware that the adjoining lessee who holds under the same landlord may, merely on the ground that his lease is earlier in date, have the right to let down his neighbour's house.

This novel application of an old rule of law will perhaps surprise some of the lessees whose wrongs are said to require remedial legislation. R.

## ST. PANCRAS MORTUARY COMPETITION.

Sir,—May I be allowed to say a few words in answer to the letter of Mr. H. H. Bridgman in your issue of the 11th inst. He tells us that an Act of Parliament prevents the Vestry from building the mortuary on the site for which competition drawings were asked (Feb. 2, 1884): hence the delay in decision. He also inserts a copy of a letter showing that his drawings are one of the (six) selected for further consideration when the new site is found. In my opinion, it is unfair to make any selection under the above circumstances, as totally different designs would have been sent in on another site. I think as the old site is not to be used that fresh competition drawings should be asked for. It would be as well if the Vestry said whether drawings were to be under motto or otherwise in future competitions, as a great many signed their drawings.

J. C. Waghorn.

## HIDDEN DANGERS.

Sir,—Any person passing the Royal Palace of Justice lately must have seen a yawning chasm in front of the building, leading under the Great Hall; and right into the midst of the wall bases, foundation arches, and so on, have the authorities placed two (or more) huge steam boilers, just where they could do most mischief if they were to give way. A veritable Samson would such a steam generator prove if it went, as boilers do go at times in factories and ships of war. If both were working when one exploded, the chance of the other going too might be reckoned on with some certainty. How many more of these bottled earthquakes are there about under our best buildings? Why not put such dangerous things in an outside shed, which need not be ugly?

Bang.

# The Student's Column.

## ON THE CONSTRUCTION OF FLOORS.

IV.

We now pass to the subject of *Fire-Proof Floors*. The risks of being destroyed by fire to which large warehouses are subjected from the combustible nature of the materials they contain, has drawn the attention of architects to the means which might be adopted to prevent the spread of a fire and confine its action to the story on which it commences. The intense heat that is generated in a large warehouse when a fire takes place, renders the construction of floors that shall be perfectly fire-resisting a matter attended with considerable difficulty, as many substances which will resist a tolerably high temperature become either completely destroyed or else their strength reduced to such a degree as to become practically useless, when exposed to the heat produced in a burning building.

A method commonly adopted at one time of forming what was deemed a fire-proof floor, is shown by fig. 10; cast-iron beams of the section




*Fig.* 10.

shown at G, were laid across from wall to wall, about 10 ft. or 12 ft. apart, and between them were turned two or three rings of brick arches in cement, the contour of the arches being very flat segments of a circle, so as not to take up more depth than could possibly be avoided. The haunches of the arches were filled with concrete, C, and the joists, *a*, laid thereon. To prevent the arches from thrusting out the walls or displacing the girders, wrought iron rods were generally passed through the lower part of the girders, as at T in the figure, being secured with nuts and screws. Experience, however, has shown that when subjected to great heat, the cast-iron beams either broke in pieces or became fused, and allowed the whole floor to fall in. Ordinary bricks also split up under the action of fire, only those made of fire-clay being able to resist a high temperature. Wrought-iron beams have been tried in place of the cast-iron ones, but these become twisted and weakened when exposed to the fire, although they will not fuse as cast-iron does; the longitudinal expansion of the iron is also liable to endanger the walls.

As it is scarcely practicable to make a fire-proof floor without using iron, it becomes an essential point to completely protect the metal from becoming strongly heated, by encasing it in some material capable of resisting the action of fire. A method shown in section by fig. 11,

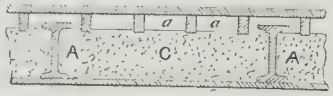



*Fig.* 11.

which has been successfully used to a large extent, consists in laying rolled iron joists across from wall to wall of size proportioned to the span; close boarding is temporarily fixed to the underside of the joists, and on this is placed a layer of cement concrete, C, so as to cover up the whole of the iron, as shown in section by fig. 11. The iron joists, A, are usually from 4 ft. to 5 ft. apart, and if the floor is to be boarded, light wooden joists, *a*, about 2 in. square, are bedded on the concrete before it hardens. If a cement or asphalte floor is required, it can be laid directly upon the top of the concrete after it has thoroughly hardened. As the concrete becomes set in twenty-four hours, the planking below can be removed at the end of that time, and the under-surface will be ready to receive the usual coating of plaster, if it is desired to form a finished ceiling. If the joists are placed 5 ft. apart, the following sizes may be used for ordinary floors according to the span,—for 10 ft. span, the joists may be 5 in. by 3 in. wide; for 12 ft., 6 in. by 3 in.; for 15 ft., 7 in. by ½ in. Or if joists of ⊥ section are used, they may be 4½ by 4 for 10 ft.; and 5¾ by 5½ for 15 ft. The floors of corridors which are not more than 6 ft. wide can be made of concrete 5 in. or 6 in. thick without the employment of any ironwork, if well bedded on the walls; or York landings 4 in. or 5 in. thick may be used and will be equally impervious to fire. This kind of floor possesses far more rigidity than one of timber, and is also more sound-proof; and although the weight that it throws on the walls is much greater, yet this is, to a great extent, counterbalanced by the absence of vibration which is often so injurious to the walls of a building.

In warehouses and other buildings of wide span it is necessary to use iron girders and binders as in the manner described for timber floors, and shown on figs. 12 and 13. If a

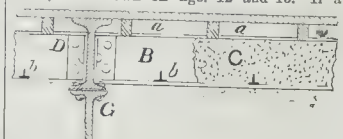



*Fig.* 12.




*Fig.* 13.

single rolled iron beam cannot be obtained of sufficient strength, then the girder G may be formed of one on the top of the other, as previously described and shown by fig. 8; or they may be placed side by side as shown by fig. 9. This latter plan is, perhaps, better, as it is easier to encase the girder in fire-resisting material, which must always be done when iron is used.

Rolled iron joists, B, are laid across from girder to girder in the manner of binders, resting on the lower flange of the girder and being riveted thereto with angle plates as shown at D. Between the binders are laid light wrought-iron joists, *b*, of ⊥ section, and on these are laid the concrete, C, in the manner before described, so as to fill up the space between the binders. Light wooden joists, *a*, can be laid on the top of the concrete to receive a wooden floor. Fig. 12 shows the section of the floor across the girders, and fig. 13 is the section across the binders, at right angles to the former.

As the concrete itself weighs about 140 lb. per foot cube, a thickness of 6 inches will add 70 lb. a foot superficial to the load on the girder, the strength of which must be regulated accordingly. For a span of 18 ft. a single iron joist 19¾ in. deep by 7 in. wide, will make sufficiently strong girder for a warehouse floor constructed in the manner above described. For a span of 26 ft. a pair of rolled joists, 16 in. by 6 in., with ¾ in. plate 14 in. wide, riveted at top and bottom, as shown by fig. 9, will serve the purpose of a girder.

Another method of employing concrete and iron for a warehouse floor is shown by fig. 14,

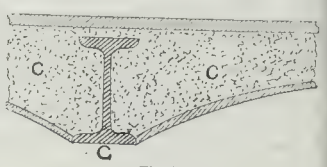



*Fig.* 14.

where G is the iron girder, C the concrete which is laid upon centering to give it an arched soffit. By this means the whole of the iron can be encased in the concrete, which is made thicker at the springing than at the crown. A concrete in which sulphate of lime is used in place of Portland cement has been much employed for arches of this description, which are often made of considerable span without any iron being used between the girders. The floor is laid on the top of the concrete in the manner previously described, upon joists bedded thereon if a wood floor is required, or a cement floor may be laid directly on the concrete and covered with tiles or asphalte.

If iron columns are employed to support the girders they should be cast solid, as being more capable of resisting the action of fire than hollow ones, which split up into pieces when exposed to great heat, especially if water comes in contact with them when red-hot. It is, however, always advisable to case the iron columns round with some fire-resisting material, such as fireclay, to prevent any risk of their becoming so weakened by the action of fire as to give way under the superincumbent load.

When a floor of stone, tile, or asphalte has to be laid on the level of the ground, the top soil is first cleared away and the earth raised to the required level by means of a layer of broken brick, lime-core, or ashes, upon which the stone flags can be bedded in mortar, their surface being tooled or rubbed and the edges dressed square before being laid. Where asphalte or tiles are required, a bed of concrete 3 in. or 4 in. thick is first formed, and rendered as nearly level as possible; on this is floated a thin coating of cement, which is allowed to harden, and the tiles, asphalte, or other material laid thereon; tiles being bedded and jointed in cement, and asphalte poured on in a semi-fluid state, fine sand being sifted over the surface while still soft.

As a flag-paving if laid on the ground is liable to become damp, it is best to build sleeper walls 3 ft. apart from centre to centre, and to lay the flags across from wall to wall, bedding them thereon in mortar. In this case the flags must be cut to the exact length of 3 ft. By this arrangement the damp is prevented from striking up from the ground, and the floor is kept dry. Ventilation can be maintained under the floor by means of air-bricks in the outer walls.

Sir,—In your "Student's Column" this week is there not an error in giving the *clear* depth of a double iron beam for warehouse floor as 13¼ in.?

so, is there not a discrepancy between the rule example for finding the deflection? The rule t, "multiply the cube of the length (in inches) he load to be laid on the *middle* of the beam; in the example the cube of length is multiplied he distributed load, viz., 9½ tons.

JOHN A. MARSHALL.

, *Prospect-road, Child's Hill, N.W.*, Oct. 18, 1884.

* "13½" was a misprint for "10½." As to the ed "discrepancy," if the writer had read on he id have seen there was none, as it is stated that e quotient is ·96 the deflection in inches when oad *is all at the centre; but, as in this case, the is supposed to be distributed over the length of the , we take five-eighths of the above, or* ·6 *in. as the ction in the middle.*"

## Books.

*n Implements and Machines.* By Professor OHN SCOTT. London: Crosby Lockwood & o. 1884.

OWING to the constant and increasing competition in everything appertaining to agriculture, to secure in this ntry even a moderate return on invested bital, it has become necessary to conduct ming operations on an improved, or, we y say, a more scientific basis than has herto been the practice. The recent vances made by America in reaping and af-binding and other agricultural machinery, d the progress made by some of the Conental nations,—notably Hungary with regard milling machinery,—have, with other causes, ndered successful competition by English eat-growers a matter of extreme difficulty. The issue, therefore, by Messrs. Crosby Lockod & Co., of a series of farm engineering kt-books, by Mr. John Scott, must be conidered very *apropos* at the present moment. ne one before us "Barn Implements and achines," No. 5 of the series, we do not conder altogether so worthy of commendation as ose that have preceded it. Some of the apters,—particularly those relating to water, eam, gas, and hot-air powers,—are crude, and e matter not by any means new. In several aces they smack very much indeed of the ade catalogue.

We cannot agree with the author's conclusion at "an engine which is merely a portable, and ot a traction, engine is now of comparatively mited value on the farm." In point of fact, is,—owing to hills, bad roads, small fields, and her causes,—only a moderate proportion of the rms in this country that can use a tractionngine profitably, to say nothing of its largely creased first cost. The author remarks that ne best makers give 20 ft. of heating surface the boiler for each nominal horse power." e does not say in what type of boiler; we preume, however, he refers to tubular boilers. /e think on inquiry he will find that this mount of heating surface is exceptional, and h the case of the larger tubular, Cornish, Lanashire, and vertical boilers, this statement equires very considerable modification.

The latter part of the book is a great improvement on the first, and the author appears b be much more at home with his subjects. The best chapters are those relating to thrashing-achines, the arrangement of barn machinery, nd dairy appliances, and these alone are well vorth the price charged for the whole.

*Toitures en Ciment de Bois.* By CHARLES S. HAEUSLER. Hanover: Th. Schäfer. 1884.

THIS is a pamphlet describing a woody cement or the construction of flat roofs, which is said by the author to have been largely introduced nto Southern Germany. The cement is a viscous and bituminous paste, of which the basis is wood, and is stated to be flexible and incombustible; it is put on warm, and becomes when cold metallically hard. The roof is arranged horizontally, or with a very slight rise, and the wood covered with a thin bed of fine sand (about three millimètres); this, again, is covered with alternate layers of prepared paper and wood cement; and, finally, with powdered coal or fine furnace slag dust; on this is placed sand and gravel, which is well rolled, the object being to protect the cement from the deleterious action of the atmosphere. Amongst the advantages claimed for this roof by the inventor are that it is as cheap as an ordinary roof, weighs very little more, is fireproof and weatherproof. The roof has been designed specially to allow of it being used as a garden or playground, and the book contains some illustrations of such gardens, the appearance of which in London would be, to say the least, refreshing. A number of illustrations of different designs for the construction of roofs in wooden cement are given.

The composition of the cement not being stated, we are unable to form an opinion as to the likelihood of its durability: the method of fixing certainly appears rather troublesome, and we should imagine that its success would depend largely on the skill with which the roof was laid, and protected from moisture by proper ventilation, say by free currents of air passing beneath it.

## RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,057, Improvements in Balancing Apparatus for Railway-carriage or other Window Sashes. J. A. Adams, Liverpool.

This device is chiefly for railway-carriage windows and to obviate the defects of the present system. The windows are at present generally lowered with a strap. This strap necessitates an expensive holder and strap, with a stud or holder, and a defect of a more serious kind is the open space between the inner and outer middle rail or cross-bar of the door, down which space or opening rubbish of various kinds, and occasionally lighted matches or fusees, are thrown. The removal of these is only effected with great expense. In this invention cords or wire-ropes are used, and the weights for balancing the sash are placed out of the way. The opening is also covered by a thin strip of wood. The balance-weight or weights preferably take the form of an iron bar, which is fixed, stretching from side to side of the hollow panel or pocket of the door. This bar has india-rubber buffers at each end to deaden the shocks or concussion.

11,509, Improved Process for the Production of Monumental Designs, &c. A. J. Boult, for F. M. Nicholls, of Chicago.

The designs for building monumental or other work are varied by the interchange of blocks or cards with parts of designs cut upon them, and comprising in all but a very few pieces of finished structures, an endless variety of designs by mere mechanical operations may be produced.

11,614, Improved Wheel-barrow. Browne & Co., for Jules George Dreyfus, Paris.

These metallic wheelbarrows are made with the body stamped out of a single piece by a die, and the bottom of the barrow is also stamped from a single corrugated piece of iron or other metal. The frame, too, is corrugated, and the inventor claims lightness and strength, combined with cheapness in manufacture.

1,290, Improvements in the Arrangement, &c., of Receptacles for Coals, &c., in combination with Chimney-pieces or Fireplaces. Arthur Foley, Salisbury.

Into the chimney-breasts, jambs, hoods, or sides, receptacles are introduced for holding coal or other fuel. These are so arranged as to slide in or out, or to move to and fro on hinges, open sideways, fall over, or as convenient for storing and emptying the fuel. The hoppers or drawers are hidden from sight by the fittings, and in an improved form a projection is made at the base of the jamb, which is very convenient for holding coal.

342, Improvements in regulating the Height of Desks and Seats. W. H. St. Ruth, Manchester.

The desk or seat rests on a round, oval, square, or triangular column or shaft, with parallel or with tapering sides, placed in a cavity with a wedge, thin end downwards. When the desk or seat is lifted, the wedge prevents its return. When the wedge is lifted, the desk or seat descends. The wedge is moved by a handle working freely in a slot. This method of fixing the adjustable column is the claim of the patent.

APPLICATIONS FOR LETTERS PATENT.

*Oct.* 10.—13,388, H. Smith, Coventry, and D. Smith, Birmingham, Improvements in Window-sash Fasteners.—13,390, W. W. Crowder, Birmingham, Automatic Bolt or Fastener for Doors, Gates, Window-sash Frames, and Shutters.—13,391, J. Waller and B. Farringdon, London, Bell Levers and Bell Pulls.—13,394, S. Rideal, Manchester, Improvements in Wheel Tyres, and the Method of Attaching same.—13,397, R. A. Goodman, Halifax, an Improved Construction of Ventilator.—13,412, F. West, Lewisham, Improved Adjustable Crane, Ascending and Descending a Vertical Post, specially applicable to Concrete Building.—13,416, J. Hamblet, London, Machinery for the Manufacture of Ridge and other Roof Tiles.—13,424, C. D. Abel, London, Controlling Cover for Key-holes.—13,430, P. A. Ames, London, Construction of Ceilings and other Parts of Buildings or Structures.

*Oct.* 11.—13,435, J. Peachey, Worcester, Sanitary Urinals.—13,452, B. Hawerkamp, London, Improvements in Grates and Kitcheners.—13,458, G. Harsant, London, Apparatus for Supplying Disinfectants to Water in Cisterns.—13,459, G. M. Phillips and J. Millier, London, Adjustable and Removable Dip for Gullies, Drains, and Sewers.—13,472, H. Thompson, London, Improvements in Stoves and Grates.—13,474, H. H. Lake, London, Improvements in Bakers' Ovens.—13,477, J. R. Jex-Long, London, Apparatus for Dividing Timber.—13,490, W. H. Tooth, London, Heating Rooms and Buildings.

*Oct.* 13.—13,492, A. French and J. B. Hannay, Glasgow, Manufacture of White and other Lead Pigments, and Apparatus for same.—13,493, H. McColley, Chelsea, Manhole Covers for Drains, &c.—13,497, S. J. Chinn, Birmingham, Exhaust Ventilators.—13,500, J. T. Pearson, London, Bakers' Ovens.—13,515, A. E. Hubert and W. W. Fyfe, London, Automatic Hot-water Cistern Regulator.—13,528, W. Paulson, Mountsorrel, Ventilating Rooms and Preventing Smoke.—13,534, H. J. Hadden, London, Machinery for Dressing or Moulding Blocks of Wood and other Material.

*Oct.* 14.—13,544, R. M. Whitaker, Skipton, Machines for Excavating and Re-filling Drains.—13,551, W. England, jun., London, Improved Handle for Tools.—13,554, R. C. Jones and J. W. Cunningham, London, Improvements in Lock Furniture.—13,556, A. C. Carver, London, Improved Window-sash Fastener.—13,582, H. H. Lake, London, Lifting Jacks, parts of which are applicable for other purposes.—13,593, W. Hassall, London, Fireplaces or Furnaces for Heating Pottery, Bricks, and like Kilns or Ovens.

*Oct.* 15.—13,602, D. Allport, London, Improved Paving for Carriage-ways.—13,665, H. Nance, Liverpool, Locks and Latches.—13,621, R. G. Kirton, London, Chimney-top and Ventilator.—13,626, E. Wood, London, Composition for Washing, Renovating and Reviving all kinds of Stone Work.—13,634, C. De Bourbon, Gonzaga, London, Application of Veneers of Wood or other Substances to Cloth, Paper, or other flexible Material, for decorative purposes, and to Wood with Waterproof Glue and Cement.—13,636, F. Howcroft, London, Automatic Sash Lock.—13,646, H. C. Gilchrist, London, Gasfitters' Pliers.

*Oct.* 16.—13,656, E. H. Booth and F. N. Dyer, Manchester, an Improved Sanitary Appliance.—13,668, S. Willett, London, Improvements in Door-handles and their Spindles.—13,672, H. G. Appleford, Birmingham, Burners for Heating purposes.—13,684, S. Pooley, London, Machinery for Sawing Timber.—13,690, J. Waller and B. Farringdon, London, Taps and Cocks.—13,691, G. Nobes, London, Supplying Disinfecting Fluid to Water-closets and Urinals.—13,692, A. F. Dennison, London, Machinery for Cutting Wood of various Shapes for Marquetry and Parquetry Work.—13,699, H. G. Harris and G. Beavis, London, Improvements in Bakers' Ovens.—13,700, G. Coultas, London, Improvements in Pipe-joints.

PROVISIONAL SPECIFICATIONS ACCEPTED.

11,926, G. Cresswell, Brighton, Improvements in Pipes for Water-closets, &c.—11,957, S. P. Pochin, London, Improvements in Structures of Iron and Concrete, or equivalent Material.—12,143, B. P. Harris and A. Stagg, London, Kilns or Drying Floors.—12,237, J. Bartlett, London, an Improved Lift.—12,257, J. Partridge, London, Window-blinds, applicable also to Partitions or Screens.—12,364, J. Rawlings, London, Cutters for Wood-planing Machines, and an Appliance for Grinding same.—12,486, T. Freeman, jun., and E. Eardley, Hanley, Machinery and Method of Manufacturing Hollow Bricks and other Hollow Clay or Plastic Building Materials.—12,607, W. L. Wise, London, Ventilating Apparatus.—12,747, W. Shaw, Glasgow, Stoves and Cooking-ranges.—12,750, S. B. Sutcliffe, London, Construction of Wooden and other Chimney-pieces.—12,767, W. D. Curzon and G. Jones, London, Manufacture of Pigments.—12,816, J. Stephens, Stonehouse, Heating Apparatus.—12,846, S. Peacock, London, Improvements in Ovens.—12,893, H. J. Hadden, London, Drying Kilns.—12,907, E. Smith, Birmingham, Appliance for Opening and Closing Windows.—12,973, H. K. Bromhead, London, Kitchen Ranges and Stoves.—13,083, S. Coombs, London, Improvements in Door-springs.—13,089, R. Hodges and J. Archer, London, Sash Fastenings.—13,112, T. S. Worthington, London, Producing Imitations of Wood and Marble on Painted and other Surfaces.—13,136, G. Grey, London, Appliance for Locking the Levers of Window-catch Fasteners.—11,113, J. Rosenthal and C. M. Rosenthal, Vienna, Fireproof Curtains for Theatres, Warehouses, and other Buildings.—11,344, W. Carron, Birmingham, Adjustable Holding and Regulating Cramp.—12,538, W. Mangnall, London, Improvements in Water-closets.—12,736, J. Blacka, Todmorden, Pointing Tool.—12,771, H. A. Stuart, Fenny Stratford, Screw Lifting-jacks.—13,033, L. Dathis, London, Bakers' Ovens.—13,143, H. Tuff and C. R. Mathews, London, Water Waste-preventers for Water-closets.—13,147, R. Oakley, London, Apparatus for Ventilating and Warming Buildings.—13,231, F. C. Hustler, London, Window Sash-fasteners.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

108, T. Jones, London, Improvements in Ventilators.—180, W. H. Baraclough, Edgbaston, Apparatus for Flushing Water-closets, &c.—259, H. H.

Bridgman, London, Improved Girder and Fireproof Floor.—260, H. B. Bridgman, London, Fireproof Floors.—326, J. Smith, Liverpool, Improvements in Fireplaces and Grates.—407, F. T. Bond, Gloucester, Stoves for Warming and Ventilating Purposes.—2,381, C. Walton, London, Machine for Separating Clay or other Materials, from Stones or other Hard substances.—10,853, J. Brendon, jun., and Geo. D. Brendon, Cullington, Cupboard Fasteners.—299, F. Smith, Birmingham, Raising, Lowering, and Securing Window Sashes,—519, J. Petrie, Rochdale, Heating Rooms and Buildings.—571, H. M. Ashley, Ferrybridge, Kitchen Range.—661, E. Woolfenden, Rochdale, Improved Ventilator.—723, S. Smith, Smethwick, Cooking Ranges.—887, S. Reeve, London, Warming and Ventilating Apparments and other Places.—1,046, H. Sutcliffe, Halifax, Water-closets and Apparatus connected therewith.—1,339, J. Hodgson, Birkenhead, Window Sash or other Fasteners.—9,744, T. Telford, Newcastle-on-Tyne, Chimney-tops and Apparatus connected therewith.—12,478, J. E. Hopkinson, London, Improved Roller Blind.

## MEETINGS.

MONDAY, OCTOBER 27.

*Inventors' Institute*.—Mr. E. Guest on "Universal Visible Speech," 8 p.m.

TUESDAY, OCTOBER 28.

*St. Paul's Ecclesiological Society*.—Mr. Hugh Stannus on "The Decoration of St. Paul's." 7.30 p.m.

WEDNESDAY, OCTOBER 29.

*Institution of Carriage Manufacturers*. The Taxes on Carriages (public meeting, Westminster Town-hall), 8 p.m.

## Miscellanea.

**Third-class Passenger Traffic and Railway Profits.**—The returns which have just been issued show that railway shareholders continue to be mainly indebted for their dividends to third-class traffic. The total number of first-class passengers who travelled on all the railways now opened for traffic in the United Kingdom, during the half-year ending on the 30th of June last, was 16,115,749; second-class, 25,814,099; and third-class, 241,739,085; the number of third-class passengers being more than 500 per cent. in excess of first and second-class passengers combined. The relative amount of receipts is in equal proportion, those from first-class passengers being 1,658,977*l*.; second-class, 1,402,489*l*.; and third-class, 7,281,213*l*. The difference applies to all the lines in common, as a reference to the traffic on the London and North-Western and other leading lines shows. Thus, on the London and North-Western line the number of first-class passengers was 1,139,500; second-class, 1,946,000; third-class, 22,841,751; and the receipts from first-class passengers, 241,534*l*.; second-class, 172,710*l*.; and third-class, 1,007,950*l*. The figures given in connexion with the traffic on the Great Western, Great Northern, Great Eastern, Midland, South-Western, and the whole of the other lines having their termini in the metropolis show similar results. The North London line returns are specially striking, the receipts from first and second-class passengers being 16,768*l*., whilst those from third-class passengers amounted to 128,590*l*., or about 800 per cent. more than from first and second-class combined. Within the period named the Metropolitan and Metropolitan District Companies and the North London Company carried upwards of 50,000,000 passengers, to which must be added, as showing the enormous traffic within the area of the metropolis, that of the Great Eastern, London, Chatham, and Dover, London and Brighton, and the South-Western and South-Eastern companies, a large portion of which is purely metropolitan.

**The Nineteenth Century Art Society.**—Saturday, November 1st, has been appointed for the private view of the Autumn Exhibition of the Nineteenth Century Art Society at the Conduit-street Galleries, and the Exhibition will be open to the public on Monday, November 3rd.

**Inventors' Institute.**—The opening of the session will take place at Lonsdale-chambers, Chancery-lane, at eight p.m. on Monday next, when, after a brief address by Admiral Selwyn, Mr. E. Guest will read a paper on "Universal Visible Speech," introducing, in illustration, one of Farini's dwarf Earthmen, from the Aquarium.

**The Surveyors' Institution.**—The first ordinary general meeting of the Session will be held on Monday, November 10th, when the president, Mr. T. Smith Woolley, will open the Session with an address.

**New Office Buildings in Basinghall-street.**—An extensive and striking block of new buildings is at present in course of erection in Basinghall-street, having a frontage of 62 ft. to that thoroughfare. The buildings are Flemish in style, and are faced with Dumfries stone and Portland cement. They contain six floors above the ground-line, and a deep basement. The main elevation, containing four of the floors, is 50 ft. high, the extreme height to the apex of the stepped gable in the centre of the frontage being 76 ft. The buildings are being erected in two divisions, and under separate contracts, one of the divisions being now almost completed and ready for occupation. The ground-floor of this division has two spacious windows on each side of an entrance 11 ft. in width, which is very elaborately treated. This portion of the frontage, up to the top of the first floor, is constructed in a recess about 4 ft. in depth to the rear of the main face of the building. Immediately over the entrance is an enriched moulded cove in fibrous plaster, containing work in relief, specially designed and modelled by Messrs. Daymond & Son, of Vauxhall Bridge-road. Immediately above the entrance, within the recess already named, there are octagonal piers alternately in Dumfries stone and Portland cement surmounted by hoods or turrets, and above these, on a level with the upper part of the second floor, there is a central arch in Dumfries stone. The treatment, architecturally, of the building within the recess is a special feature in the structure. The several floors have two and three-light mullion windows, and in the glazing and other details the character of the style of architecture adopted is maintained. The interior is arranged in suites of offices, of which there are a large number, admirably lighted from the rear as well as from the front of the building. All the offices are fitted with slow-combustion stoves, supplied by Messrs George Wright & Co. Mr. R. M. Roe, A.R.I.B.A., of Basinghall-street, is the architect, the contractor for that portion of the block now nearly finished being Mr. J. Grover, of the Wilford Works, New North-road, and for the other portion, Messrs. Larke & Son, of Fore-street, E.C. The cost of the entire block will be about 8,000*l*.

**Technical Education for Carpenters and Joiners at the Health Exhibition.**—Some instructive diagrams and models in wood, illustrating the principles of carpentry and joinery, are exhibited in one of the rooms containing the Finsbury Technical College exhibit, by Mr. Staynes. The drawing and model of a splayed lining to an "ellipse on circle" frame shows all the working lines for the construction of this difficult piece of work. A very difficult case of raking moulding is shown. The angle between the walls is an obtuse angle; both mouldings are on the rake, and the rake of one is greater than that of the other. The drawing and model of a piece of handrail show the theory of the tangent system of handrailing, the drawing giving the tangents, pitch of the plank, face mould, bevels, the thickness of the plank, and the width of the cutting-out mould, while the model shows the application of moulds and bevels, and it can be taken to pieces so that the manipulation can be clearly illustrated. The model of a piece of "circle on circle" work, made by one of the first-year students of Mr. Staynes at Finsbury College, shows, at the different stages of construction, the application of the various moulds and bevels.

**New Public Hall and Assembly-rooms at Streatham.**—The great expansion of Streatham, and the increase of its population, which has been going forward during the last few years, has led to a determination to erect a new public hall in the parish, which is about to be carried out. Three large estates in the neighbourhood have been laid out for building purposes within the last three or four years, and on two of these upwards of 600 houses have already been erected. Upon a third estate, the Manor Park Estate, recently laid out, building is at present actively going forward. About 100 houses have already been built. In one of the main roads of this estate, and conveniently situated near the railway station, the public hall is to be erected. The building will contain a large public hall and assembly-rooms for public meetings and entertainments, with reading-room, smoking-rooms, chess-rooms, committee-rooms, &c. The ground-floor will consist of shops. Messrs. Wheeler & Holland, of Cheapside, who have designed the buildings which have so far been erected on the estate, are the architects.

**The Width of Streets.**—Much advance h been made during recent years in securi increased space about inhabited dwellings, a modern regulations require that a certa minimum of space shall be given in the re of houses, and also to the front, the width of t street being taken into account as regards t latter space. But in the State of Illinois t excessive width of the streets is reported having of itself become a source of nuisance a of danger to health. Sixty feet and more a ordinarily given to new streets, even in t smaller towns; 8 ft. on each side are pav and devoted to pedestrians, and the remaini space, varying usually from 44 ft. to 54 ft., devoted to carriage traffic. The result is th this wide carriage-road, so often in excess of t requirements of the vehicles that have to trav over it, becomes a source of such expense as forbid its being properly paved, cleansed, a channelled. The street, consequently, soon turned into a vast surface of di mixed with filth, horse droppings, and othe refuse, and when the weather is so dry that du is formed, the air which is inhaled as the du flies about is calculated to bring about disea as well as discomfort, instead of promoting th health of pedestrians. Dr. Gregory, in bringin forward this subject, fully concurs in the grea importance of providing wide thoroughfare and of keeping the number of inhabitants t each acre down to a proper maximum, an hence he declares that he would not on an consideration diminish by a single foot th width of the streets. But he would curtail th actual roadway, so that it shall only suffice fo the proper demands of the carriage traffic; an between that limited space, which could the be properly kept at a reasonable cost, and th footpaths, he would plant trees and lay dow grass, so as really to provide in towns and citie such freshness and greenness as would go fa to induce people to take that form of exercis which is most conducive to health.—*Th Lancet*.

**Wellington College.**—The Governors o this College have recently completed extensiv sewerage and water-works schemes at th above. An entirely new system of sewer an rain-water pipes has been laid. The sewage gravitates to the purification works, consisting of mixing-house, precipitating-tanks, and sludge pits, about one mile and a quarter from the College, where it is dealt with by the Native Guano Company under their patent process The rain-water is collected in a large under-ground reservoir, near the recently-erected laundry, and is used for washing purposes. The water-supply is now also completed; the water is pumped to Edge Barrow-hill, about three-quarters of a mile from the College, where circulating reservoir filter-beds and clean water storage-reservoir have been constructed. The existing well has been relined with iron cylinders, 6 ft. in diameter; the well is about 250 ft. deep. Extensive sanitary alterations in the interior of the College have also been executed. The engineer was Mr. Baldwin Latham, C.E., F.G.S., &c. The resident engineer was Mr. Sydney Lowcock. The contractors were Messrs. B. Cooke & Co., of Battersea, whose contract amounted to about 12,000*l*.

**Messrs. Chubb & Son and their Work-people.**—The new building for the coffee-tavern and workmen's dwellings in connexion with Messrs. Chubb & Son's Safe Works, Glengall-road, Old Kent-road, London, is now well advanced, and will be completed by Christmas. We are pleased to note that arrangements are being made to form a large and complete library for the workpeople and their families; and the first book presented to it is a copy of the Queen's latest work, which her Majesty sent to the workmen quite unsolicited, the title-page bearing an inscription with her autograph. We are told that the building contains several novel features of interest, so that it will, when complete, repay a visit to those interested in such matters. The architect is Mr. Elijah Hoole, of Great Russell-street; and the builder is Mr. Edward Edwards, of Leighton-road, Kentish Town, N.W.

**Dublin Artisans' Dwellings Company.**—The secretary of this company writes, in reference to a remark in our leading article of the 4th inst., that it is incorrect that any members of the Corporation of Dublin are shareholders in the Artisans' Dwellings Company. We of course made the statement on what we believed to be trustworthy information.

**Association of Municipal and Sanitary Engineers and Surveyors.**—A meeting of members of the northern district of the Association of Municipal and Sanitary Engineers and Surveyors was held at Stockton on Saturday last. Mr. Laws, M.I.C.E., city engineer of Newcastle, and president of the association, presided. The mayor heartily welcomed the members to Stockton. Mr. J. W. Thomson, of Willington Quay, was unanimously elected hon. secretary to the district. The president briefly addressed the meeting, and urged that the Association should apply for a charter of incorporation to enable them to conduct examinations and grant certificates. If they should not take this step, he thought the Local Government Board would institute examinations. As to the suggestion that sanitary engineers and surveyors should not be liable to be discharged without the consent of the Local Government Board, he disapproved of it, because he thought a powerful association would be able to protect its own members if they were content. After visting the Tees conservancy works the members dined together.

**St. Austell.**—The parishioners of Holy Trinity Church, St. Austell, Cornwall, have just erected a four-light Munich stained-glass window, by Messrs. Mayer & Co., to the memory of the late Rev. Fortescue Todd, vicar from 1838 to 1881.

**Richhill (Co. Armagh).**—A window has been erected in the transept of Richhill Church, in memory of the late Mrs. Bacon, by the friends, parishioners, and tenantry. It is a three-light window in the Perpendicular style of architecture, with a number of openings in the tracery. The subjects chosen in the upper part of the design are figures representing "Faith," "Love," and "Hope," with typical subjects in the base of "The Marriage Feast at Cana," "Our Lord healing the Sick in the Temple," and "Our Lord raising the Widow's Son." In the upper part of the tracery are "Angels holding emblems of purity," "Angels in prayer," and in the centre an angel holding the celestial crown. The work has been executed by Mr. James Cameron, of Wigmore-street, London.

**Pulpit, St. John's Wood.**—A circular pulpit, in alabaster, to the memory of the late Mr. Edmund Robins, has recently been erected in All Souls' Church, St. John's Wood. The work has been executed by Messrs. Farmer & Brindley, of Westminster Bridge-road, from the designs of Messrs. Wadmore & Baker, of 35, Great St. Helen's, London.

**West Hartlepool.**—Plans for considerably extending the business premises of Messrs. J. Backhouse & Co. have been approved of by the Commissioners, Mr. G. G. Hoskins, F.R.I.B.A., of Darlington, being the architect.

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Wrought-Iron Bridge | Swindon New Twn. L. B. | 25*l.* | Dec. 1st | i. |
| School at Great Horton | Bradford School Board | Not stated | do. | i. |
| Pier and Landing-stage, Ventnor | Ventnor Local Board | ..... | Dec. 8th | i. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Making Well | Teignmouth Local Brd | Geo. Crow | October 25th | xviii. |
| Drainage Works | do. | do. | do. | xviii. |
| Broken Guernsey Granite | Milton Improvmnt Com. | H. W. Clarke | October 27th | ii. |
| Making-up Roads | Wandsworth B. of Wks. | *Official* | October 28th | xviii. |
| Road Making and Paving | Fulham Board of Wrks | do. | October 29th | ii. |
| Road Making | Dartford Local Board | do. | do. | ii. |
| Mall House, Ratcliffe | ..... | — Sargeant | do. | xviii. |
| Repairing Foundations, &c., at Infirmary | Grdns. of Fulham Un. | do. | October 30th | xviii. |
| Boundary-Walls and Railing, &c. | Waltham Holy Cross Burial Board | C. W. Wiggs | Nov. 3rd | ii. |
| Farmhouse, &c., Fulstow | Trustees of A. H. Allenby | E. W. Farebrother | do. | ii. |
| Outfall Sewers | Frome Local Board | P. Edinger | do. | xviii. |
| Foundations of Assembly-Rooms, Gillingham | J. L. Jayrell | Margetts & Co. | do. | xviii. |
| Beam-Roller | Acton Local Board | ..... | Nov. 4th | xviii. |
| Beech Wedges | Admiralty | *Official* | do. | ii. |
| Cast-Iron Work | Commissnrs of Sewers, City of London | do. | do. | ii. |
| Concrete, Brick, and Pipe Sewers, &c. | Romford R. S. A. | Brundell, Simmons, & Brundell | do. | ii. |
| Paving | Southwark Vestry | *Official* | do. | xviii. |
| Erection of Baths, &c. | City of Newcastle-on-Tyne | Gibson & Allan | Nov. 5th | ii. |
| Additions and Alterations, Wadhurst | Captain Walker | H. M. Caley | do. | xviii. |
| Broken Granite | Walthamstow Lcl. Bd. | *Official* | Nov. 6th | ii. |
| Stone Paving | Dartford Local Board | do. | Nov. 7th | ii. |
| Broken Granite | do. | do. | do. | ii. |
| Factory, Vauxhall | Barrett's Bottling Co. | Hilton & Rawlings | Nov. 10th | xviii. |
| New Post-office, Bradford | Commissnrs. of Works | *Official* | do. | ii. |
| Bridge on Filsham Estate | Owners | Elworthy & Son | do. | ii. |
| Granite, Gravel, Flints | Croydon Corporation | *Official* | Nov. 11th | ii. |
| Widening Line | Great Western Ry. Co. | do. | do. | ii. |
| Construction of Embankment | Rochester Corporation | W. Banks | Nov. 17th | xviii. |
| Construction of Sewer | Met. Board of Works | *Official* | Nov. 28th | i. |
| Stores and Materials | Cheshire Lines Com. | ..... | Dec. 1st | ii. |
| Main Drainage Works | Acton Local Board | *Official* | Dec. 2nd | xviii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Applications to be in. | Salary. | Page. |
|---|---|---|---|---|
| Surveyor, &c. | Wantage Improvement Commissioners | Nov. 1st | 100*l.* per annum | xvi. |

## TENDERS.

For laundry to be erected in the rear of Ebenezer-terrace, Kennington-road, for Mr. C. Zierenberg. Mr. Banister Fletcher, architect:—

| | |
|---|---|
| Blyton | £917 0 0 |
| Mills | 876 0 0 |
| Parker | 799 0 0 |
| Towner & Patten | 765 0 0 |
| Burman & Sons | 749 0 0 |
| Buchan | 695 0 0 |
| Andrews (accepted) | 679 0 0 |
| Aldridge & Jenvey | 673 8 0 |

For additions to "Anglebay," Woodchurch-road, West Hampstead, for Mr. Banister Fletcher:—

| | |
|---|---|
| J. Mansbridge (accepted) | £220 0 0 |

For shops to be erected in Brent-street, Hendon. Second contract. Mr. Banister Fletcher, architect:—

| | |
|---|---|
| J. Ellacott (accepted) | £1,400 0 0 |

For the erection of a house in the Royal-road, Kennington, for Mr. C. Zierenberg. Mr. Banister Fletcher, architect:—

| | Smaller House. | Larger House. |
|---|---|---|
| Mills | £800 | £940 |
| Towner & Patten | 798 | 937 |
| Parker | 799 | — |
| Blyton | 799 | 890 |
| Burman & Sons | 705 | 767 |
| Aldridge & Jenvey | 640 | 719 |
| Andrews | 598 | 671 |
| Buchan | 594 | 665 |

For the erection of a villa at Goring, Oxon., for Mr. E. H. Bayldon. Mr. J. S. Dodd, architect, Reading:—

| | |
|---|---|
| T. Higgs, Goring | £2,374 0 0 |
| W. Brasher & Son, Wallingford | 2,285 0 0 |
| T. H. Kingerlee, Oxford | 2,195 0 0 |
| G. Wernham, Reading | 2,166 0 0 |
| J. Bottrill, Reading | 2,098 0 0 |
| W. H. Simmonds (accepted) | 1,987 0 0 |

For the execution of sewage and outfall works at Farnborough, for the Hartley Wintney Union Sanitary Authority. Mr. J. R. Sisterson, surveyor:—

| | |
|---|---|
| Bottoms Bros., Battersea | £2,280 0 0 |
| L. H. Green, Epping | 2,250 0 0 |
| Bath & Blackmore, Clapham | 2,162 0 0 |
| John Howard, Basinghall-street, London | 2,042 9 8 |
| J. Hughes, Aldershot | 2,010 0 0 |
| T. P. Hall, Portsmouth | 1,874 0 0 |
| T. Adams, Moorgate-street, London. | 1,794 0 0 |
| T. B. Hayter, Landport | 1,742 0 0 |
| J. Hayward, Eastbourne | 1,737 0 0 |
| Crook & Smith, Southampton | 1,693 0 0 |
| B. Cooke & Co., Battersea | 1,670 0 0 |
| Evans Bros., Wallingford | 1,618 11 8 |
| Geo. Smith, Newcastle-on-Tyne | 1,603 3 5 |
| J. Pool & Son, Hartley Wintney | 1,525 0 0 |
| H. J. Saunders, Northam, Southampton | 1,498 0 0 |
| Martin, Wells, & Co., Aldershot | 1,428 0 0 |
| Jas. Young & Co., Skegness | 1,330 0 0 |
| R. C. Trimm, Hersham, Walton-on-Thames (accepted conditionally) | 1,288 0 0 |

For supplying and laying cast-iron pipes, &c., at Hartley Row, for the Hartley Wintney Union Sanitary Authority:—

| | |
|---|---|
| Bath & Blackmore, Clapham | £2,493 0 0 |
| J. S. Stidder & Co., Southwark Bridge-road | 1,850 0 0 |
| Martin, Wells, & Co., Aldershot | 1,658 0 0 |
| G. E. Child, Southwold | 1,540 18 3 |
| S. Chandler & Sons, Kennington Oval | 1,428 18 0 |
| T. P. Hall, Portsmouth | 1,410 4 0 |
| J. Wood, York Town | 1,370 2 2 |
| Green & Burleigh, Upper Thames-street | 1,360 0 0 |
| Bottoms Bros., Battersea | 1,358 0 0 |
| R. Laidlaw & Son, Cannon-street | 1,296 7 0 |
| B. Cooke & Co., Battersea | 1,280 0 0 |
| Crook & Smith, Southampton | 1,256 0 0 |
| L. H. Green, Dartford | 1,236 7 6 |
| H. Young & Co., Pimlico | 1,235 0 0 |
| Evans Bros., Wallingford | 1,215 11 0 |
| John Howard, Basinghall-street | 1,190 0 0 |
| G. Smith, Newcastle-on-Tyne | 1,162 15 6 |
| H. J. Saunders, Northam, Southampton | 1,158 0 0 |
| J. Young & Co., Skegness | 1,154 2 6 |
| Jas. Proctor, Sutton, Surrey | 1,099 8 7 |
| Jas. Pool & Son,* Hartley Wintney | 1,040 0 0 |
| R. C. Primm, Hersham, Walton-on-Thames | 1,019 0 0 |
| F. Greenaway, Slough ..... per yard | 3s. and 3s. 4d. |

* Accepted.

For the erection of a block of dwellings and offices in Camberwell New-road, for the London Tramways Company (Limited). Messrs. Ward & Clarke, architects, 2, Lancaster-place, Strand:—

| | |
|---|---|
| Barrie Bros. | £2,596 0 0 |
| Richards | 2,587 0 0 |
| Belham & Co. | 2,559 0 0 |
| Downs | 2,550 0 0 |
| Blasby | 2,535 0 0 |
| Colls & Sons | 2,486 0 0 |
| Burman & Sons | 2,463 0 0 |
| Priestley | 2,390 0 0 |
| Holliday & Greenwood | 2,357 0 0 |
| Sabey & Son | 2,349 0 0 |
| Stimpson & Co. | 2,343 0 0 |
| Balaam Bros. (accepted) | 2,200 0 0 |

For alterations and decorations to No. 47, Longridge-road, Earl's Court, for Mrs. Kennett. Mr. Alfred Wright, architect, 190A, Brompton-road, S.W.:—

| | |
|---|---|
| Hayden | £433 0 0 |
| Cook | 319 0 0 |
| Johnson | 289 0 0 |
| Kent & Wilkins | 270 0 0 |
| Hunt | 245 0 0 |

For the erection of a new vicarage, Beguildy, Radnorshire. Mr. E. H. Lingen-Barker, architect:—

| | |
|---|---|
| Price & Deakin, Knucklas, Knighton | £1,657 0 0 |
| J. Williams, Knighton | 1,578 0 0 |
| Davies & Son, Newtown, Montgomery | 1,541 0 0 |
| W. Dowland, Kenilworth (accepted) | 1,496 0 0 |

For the construction of about three miles and a half of single line of tramway in Rea-street; High-street, Deritend; High-street, Bordesley; Camp Hill; Bradford-street; Kyott's Lake-road, and Stratford-road, for the Corporation of the Borough of Birmingham:—

Jacob Bigge, 3, Villa-road, Handsworth (accepted).*

* At schedule of prices.

For the erection of a new convent and chapel upon the Bowling-green Estate, in Queen-street, Scarborough, Yorkshire. Mr. Fredk. A. Walters, A.R.I.B.A., architect, 4, Great Queen-street, Westminster, London. Quantities supplied by Mr. W. H. Brayshaw:—

| | |
|---|---|
| John Barry (accepted) | £11,286 10 0 |

For college and hall at Hampstead, for Mr. J. Hayeman. Mr. Banister Fletcher, architect:—

| | |
|---|---|
| Groom, Rowland, & Co. | £6,634 0 0 |
| W. Downs | 6,54[illegible] 0 0 |
| Castle | 6,49[illegible] 0 0 |
| Tozer | 6,43[illegible] 10 0 |
| Mansbridge | 6,425 0 0 |
| Parker | 5,900 0 0 |
| Hayes | 5,800 0 0 |
| Couzens & Simmons | 5,255 0 0 |
| Aldridge & Jenvey (accepted) | 4,989 13 0 |
| Scharien & Williams | 4,759 0 0 |

For alterations to No. 44, Fish-street-hill, E.C. Mr. Edward Power, architect, 16, King William-street, E.C. Quantities by Mr. W. Barnett —

| | | | |
|---|---|---|---|
| B. E. Nightingale | £1,507 | 0 | 0 |
| R. Conder | 1,395 | 0 | 0 |
| Burch & Co. | 1,287 | 0 | 0 |
| J. R. Hunt | 1,249 | 0 | 0 |
| J. & J. Greenwood | 1,212 | 0 | 0 |
| J. Dover | 1,200 | 0 | 0 |
| Fuller (too late) | 1,200 | 0 | 0 |
| W. Shurmur | 1,188 | 0 | 0 |
| Hill & Berridge | 1,150 | 0 | 0 |
| J. O. Richardson | 1,059 | 0 | 0 |

For alterations, &c., at Richmond-road, Barnsbury, for Dr. Wilkinson. Mr. W. Smith, architect :—

| | | | |
|---|---|---|---|
| Wood | £205 | 0 | 0 |
| Olds | 201 | 0 | 0 |
| Matthews | 193 | 0 | 0 |
| Larke | 180 | 0 | 0 |
| Hewitt | 177 | 0 | 0 |
| Dearing & Son | 176 | 5 | 6 |
| Duncan & Lang | 160 | 0 | 0 |
| Stevens | 156 | 0 | 0 |

Accepted for the erection of storehouse, coachhouse, stables, &c., being the first portion of new brewery stores, London-road, Enfield, for Messrs. Savill Brothers. Mr. Frederick A. Ashton, architect, Stratford :—

| | | | |
|---|---|---|---|
| J. Hearle & Son | £750 | 0 | 0 |

Accepted for the erection of committee-rooms, class-rooms, and caretaker's apartments (Contract No. 2), for the Building Committee of St. Barnabas's Schools, Homerton. Mr. E. Witts, architect. Quantities supplied : —

| | | | |
|---|---|---|---|
| Stimpson & Co. | £1,539 | 0 | 0 |

For converting three houses into shops near Clapham Junction. Mr. Thomas Spearing, surveyor :—

| | | | |
|---|---|---|---|
| J. Munday | £750 | 0 | 0 |
| Samuel Steel | 750 | 0 | 0 |
| Jones & Edwards | 690 | 0 | 0 |
| B. Book | 469 | 0 | 0 |
| Robinson & Miller | 475 | 0 | 0 |
| Howard | 441 | 0 | 0 |
| Saunders & Co. | 405 | 0 | 0 |
| Rudd | 409 | 0 | 0 |
| Thompson & Co. | 398 | 0 | 0 |
| W. Ellis | 390 | 0 | 0 |
| F. Warr | 360 | 0 | 0 |
| R. Smith | 350 | 0 | 0 |
| Hughes & Davis | 318 | 0 | 0 |
| Baker | 330 | 0 | 0 |
| Scharien & Williams | 317 | 0 | 0 |
| Coussens & Simmons | 295 | 0 | 0 |
| Stewart & Co (accepted) | 245 | 0 | 0 |
| C. J. Rand | 225 | 0 | 0 |

For alterations, &c., at No. 180, Kingsland-road, for Messrs. A. & W. Flatau. Mr. T. E. Knightley, architect. :—

| | | | |
|---|---|---|---|
| Greenwood | £717 | 0 | 0 |
| Ashby | 696 | 0 | 0 |
| Staines & Son | 594 | 0 | 0 |
| Staines & Son* (reduced estimate) | 382 | 0 | 0 |

* Accepted.

For alterations and additions to the Wesleyan Sunday Schools, Ramsgate. Mr. E. L. Elgar, architect :—

| | | | |
|---|---|---|---|
| Bugden | £335 | 0 | 0 |
| Smith | 497 | 10 | 0 |
| Port | 420 | 0 | 0 |
| Martin | 419 | 10 | 0 |
| Grummant | 370 | 0 | 0 |
| Bowman | 339 | 0 | 0 |
| Miller | 310 | 0 | 0 |

For alterations to wine cellars, and building chimney-shaft, for Messrs. Westwall & Co., Ramsgate. Messrs. Hinds & Son, architects :—

| | | | |
|---|---|---|---|
| Smith | £1,385 | 0 | 0 |
| Miller | 900 | 0 | 0 |
| Bowman | 879 | 0 | 0 |
| Newby Bros. | 876 | 10 | 0 |
| Home | 665 | 0 | 0 |
| Grunmant | 594 | 0 | 0 |
| Martin (accepted) | 532 | 0 | 0 |

For heating with hot water Hope Church, North Wales. Mr. J. Oldrid Scott, 31, Spring-gardens, London, architect :—

| | | | |
|---|---|---|---|
| Messenger & Co.,* Loughborough | £95 | 17 | 6 |

* Accepted.

For erecting cement concrete sea-wall, groyne, and other works, for the Commissioners of Highways, on the shore near the Granite foot, Sandown Plain, Isle of Wight. Quantities by the surveyor, Mr. E. Humphreys, East Medina District :—

| | | | |
|---|---|---|---|
| T. Hall, Portsmouth | £918 | 15 | 0 |
| T. B. Hayton, Portsmouth | 835 | 0 | 0 |
| T. Jenkins, Newport | 760 | 0 | 0 |
| G. Hales, Shanklin | 695 | 0 | 0 |
| T. Hayden, Sandown | 625 | 0 | 0 |
| E. Pritchard, Sandown (accepted) | 615 | 10 | 0 |
| J. White, Sandown | 729 | 0 | 0 |
| T. Barton, Ryde | 694 | 10 | 0 |

[Mr. Barton's tender was first accepted, but was thrown out on account of not naming sureties at the time of tendering, in accordance with specification.]

For two new shops, Brixton-road, for Mr. F. Bird. Messrs. Fowler & Hill, architects. Quantities supplied :—

| | | | |
|---|---|---|---|
| W. King & Son | £2,900 | 0 | 0 |
| W. Drown | 2,885 | 0 | 0 |
| Jas. Carpenter | 2,796 | 0 | 0 |
| John Dickison | 2,690 | 0 | 0 |
| Pack Bros. (accepted) | 2,473 | 0 | 0 |

Accepted for storage water-tanks, &c., at the Ipswich Borough Asylum. Mr. E. Buckham, surveyor :—

| | | | |
|---|---|---|---|
| Crisp & Smith | £251 | 0 | 0 |

[Amended price for ⅜ in. tanks.]

For works to Cobden-road, Sevenoaks, Kent, in forming, metalling, kerbing, channelling, storm-water drain, gulhes, &c., for the Sevenoaks Local Board. Mr. Jabez Mann, surveyor :—

| | | | |
|---|---|---|---|
| H. Owen, Sevenoaks | £561 | 16 | 6 |
| W. J. Botterill, Sevenoaks and London (accepted) | 405 | 0 | 0 |

[Surveyor's estimate, 486*l.*]

For the construction of 106 lineal yards of glazed earthenware pipe sewer, with manhole and lamphole, in a portion of the Gordon-road, Sevenoaks, Kent. Mr. Jabez Mann, surveyor :—

| | | | |
|---|---|---|---|
| H. J. Botterill, Sevenoaks and London | £85 | 0 | 0 |
| Chas. King, Sevenoaks | 68 | 16 | 4 |
| H. Robbins, Sevenoaks | 62 | 9 | 0 |
| H. Owen, Sevenoaks (accepted) | 53 | 16 | 0 |

[Surveyor's estimate, 70*l.*]

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

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### TO CORRESPONDENTS.

E. and R. (our advertising columns are open).—J. W. S. (not our mark).—W. G. & Knorr. (an quots should be sent).—R. T. E. (too late for this week).—P. C. P.—J. C.—E. G.—H. H.—J. H.—W. J. W. G.—E. W. C.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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N.B.—On View at **HEALTH EXHIBITION** (Eastern Gallery).

# The Builder.

Vol. XLVII. No. 2178. Saturday, November 1, 1884.


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### *On Structural Analogies in Nature and Art.*

THAT the sculptor and art-student may feel the want of a guide to the proportions of the human form is avouched by the repeated attempts which have been made in ancient and modern times, and even by artists who themselves had the best claim to be independent of any assistance, to establish and supply it. A translation, with reproduced plates, of the "Polycletus" of the Prussian sculptor Schadow is the most recent recognition of this want; it is published by the authority of the Committee of Council on Education,—so we read on the title-page,—and "is intended more for the advanced art-student and draftsman (draughtsman) than for those who have not attained a certain proficiency in drawing the figure." Credit is taken for care to preserve very closely the character of the original lithographs, but we are warned not to regard them otherwise than as mere diagrams explanatory of the text. They are certainly not likely to be mistaken for anything more ambitious; the notice is only not superfluous because otherwise it would not be unreasonable to suppose, from the reputation of the sculptor who drew them, that he had naturally taken pains where pains would have been appropriately bestowed, and fancied that he had succeeded. As it is, the truth must be told, that whether we turn to examples of the average human figure, or to an Apollo or a Venus, the object which is presented to us in illustration of the laws of beauty is scarcely less repulsive and repugnant than those marvellous types with which Albrecht Dürer was satisfied for his treatise on human proportions. The Berlin of our own day would seem, if we are to trust these specimens, not more fortunate in its models of form than the Nuremberg of four centuries since.

Few who have given attention to that book of Dürer's will disagree with the brief verdict of Michelangelo thereon,—"poca e debole cosa questo libro." We are obliged to ask ourselves seriously how far the same may not apply to the "Polycletus" of Schadow. The very title-page provokes a challenge, and we ask, will sculptors and art students derive much guidance in the matter of proportion by "measurements in feet and inches of full-grown figures of both sexes and of various ages"? and, indeed, of figures not full-grown? for the measurements begin with the new-born infant, "which can only be taken with accuracy when the nurse stretches out by force the arms and legs." It is only in the fourteenth double plate that we reach the full-grown example; earlier plates exhibit front, back, and profile measurements for years and half-years of progress up to seventeen. To an eye not unused to the scrutiny of living forms it is not pleasant to scan representations which the author may excuse as mere diagrams, but which on their own part evidently would be characteristic if they could, but cannot. We may fairly give credit to the measurements having been accurately made and recorded, but what interest they have very clearly does not belong to art, but to anthropometry. From the latter point of view, it may be of interest to record and classify the measurements of the entire population of a German town, man, woman, and child; but what an artist may be thankful for would be the measures of such select individuals as he recognises independently for beautiful or characteristic examples; for this recognition he does not want guidance, but he will welcome and be thankful for the discovery of any proportionate relations between dimensions or between masses which can be shown to conduce or be essential to the expressive result. It was a saying of Michelangelo that a sculptor should have his compasses in his eye; but this by no means amounts to the repudiation of the precision of measurements which proportion implies; he would have the perception by sight of proportionate magnitude so perfect that the application of compasses would not correct its report. It was only his mistrust, according to Condivi, of his literary faculty that withheld him from putting into form a better theory, matured between his anatomical studies and practice of art; it is unfortunate that the notes which Condivi made of his observations (*molte cose rare e recondite*), upon the body of a beautiful Moorish youth were never given to the world.

The explanation of these plates is preceded by a chapter headed,—"The History of the Science of Proportion"; but the substance of this is rather a bibliography arranged according to the nationality of the authors who have treated the subject. Even so it is necessarily incomplete, as the first edition of the Polycletus dates half a century back, and no note is given of even German writers,—Ziesing and others,—who have treated of the subject since. No attempt is made at definite summaries of the systems and principles of the different writers, nor are we supplied even with any general indication of what is most necessary,—the distinction between a truly scientific view of the subject and the many varieties of unscientific, with which the literature of it is encumbered. We can scarcely concede to the translator that Dr. Schadow himself has ably treated the science, though he claims only,—it is said "with the characteristic modesty of his erudite countrymen" (it is as well to remember that Schadow was writing in 1834),—only to have extended the researches of others,—and even so claims too much.

The treatment of the subject fails indeed of a scientific character above all in this respect, that the consideration of Proportion in the true sense,—the comparison of elements having definite functional relations by reference to definite ratios,—is deserted easily for a simple comparison of particular measurements. For the subject of the proportions of the human figure to be dealt with satisfactorily it is necessary, in the first instance, to acquire a distinct conception of what are the concrete phenomena of which we seek an explanation; what are the combinations of which we require the elements.

The concern of the artist is with expressive form,—with form that has a clear and definite characteristic expression,—whether of sublimity, of beauty, or of any subordinate modifications of such qualities, as even of prettiness or grotesqueness, and thence to well-marked varieties of the repulsive and the ugly. Now, to take the most familiar illustration possible, the heads of an Apollo, a Jupiter, and a Hercules all agree in essential features and their general arrangement, but special characteristic beauty is conferred by special proportions. When we extend our comparisons to the entire figure the same rule holds with limbs as with features. The beauty of each figure is a birth of the artist's poetic imagination. But if science presumes to meddle with the matter, we are entitled to demand of science an exposition of the contrasted governing principles which induce such contrasted results. Contrasted as two beautiful forms of a youthful Apollo and a youthful Hercules may be, they fall into direct comparison in two respects. The elementary limbs, members, features, are identical as such, in either form; and either form has a relation, but a relation of its own, to a common primary type; they may be regarded as diverging from this in different directions and degrees, but each at last presents itself as a strictly self-consistent and specific unity. The attainment of such well-defined specific character can only be accounted for on the assumption of the divergence from a common and primary type being subject to some regulative principle.

Such characteristic differences are matters, therefore, not of difference of parts but of relative dimensions of parts that in themselves are of the same nature; not of quality, but of quantity; not of what general kind of limbs, for instance, are combined in an organism, but

of what proportions are assigned to them severally, and on what principle.

The most important variations of specific character, then, it is clear, must depend upon modifications of the most important proportions, and it becomes a matter of leading interest to decide what are the seats of these, and what modifications they are susceptible of without being utterly lost and vitiated. We are just at present only concerning ourselves with the human figure, the highest of natural organisms, but have to bear in mind that if the principles which we arrive at are just, they must equally apply to characteristic variations of artistic types,—and notably of all the orders of Greek and all the styles of Gothic architecture. The determination of the proportions of the human body in a general way may be compared to that of the scheme of proportions among the notes of the diatonic scale; to have ascertained these would be a limited advantage indeed, but that it introduces us to the command of the re-arrangements which constitute the entire list of varied keys, both major and minor, with all their diversified characteristics in alternation and transition.

To deal with a human figure of an average type, we may say that when it is erect the total height is divided equally at the *symphysis pubis;* the upper half is then again equally subdivided at the line of the nipples, and the lower half just below the patella. But two of these lines of division at least have not exact structural or functional coincidence; and mere subdivision by what an ancient would call continued dichotomy, into a mere series of equalities, is essentially defective in power to express energetic consolidation. For proportional adjustment to fulfil its true office it must be applied to bringing into orderly relation those parts or functions which, in themselves, present the greatest contrast, and which therefore may seem liable to introduce confusion or fall into antagonism.

Here we have a problem for analysis, in the treatment of which we sometimes get our best clue from nature, and sometimes from perfected art. In a Greek portico we have no difficulty in recognising that the primary contrasts are between the comparative heights of the vertical and horizontal members in the first case, and then between the voids and solids,—that is, between the diameters of the columns and their interspacing. In the less developed stage of architectural art, but long after all the Doric members and details were decided, the principle of applying an exact proportional relation between the height of the column and the joint height of the horizontal members above and below them, seems to have been unrecognised. At the next stage, in cases when true proportionate exactness was applied, the column was at best allowed only half the height of the elevation; very frequently an effect of more than cumbrousness,—of clumsiness,—was the result of the height of the column being made the minor term in the comparison,—being made less than half the full height, however, in some precise proportion. To Athenian taste, study, and insight it appears to have been due at last that the architect recognised the superior, the animating effect, of assigning superiority of elevation to the column; and then not only of making this height precisely proportional to that of the horizontal members jointly, but adhering to a proportion of very low numbers, and to a proportion again of the simplest character, as having a difference between its terms of unity only. In the appendix to Mr. Cockerell's work on Ægina and Bassæ will be found an example. The height of the column of the latter temple compares with the joint height of stylobate, entablature, and pediment, in the ratio of 7 : 6. Here it is evident that we obtain a principle which may be stated in rigid terms, and yet is susceptible of varied characteristic application. These ratios, to which the geometricians have given the name of superparticular ratios, may be arranged in series, as their terms gradually approach to equality. The columns of the Theseum have the lighter proportion of 5 : 4, and those of the Parthenon the severer 10 : 9 (= the series $\frac{5}{5}$, $\frac{5}{5}$, $\frac{5}{5}$).

We turn now again to the erect human form, and ask ourselves where would the Greek look for the leading contrast which demanded a primary proportional adjustment? What members or groups of members might he be expected to declare the exponents of a predominant antithesis, and to which of the terms selected would he assign a predominance between themselves? If we take upon ourselves to follow out the suggestive analogy supplied to us by the architect, we may find no difficulty in assuming that the massive trunk constitutes one term of a comparison with the joint height of the free lower limbs and the head and neck above, as the other. Accordingly it proves that the typical proportion, which we thus obtain, is 1 : 2, the simplest of all. That is to say, the massive body or trunk may be taken as exactly one-third of the height, the other two-thirds being divisible between the upper and lower completions of the full stature. This is a single, simple, and comprehensive proportion between terms which are naturally antithetical, and the natural effect and consequence of it is to convey an instinctive impression of unity, concert, combination, and breadth of effect.

As the lower extremities are equal to half the full height, there remains on this assumption one-sixth for head and neck, and it will be found by observation that the proportions which result have a satisfactory appearance both in art and nature; namely, head and neck, one-sixth; body, two-sixths; legs, three-sixths; equivalent to a proportion for the body of two-sixths to complement of full statue, four-sixths, or 1 : 2.

As we turned from architecture to Nature before, we may now in requital proceed in our comparison, by tracing how the hint obtained from Nature is applicable to architecture. "The perfection of proportion, as of many other things, was reached," says Fergusson, "in Westminster Abbey. Here the whole height of a bay is divided into two equal parts, and the upper subdivided into three, of which one is allotted to the triforium, and two to the clearstory." It will be observed that in this distribution, as in the typical human body, we have an exact division of height into halves, associated with a further subdivision of one half, resulting in a triple division, which followed the simple arithmetical series, 1 : 2 : 3. But the triforium, by its structural relation, groups preferentially with the arcade below, and the connexion is emphasised by continuousness of decoration; thus brought conspicuously together, they form a compound term of comparison with the height of the clearstory in the ratio 2 : 1, the height from the pavement to the string-course above the triforium being just double the height of the clearstory, which asserts its distinct and independent office above.

It is by no means as a matter of unlicensed fancifulness that again we recognise an analogous relation in the human figure. The test of this is to put to proof whether the point assigned as boundary of the divisions which are made terms of comparison, has or has not a natural propriety, to the full as positive and distinct as that which regulates the limit of the clearstory in the architectural examples.

When we contemplate the human form at the same time that we are possessed with a lively sense of its varied relations, the same distinction among them naturally declares itself, which is traceable as pervading the philosophical reflections of Prince Hamlet:—"Noble reason" and "infinite faculties" are correlative to "expressive and admirable form and movement,"—the action as of an angel, to apprehension as of a God. Even so, consciously or unconsciously, we are impressed by the correlation of what, with no meaning of disparagement, may be called the servile division of the body to the noble division. Even those who are least inclined to consider their bodies to be what they mean by themselves, will be apt to recognise a nearer relation of their intellectual, imaginative, and moral nature and functions, to the head and that upper portion of the trunk which houses the heart and lungs,—the organs most immediately concerned with and affected by sensation, thought, and emotion. There are vessels of honour and vessels comparatively of dishonour, and the organs which directly subserve animal growth, digestion, and locomotion, are on a different line of dignity to the immediate instruments of our highest endowments, from the organs of speech to the all-accomplished hands. The line which marks this division below the chest gives to the upper nobler division, as in the case of the Westminster clearstory, exactly half the height of the lower and subject or subordinate division of our marvellous frame. But, as Cicero is fond of interposing, *hactenus hæc*,—so much for this part of our subject. Still more definite application may follow.

## REFORMS IN PLUMBING.

SOME members of the Plumbers' Company deserve to be congratulated on the effective Congress recently held at South Kensington,—the proceedings of which were reported at length in last week's *Builder*.* The company is not one of the great guilds;—it has no hall, and presumably its members are not stimulated so frequently as in some companies which have their palaces and use them royally. Plenty of work was, however, cut out for the members by the speakers and movers of resolutions. If what was asked of them is undertaken, all lead and solder of standard weight and quality will be sealed or marked; and as this was asked for by Scotch and Irish people in company with Londoners and visitors from country towns in voting for the resolution, that alone will prove a considerable task. They were also asked to consider whether the materials used in plumbers' work as substitutes for lead are suitable,—there being a very strong suspicion in the minds of some of the plumbers who were present that there was nothing like lead; and that iron pipes must fur up, have bad joints in themselves, and join other pipes awkwardly; that the best specimens of earthenware will have but a short life; and that zinc should have its character pronounced in an authoritative way. Still, if these claimants for notice made good their claims, then the company was requested to consider whether it would not be a good thing to fix standards of quality for those materials, and settle on marks by which the standards should be easily recognised.

When these tasks with reference to materials have been duly performed, the journeymen and master plumbers, their education, status, remuneration, and rewards, remain to be dealt with; and all these subjects with others allied to them,—and some a little wide of them,—were treated of at the Congress, in a number of short papers, and by plenty of speakers, before a large and appreciative audience. It is true that the order of things was not just as we, for the reader's convenience, have stated it. The materials were talked of nearly at the end; and the Congress had resolved without one dissentient at the beginning that plumbers ought to be properly paid. Observers have drawn very favourable conclusions from this fact. The resolutions seem to mean business, say these students of men and things, when the business element takes a decent prominence. If the members of the company, and the plumbers who are not members, had not been in force this practical appeal, they say, to sensibilities would not have been made. The "professional men, and men whose social position enables and entitles them to support the credit of the body and to advance its usefulness" (thus the worthy master commended his colleagues), who lend support to the mystery of plumbing would hardly have been so very much in earnest on this topic. The decision was put in these terms:—"It is desirable that in the future architects should not include plumbers' work in builders' contracts"; and the meaning of it was that general contractors are not fair to the plumbers,—that they pay them as little as possible for as much work as possible,—and that plumbers must either lose work, or work at too small profits, or do inferior work. Good general contractors, and many plumbers who

* See p. 553, *ante*.

work with and for them, would, no doubt, put a different complexion on some parts of the case; and the other sort of contractors need very slight consideration.

The system of lump-sum contracts by one contractor has taken pretty good hold, at least in the south,—and in the main good and honest work is produced under it,—in plumbing as in other trades. The effect of the clause against sub-letting in ordinary contracts is frequently misunderstood, or, at any rate, misrepresented. One common form is, "The contractor shall not sub-let or assign this contract, or any part thereof, without informing the architect and obtaining his written consent"; and then it is observed that, notwithstanding this, and without intimation or written consent, the architect will be well aware that a number of sub-contractors are at work on any large building. This looks like remissness, but is really judicious. The sub-contractors are not formally recognised unless they are inefficient,—then the contractor must employ them no longer. If they are underpaid, the feeling will be in the air, so to speak, and detected by a vigilant architect and a capable clerk of works without prompting. When the general contractor selects and employs other people, a better concert may be hoped for than where two equal powers,—or one that should, and another that wants to, rule,—are contending for precedence. It is difficult and often impossible for work to be carried on without little adjustments among the workpeople; the right men will not be available till next week; cannot something be done to make this suit? There are a dozen similar reasons, and others concerning employers besides, which lead people to look with favour on the system, even though they are unable to call it perfect. Still there is a case on the other side. The increased attention given to these matters by the more intelligent sections of the population will help the plumbers if they are reasonable and politic, as well as resolved. They may compel the world to make exceptions in their favour, and use their power so wisely when they get it as to make everybody confess that the change is an improvement.

The example of the Rochester (New York) master-plumbers was not quoted at the Congress, but it may supply a precedent for other people who have sufficient unity of purpose and resolution. Early in this year the leading people in the trade there,—about twenty employers,—resolved that they would, after the end of March, refuse to submit tenders for plumbing work, except directly to owners or architects. Their reasons were that "the practice of including plumbing and gasfitting work in builders' contracts has developed many evils. It has been a simple matter to foist upon the owner poor material and poorer labour,—the entire system of skin work,—and our trade has been branded as incompetent and dishonest. . . . . Some builders secure work with the estimate of one firm of plumbers, and then begin to play us off against each other, and thus cut down the price to be paid to the plumber who is actually employed to do the work; or they perhaps drop the plumber entirely, and buy the material and set a tinker to do the work." The stringent plumbing laws in some American towns, with such fines as 250 dols. for bad plumbing work in new buildings, and 150 dols. for putting vent-pipes which only pretended to be vent-pipes, and were worthy to be classed with wooden nutmegs or stage properties, may have rendered things possible there, for which the necessary education has probably not yet been gone through on this side of the Atlantic.

Perhaps there is still less preparedness here, for the institution of Provincial Boards of Examiners of Plumbing Work, consisting chiefly of trained working plumbers, all in connexion with the provincial schools of plumbing, and affiliated with a Metropolitan Board. The Board in a country town, it was maintained, should be invested with some local authority, hold a well-defined and acknowledged position, work in connexion with parochial authorities, and at the same time not usurp the duties of any of the municipal officers. Put forward as a little committee of trade experts, assisted by the knowledge and trained skill of professional architects, there might be a field for reports for small fees, and a good deal of useful work might be done in a quiet way. To carry out laws and regulations, and put in force compulsory powers, under Parliamentary authority, would be another thing, — requiring, indeed, something more than the education of the general population which would call for and favour such control. "Sanitary plumbers" have not yet proved, in any considerable number, that they could wisely be trusted with these powers,—that their superiority to fads and crotchets is so complete that their superiority to preferences for their own specialities and to dislike of other people's, is so evident that a self-respecting Sindbad should quietly allow such a weighty burden to seat itself upon his shoulders once for all.

Certificates to journeymen, who had proved their competency, was pointed to as one of the special duties which such Boards could well perform. Evey one must sympathise with a tradesman's preference for a workman who has come in at the front door, who has been admitted regularly, and been kept steadily in contact with actual work under an experienced master. It was decided that the apprenticeship system ought to be continued, —modified if necessary to suit the improvements in technical education. The old term of seven years some think too long,—keeping a young man from earning money for himself when he might well be doing so, if clever and well-taught. Five years was advocated as a more suitable time, perhaps from the fifteenth to the twentieth year; if finishing at nineteen there might be two years of probation added in other workshops. Strict apprenticeship for a sufficient time, and a scale of payment bearing some relation to the services of the apprentices to the master, will apparently be offered in times to come to the young plumber who wishes to qualify for being a useful servant of the public. Antecedents and character ought to go for a good deal,—for more than they always do now,—in securing employment; and the granting of a certificate which could be obtained by the right man, and which the wrong man could very rarely manage to secure, would be a step in the right direction. Such a testimonial to the serviceableness of a workman should be given for his qualities as a workman; for his skill of hand, trustworthiness, and so on. He should, of course, know the real purpose of the appliances which he spends his life in putting upon and into buildings, and his understanding of how to use them should obviously not be limited to the mere power of handling them in a good traditional way; nor, still more obviously, to merely correct knowledge of the theory. Perhaps in some of the speeches the value of knowledge, as an instrument for finding fault skilfully, was insisted upon too firmly. The working plumber, it was argued, ought to know whether work would fail if carried out in the manner directed; and one speaker went the length of stating that he should be able to refuse to work, when he thought he knew better than the people who were setting him to do it.

There is always a trifle too much fun made of the ignorant architect when drainage, soil-pipes, traps, and water-closets are being talked about. The architect,—that is, putting all the profession together and writing of it as an individual, several thousand single gentlemen rolled into one,—knows quite as much about those matters which are within his province, as the individual comprising (by the same figure) any other profession or trade, knows about the province under his professional or tradesman-like care. We are, it may be, inclined to show some sensitiveness on this point, when taking no notice might seem more politic; but the time must come for making it clear that a bad joke is not improved by endless repetition. However, at a Congress there is a happy tendency towards throwing blame on the absent, as well as on those whom it is difficult to honour. *Apropos* of the registration of journeymen, it was pleasantly suggested that if masters were registered it might have the effect of keeping linen-drapers and others from undertaking plumbing work; and, stung probably at the recollection of specialist assumptions, another speaker blurted out his complaint that "the honest plumber was too often put on one side, and any one who could write on sanitary science came to the front." This sort of thing may be useful, but Mr. Bultitude had actually to change his identity before he profited duly by this kind of discipline.

The congress was certainly an interesting one; and will prove more so in looking back, if the recommendations are carried out to practical results. We hinted above that the Plumbers' Company will have its hands full; but hope it will make haste slowly, and manage to go bravely to and through all the workings;—that it will take the leadership, and get plumbers to do the best of work when it it is required of them, to train themselves very thoroughly, to look after their apprentices, and find good workmen constant employment, and that somebody will at the same time be taking pains to make it clear that the materials are as good as the work upon them.

## NOTES.

AT a special meeting of the Court of Common Council last Tuesday, at the Guildhall, to discuss a report of the Bridge House Estates Committee in relation to the erection of a low-level bridge over the Thames, from Irongate Stairs to Horselydown, it was unanimously resolved to adopt the report. The recommendation of the Committee was for a bascule or lifting bridge, rather than a swing-bridge, in which we entirely concur; of the two it is likely to be the more manageable, though probably the more expensive at the outset. (The estimated cost is 750,000*l.*) There will be only two piers, occupying together 80 ft. of the waterway, leaving a clear passage of 200 ft. We shall watch the result, if powers are obtained for it, with the greatest interest, but the statements on the subject at present are too *couleur de rose*. It has been asserted, for instance, that the average time occupied in the passing of vessels will be only about three minutes, and that in regard to the average number of vessels passing this will not involve the stoppage of the bridge traffic for much more than an hour during the day. We feel certain that the average time from the raising to the lowering of the bridge will prove to be more than that, especially when it is remembered that, taking into account the swiftness of the tide current in the Thames, a very large margin will have to be allowed for an approaching ship, to insure perfect safety. Then the stoppage of a bridge for a number of short intervals, amounting in the aggregate to an hour, is a very different thing from its stoppage for one hour at a specified time. The latter could be reckoned on in the traffic arrangements, the former cannot. We are glad to see that our often-repeated recommendation to try well-appointed ferries for intercommunication is to be acted upon, and the Board of Works will go to Parliament for powers to establish such ferries, free of toll, between North and South Woolwich, and between Greenwich Pier and Barque-street, Poplar.

IN one of the roughly-fenced inclosures in front of the South Kensington Museum there are now lying the *disjecta membra* of a very interesting work of modern art, which on every account deserves very different treatment. These are the ponderous carved stones of a gateway executed in the Hindoo style by modern Hindoo workmen for the recent Calcutta Exhibition, at the cost of the Maharajah Scindia of Gwalior, and subsequently sent over by him as a gift to the South Kensington Museum. The idea of encouraging modern native workmen to execute a work in emulation of their ancestors originated, we believe, with Major J. B. Keith, who was commissioned by Sir Lepel Griffin to look after the work. Having been engaged in the work of conserving the ancient monuments of Central

India, it occurred to Major Keith to give the work a practical significance, as showing that the descendants of those who had executed the massive carved gateways of the Gwalior district retained something of the same cunning. The native art-workmen threw themselves into the work with enthusiasm, and executed it in the space of six months, a very short period, considering the massive character and the elaboration of the work. The arch (so-called) alone is a solid piece of eight tons weight, the spandrels and jambs being covered with delicate carving. Well, this piece of work, executed by the men of our great Indian dependency as an example of their skill, presented to our national museum by an Indian dignitary, has been for some months lying, in pieces swathed in haybands, in a back-yard, as one may say, of the South Kensington Museum. The arch-shaped doorhead is set up to see how it looks, apparently, and it seems that a considerable number of the bud-like pendants of the soffit have been knocked off in transit. The jamb-columns and capitals are uncovered, lying on the ground, and show beautiful workmanship. The whole thing would be of the highest interest, and it is left lying on the ground, like another Burlington colonnade business, because the authorities cannot make up their minds where to put it. Is this creditable?

AS our readers must be aware, we never meddle with party politics, not wholly from want of interest in the subject (though it seems to tend just at present more and more to a paltry game of "beggar my neighbour,") but because it is out of the proper scope of this journal. Architecture is of no politics. But in the interests of public order we must say that the attitude taken by the Home Secretary on the opening night of the session, in regard to the complaints of Members who were impeded in their passage to the House by the great anti-House-of-Lords procession, was most unsatisfactory, not to say absurd. If it is a standing sessional order that "the Commissioners of Police do take care that during the sitting of Parliament the passages through the streets leading to this House be kept free and open, and that no obstruction be permitted to the passage of Members," it is the simple duty of the authorities in power at the time to see that this provision be carried out. One honourable Member, who, it may be admitted, is rather prone to make the most of things, declared positively that he could not have got to the House but that his club enjoyed the special convenience of a subterranean passage thereto; and the leader of the Opposition, who is certainly not given to inordinate grumbling, stated that on entering a cab at Waterloo Station to drive to the House, he was forbidden to cross Westminster Bridge (which, in fact, he would have found impassable on that day,—*expertis credite*),—and was told to go round by Lambeth Bridge. If this is not "obstructing the passage of Members to the House," what is it? It is against all common sense for the Home Secretary to pretend that he has not power, or that it is an injudicious interference, to forbid to a popular procession a route the use of which must involve the abrogation of one of the very orders which it is his own official duty to see carried out. We make the comment without prejudice, seeing that our politics, if we had any, would not be those of Sir Stafford Northcote and Mr. Chaplin. But this is a question not of politics, but of police; and we hold that the objectors were perfectly right, and that such an obstruction ought not to be allowed to become a precedent.

THE recent meeting in the City in favour of a code of arbitration law was a practical attempt to assist the passing of a useful measure. Perhaps of all the branches of municipal law there is none of greater interest to those who are connected with building matters than that which is concerned with the law of arbitration. It will be very satisfactory if a plain and clear digest of this subject can be published. But we should be sorry to see any regular Court of Arbitration grow up. The law courts are in themselves one kind of courts of arbitration, and what are popularly termed arbitrations are only required when the matter to be inquired into is full of so much detail that it is not possible to enter into it in a court of law. It is also quite a mistake, as many of our readers are well aware, to suppose that arbitrations are really cheaper than actions. The expenses of witnesses, of preparations for the encounter, of arbitrators, have all to be incurred. The cheaper the law is the more useful it is to the community at large, but we entirely deprecate setting up courts of arbitration side by side with the law courts. But this objection in no way prevents us from expressing a desire to see a code of arbitration law speedily in the Statute Book for the use of all those who may have to give their attention to this subject.

MR. RUSKIN'S Oxford lectures on the various pleasures of England, though they were announced as art lectures, seem to turn mainly on what may be termed moral lessons derived from history. The second one, delivered on Saturday last, on "The Pleasures of Faith," and embracing the period from Alfred to the Confessor, was, in fact, a religious exhortation for the most part, and as such in many points most stirring and admirable; but into that side of his subject we do not here profess to follow Mr. Ruskin. There were one or two bright gleams of light thrown on the artistic side of the subject, however, as when the lecturer appealed to the coinage of Alfred as part of evidence of what London was like in the ages of faith. The character of a coinage, he urges, is quite conclusive in national history; there is no great empire but tells its story in beautiful coins. True, as far as it goes, no doubt; but it hardly goes quite so far as Mr. Ruskin makes out. Then there were the Saxon war-ships "bright with banner and shield and dragon prow," lying at London's strand, more beautiful, it is implied, than anything to be seen there now. We should like to draw Mr. Ruskin's attention, by way of looking at the other side, to the enthusiastic and picturesque meditation on the London docks and shipping by Mr. Richard Jefferies, which appeared some time ago in the *Pall Mall Gazette*, and part of which we reprinted and commented on at the time.*

THE exhibition of the Turners' Company at the Guildhall, though it includes a good deal of very neat and some very finished workmanship, does not seem to have satisfied the judges, who have declined to award the highest prizes because the combination of high finish with excellence was not found in any article submitted in the competition; though, as the number of exhibits was 121 and the number of prizes of some kind awarded is 44, the minor guerdons seem to have been distributed with a tolerably liberal hand. The exhibits were classed under three heads: wood, pottery, and the cutting of precious stones; the subject of turning including mechanical manipulation of various descriptions. Now, in regard to the artistic side of the matter we must say that the exhibition confirms what we have always felt and occasionally said,—that turning does not seem to be a branch of work which by any means tends towards artistic development. Neatness, cleverness, what may be called sleight of hand, it promotes no doubt; but there seems to be something in the very nature of lathe operation which deadens the artistic sense. Nearly all the more elaborate exhibits in wood show indifference to, or want of feeling for, pure beauty and expressiveness of form; the outlines are essentially mechanical; the object is to execute little *tours de force* in minute turned ornaments stuck on over the larger turnings, &c. The only things that have some of the salt of art about them are some of the larger plain, but freely-shaped, pottery exhibits, with their fine flowing lines. The eye for form seems to be cultivated by these; by woodturning it seems only to be deteriorated; the wood will not take the fine flowing sweep of the clay, and the result is "a thing of shreds and patches," the exhibition of ingenuity rather than art.

* "The Picturesque of To-day," *Builder*, Nov. 10, 1883.

AT the General Meeting of the Egypt Exploration Fund on Wednesday last, Mr. Flinders Petrie gave an interesting description of the excavations he has been recently conducting at the Temple of San, which he illustrated by a large series of photographs shown by limelight. The great area of the temple presents the appearance of a long disused quarry, which, in a sense, indeed, it may be said to be, though no stone was naturally there craggy-looking masses of granite, parts of broken obelisks, colossi, and columns with their lintels lie scattered on the ground, a few stones of a distant pylon alone being left one upon another. Mr. Petrie has cleared away the accumulated rubbish and sand from the remains, exposing some fine carvings and hieroglyphs, but, beyond an interesting shrine of limestone, a very fine colossal head of Rameses II. when young, and some few exceptional treatments of the sculptured figure, there is little to be seen at present that throws fresh light on the art of ancient Egypt. But who shall say what treasures for the archæologist may lie hidden under that *débris* of ages which cover the wide and unexplored ground yet to be worked? Mr. Petrie proposes to return to Egypt next year to resume his works outside the wall of the Temple.

THE Council of the Institution of Civil Engineers have forwarded us the list of subjects on which they invite original communications, for the best of which various premiums, arising from funds bequeathed for the purpose, will be awarded. The list is large and various, including forty-three different subjects. Among those which bear more or less upon our own class of subjects may be mentioned:—

"Improved Instruments for Surveying and Levelling."

"Machines and Measuring-Apparatus for Testing Metals, and the Equipment generally of Mechanical Laboratories."

"The Mechanical Properties of Cold-Rolled Metal, as compared with Hot-Rolled Metal, and on the Cold-Rolling of Iron Shafting, as practised in America."

"The Manufacture, Strength, and other Properties of Castings of Malleable Cast Iron and Cast Steel."

"The various systems of Brickmaking by Machinery."

"The Principles involved in the Conservation or Improvement of any Tidal River or Estuary."

"Promenade and other Piers, with reference to the effect of Sea-water on Wrought and Cast Iron Structures, and the best Means of Preserving the same."

"The Ventilation of Sewers, with a Summary of Experiments as to the Motion, Pressure, &c., of Gas in Sewers."

"Filter Presses for separate Fluid in Semi-fluids, particularly for the treatment of Sewage Sludge."

"The Transmission and Distribution of Electricity over large areas for Lighting and for Motive Power."

MR. ROBERT L. STEVENSON, a member of a family honourably known in the annals of the civil engineers of Great Britain, justly complains, in the columns of a contemporary, of the ascription, in a popular publication, of his grandfather's noble work, the Bell Rock Lighthouse, to Rennie. That distinguished engineer would have been the last person to claim either the design or the execution of the sea tower in question. Not only have the Stevensons reared, it may be almost said with their own hands, some of the grandest and most serviceable monuments that stud the stormy shores of our island, but they have further served their profession by the literary memorials they have put on record, such as the "Life of Robert Stevenson," by David Stevenson, published in 1878, which gives a full and most interesting account of the building of the Bell Rock Lighthouse. It is disheartening to find achievements of this nature, when referred to in popular literature, so imperfectly treated, that the author cites a second-hand reference to part of a newspaper correspondence as what he calls "authority" for very grave mis-statement. Mr. Stevenson has done well to protest.

A SUGGESTION made by Mr. Nicholas Whitley, C.E., for utilising the water power of the Nile for the purpose of forcing a supply, through a 12-in. pipe, from the Fifth Cataract to Suakin, deserves more than a moment's glance. Under reserve as to the resistance afforded by the friction of 240 miles of 12-in. pipe, and by the height to be overcome between the Nile and the Red Sea (which we leave to the responsibility of Mr. Whitley), the main difficulty involved would appear to us to lie in the guarding of the line. The height of the water in the Nile at the junction of the Atbara is given by Mr. Baker as 1,148 ft. above the Mediterranean; and the force of the cataract, or rapid, could probably be easily applied by a turbine or turbines. The quantity of water to be derived, which is an important consideration, would not be such as to raise serious objections. On the whole, it would be well to see Mr. Whitley's proposal put into the form of definite hydraulic computation.

WE are glad to observe that at a meeting of the General Purposes Committee of the Manchester Town Council at the end of last week, notice was given of a motion in opposition to the resolution of the town's meeting some little time previously in favour of making a grant out of the city rates in aid of Parliamentary expenses. Mr. Alderman King said it was unfortunate that many of the ratepayers had not been afforded the opportunity of expressing their objection to the resolution at a poll of citizens. We commented at the time on the very undesirable precedent that would be set if such a use of rating powers were sanctioned.

THE completion of the new Turkish baths in Northumberland-avenue, planned and designed by Mr. R. Walker for Messrs. Nevill, the proprietors of the London Bridge and Aldgate Turkish Baths, has been one of the architectural events of the week. The building includes baths both for men and women, the entrance to the former being from Northumberland-avenue, that to the latter from the other end of the building next Craven-street. The interior arrangements and fittings are carried out in a very complete manner, and the general effect of the rooms is pleasing. The actual baths are in the basement, and the interior includes a large central hall or divan, with a gallery running round it. We reserve further details till we can accompany them with an illustration.

AT the meeting of the St. Paul's Ecclesiological Society, on Tuesday last, Mr. Hugh Stannus delivered a lecture on the decoration of the dome of St. Paul's, describing, in a very clear and lucid manner, the principles of treatment which he regarded as correct, including the "articulation" of the dome design with the architectural substructure. Mr. J. P. Seddon occupied the chair; and a short discussion followed, in which Mr. Micklethwaite, Mr. G. H. Birch, and Mr. Statham took part. Mr. Micklethwaite urged, in a very practical spirit, the desirability of first settling the future arrangement of the cathedral for worship, and its complete furniture (in the widest sense) for that purpose, before deciding on the treatment of the culminating point in the decoration. Mr. Statham differed from Mr. Stannus in recommending a rib treatment of the dome in eight partitions; such a treatment being rather suited to an octagon dome, such as that at Florence, and being, in fact, a contradiction of the actual architectural structure of a hemispherical dome, and tending to weaken its effect of space and mystery, and reduce the dome from poetry to prose. He certainly did not, however, as Mr. Stannus in his reply seemed to think, recommend what may be called "Corregiosity" in dome decoration, but only the homogeneous treatment of the spherical surface in a purely decorative manner. Mr. Seddon summed up, if we understood him rightly, rather in favour of this latter view. Mr. Stannus has gained an honourable position in relation to the experimental decoration of St. Paul's by the energy and ability which he has brought to bear upon it; but we may suggest that he should not refer to Mr. Poynter as his "colleague" in the matter,—a phrase which hardly represents the true state of the case.

THE *Pall Mall Gazette* published on the 28th five small and rough outline illustrations of the designs submitted for equestrian statues for Blackfriars Bridge, submitted in the second competition by Messrs. C. B. Birch, Hamo Thornycroft, T. Brock, and R. Belt ("Que diable faisait-*il* dans cette galère?"). It is difficult to judge at all of the merit of the works from these rude illustrations; one or two of the statues look as if they might turn out something. The *Pall Mall* sets out, we observe, with the statement that Blackfriars Bridge "is without doubt the handsomest structure of its kind in London." It is, without doubt, the most tawdry, pretentious, and vulgarly-designed bridge ever put over the Thames; but that is the kind of thing which is usually called "handsome" in amateur architectural criticism. What must be the architectural perceptions of a critic who can look on such a piece of claptrap as Blackfriars Bridge, and on Rennie's grand work a little lower down the river (not to speak of Waterloo, which has great merits), and then deliberately characterise the first-named as "the handsomest" of our bridges? We quite agree with the *Pall Mall* that the competition has been much mismanaged, and that the sculptors ought at least to be remunerated for their labour (for it seems nothing is to be resolved upon even now), but for the rest we wish our contemporary "all manner of prosperity, with a little more taste."

## PUBLIC HYDRAULIC POWER.

SCHEMES having for their object the distribution of motive power to the public have been frequently brought forward, but, with the exception of the work we are about to describe, no practical results have followed, so far as the metropolis is concerned; unless the introduction of the gas engine may be said to have constituted the gas companies distributors of a source of motive power. A year or two ago a system was in operation in New York by which steam was generated in large central establishments, and carried underground through suitable mains, to be supplied to the public in the same way that gas and water are ordinarily laid on. The scheme, however, was a failure, and we understand that the company which promoted it has suspended operations. In England power is now being supplied by means of hydraulic pressure, the town of Hull having had such a system in operation for the last nine years.

Within the past twelve months the General Hydraulic Power Company (Limited) has been engaged in carrying out an extensive system of power distribution which has been elaborated by Messrs. Ellington & Woodall, MM. Inst. C.E., of Palace-chambers, Westminster, who are engineers to the company. The work already done, and the success attained, appears to leave little doubt that the system will become a leading feature in the metropolis, even if it does not spread to other large towns. London, however, offers an especially favourable field for an enterprise of this nature, inasmuch as it is the great depôt of the nation. Hydraulic power is especially well adapted for the production of rectilinear rather than rotary motion, and the numberless cranes and hoists of various kinds used in the metropolis for the transshipment and warehousing of goods require just such a motion as water pressure is best adapted to give. In addition to this, the great value of land in London renders it always desirable to economise space as much as possible, so that the room occupied by an engine and boiler is generally an object of considerable importance. The higher rate of wages in London is another feature that tends to the same end, the ordinary attendance and necessary repairs to machinery costing far more in the metropolis than in any other part of the kingdom.

From an engineering point of view, there is not a great deal that is new in the operations now being carried on, if we put on one side their magnitude, and the distances through which the power is conveyed. In most docks, and in the large goods depôts of different railway companies, hydraulic systems identical in principle have been in operation for so long that the venture of the present company is no experiment so far as engineering practice is concerned. The only point that had to be solved was whether the public would give sufficient support to the scheme to make it financially a success, and although it has not been in operation for a twelvemonth, the promoters consider that an affirmative answer has already been given.

The central pumping station of the company is situated at Falcon Wharf, close to the Blackfriars Station of the London, Chatham, and Dover Railway Company. The water required for the service is taken from the river below ordinary low-water mark. The intake consists of a 10-in. pipe, which has large stones placed over the inlet so as to keep out as much mud as possible. On the wharf there is one of the Pulsometer Company's No. 9 Pulsometers, and in the engine-house are two of Brotherhood's centrifugal pumping engines. These are used for lifting the water from the river to tanks placed on the top of the engine-house. There are three tanks, or, rather, one large tank is divided into three divisions. The total size of this three-fold tank is 44 ft. 3 in. by 49 ft. 6 in. by 4 ft. deep. It is composed of cast-iron plates bolted together, the joints being planed to surface. Into one of the compartments the water from the river is lifted, and is there allowed to settle for a time so as to get rid of the heavier particles of matter held in suspension, after which it is run into two double "Thames" filters by the Pulsometer Engineering Company, which are placed in the engine-house below, and which are calculated to pass 5,000 gallons per hour each. This description of filter consists of a cast-iron cylinder lined with copper. In this are two pistons composed of opened gratings covered with wire gauze.* The piston-rod, which is cased with gun-metal, passes through a suitable stuffing-box in the cylinder cover, and is attached above to a small hydraulic ram, by means of which the necessary motion is given to the pistons. Above each of the latter is a perforated diaphragm, and the space that lies between is filled with sponge, which forms the filtering medium. The water to be filtered flows by gravity from the tanks above, and rises through the mass of sponge, by which matters held in suspension are retained. So far the action is very similar to that of an ordinary filter, but it is in the cleansing arrangement that the novelty lies. When it is required to clear the filter the pistons are caused to move up and down by the hydraulic power. This action alternately compresses the sponge and releases it from pressure. The current of water is at the same time reversed, so that clean water flows downwards through the mass of sponge. The operation effectually cleanses the sponge, the working it receives from the pistons acting in the same way as the hand-squeezing one usually gives a domestic sponge when it is necessary to free it from any foreign matter. By this ingenious arrangement the great difficulty that has hitherto been experienced in large filters,—that of cleaning them,—has been satisfactorily overcome. From the filters the water rises to another series of tanks which are placed over the boiler-house. These are at a lower level than the first set, so that no further pumping is required. The combined length of the latter tanks is 66 ft. They are 29 ft. 6 in. wide and 4 ft. deep. In one corner is a charcoal filter-bed 14 ft. 9 in. long by 12 ft. 6 in. wide, through which the water first flows.

Arrangements have been made for doubling the tank capacity by erecting another tier above those tanks now in position, and it appears likely that this increase will soon be required. The first three months of this year three and a quarter million gallons of water were raised; last quarter the quantity registered was five and a quarter million gallons, and that the rate of increase will be more than maintained for some time is, we believe, insured by the installations already asked for. The company is empowered by its Act to take from the river one million gallons a day. This would be equal to a power of 800 horses continuously supplied for ten hours, but as the demand is always intermittent the capacity is estimated at from 2,000 to 3,000 horse-power. From the tanks last referred to the water is taken by the main pumps, of which

* In the ordinary single filters there would be only one piston.

there are two sets already at work, and which have been supplied by the Hydraulic Engineering Company of Chester. Another set similar to those now in operation are ready for erection, and will be under steam before long. These latter are the pumping-engines we made reference to in our recent notice of the meeting of the Iron and Steel Institute at Chester when describing the works of the Hydraulic Engineering Company (see p. 451, *ante*). The foundations are also laid for a fourth set of engines, and there is room for two more sets in the building. These, it is anticipated, will be soon wanted. The engines are of the inverted compound condensing type, and are supported on wrought-iron standards, the condenser also forming part of the framing. They have three cylinders, one high-pressure, 19 in. in diameter, which supplies steam to the two low-pressure cylinders, which are each 25 in. in diameter. The stroke is 2 ft. The Correy type of valve-gear is used. In this the expansion valve is forced down by the pressure of steam in the valve-chest acting on the valve-rods, which are made of large section for the purpose. The valve is released at the right moment by trigger gear, which is actuated by a cam. By shifting the cam the cut-off can be arranged for any desirable part of the stroke, and a very sudden closure of the part is also obtained. The stopping and starting of the engines is automatically performed by means of a governor and an attachment made to the accumulators, so that as water is drawn away in the course of work the pumps are immediately started to make up the deficiency. The pumps are 6 in. in diameter, and the plungers are driven directly from the steam pistons, there being forked connecting-rods for driving the crank-shaft. The two engines now at work will give an aggregate of about 300 to 320 indicated horse-power, and will each deliver 240 gallons per minute with the accumulator at a pressure of 800 lb. per square inch when using steam at 80 lb. pressure.

There are three steel boilers of the Lancashire type, each 28 ft. long and 7 ft. in diameter. They are fitted with Green's economisers, which consist of a series of vertical tubes placed in the flues in the path of the escaping gases. Through these the feed-water flows, and its temperature is raised by the waste heat. The great difficulty in the application of all feed-water heaters has been to keep the soot and tarry products from depositing on the cold pipes. In the present instance this is got over by having fitted to each pipe an annular scraper, which is worked automatically from the outside. The economiser is said to give very good results in the present instance. The stoking is carried on by means of a mechanical stoker by Messrs. T. & T. Vickers, of Newton-le-Willows. The fuel, which consists of breeze, the small refuse coke from gasworks, is fed into hoppers, and is automatically and continuously charged into the furnace, where it is constantly carried on towards the back end of the fire-bars, by a reciprocating motion which is given to the latter. The clinker is broken up at the same time and is removed by hand. The good results obtained in these boilers with such a poor fuel as breeze would seem to indicate that these mechanical stokers are also a success. The trunk mains are of hydraulic pipe, 6 in. in diameter. They are in 9 ft. lengths, and are tested to 2,500 lb. per square inch at the works. The joints are formed by spigots and sockets, turned and bored. They are packed with india-rubber washers, and held by two 1¼ in. bolts passing through oval flanges. At intervals of from 400 to 500 yards there are stop-valves, which can be used in case of damage to the pipes, or for the purpose of localising a leak in the system. In most cases each main can be fed from either end, so that an accident in any one spot would only shut off the length of 400 or 500 yards between the two nearest stop-valves.

The area over which the company is empowered by the Act of Parliament to lay their pipes extends on the south side of the Thames from the Surrey Commercial Docks to Vauxhall Bridge, and goes back a distance of 600 yards from the river bank for the whole length on the Middlesex side; the district comprises all land that lies between the West India Docks and Vauxhall Bridge, within a distance of 1,200 yards from the river. Several miles of mains have already been laid, and these are being added to as fast as the work can be done. On the north side two large mains pass down Cannon-street and Upper and Lower Thames-street respectively. On the south side the pressure has been carried east as far as Crucifix-lane. The quantity of water used is ascertained by a meter, and the consumers are charged, at the registered rates, only for the amount consumed. The following is the scale of charges:—

| | | | | | Per Quarter. | | | |
|---|---|---|---|---|---|---|---|---|
| Under 3,000 gallons | | | | | £1 | 5 | 0 | per machine. |
| Above 3,000 | ,, | not exceeding | 5,000 | gallons | 0 | 8 | 0 | per 1,000 gallons. |
| ,, 5,000 | ,, | ,, | 10,000 | ,, | 0 | 7 | 0 | ,, ,, |
| ,, 10,000 | ,, | ,, | 20,000 | ,, | 0 | 6 | 0 | ,, ,, |
| ,, 20,000 | ,, | ,, | 50,000 | ,, | 0 | 5 | 0 | ,, ,, |
| ,, 50,000 | ,, | ,, | 100,000 | ,, | 0 | 4 | 0 | ,, ,, |
| ,, 100,000 | ,, | ,, | 200,000 | ,, | 0 | 3 | 0 | ,, ,, |
| ,, 200,000 by special terms. | | | | | | | | |

There is a charge of 5s. per quarter for meter. We understand that at the highest rate the cost for power is less than half that charged by the water companies for an amount of water at the company's pressure capable of doing similar work. In many cases the cost of lifting by the Hydraulic Company's power is as low as ¼d. per 50 foot-tons.

The many uses to which the hydraulic power may be put will readily suggest themselves; we will, however, give a few details of some of the principal installations that we have lately met with. The first we will mention is that at the Lead Works of Messrs. Grey & Marten, which adjoin Southwark Bridge. Here the original motive power machinery has been entirely done away with, and that from the Hydraulic Company's main only is taken. The presses for producing solid-drawn lead pipe are one of the principal features in the plant. A water pressure of about 5,000 lb. per square inch is required for working these, and, as the Hydraulic Company's pressure is not much above 700 lb., a machine, known as an intensifier, is used. This consists of a double ram, the two areas not being the same. The pressure from the main is admitted beneath the larger ram, and in this way a considerably higher pressure can be obtained upon the smaller one, the final pressure being proportional to the difference in areas. At the large grain warehouses of Mr. George Doo, situated at St. Mary Overy's Wharf, near London-bridge, the Hydraulic Company's power is extensively used. Here there are several cranes, elevators, and conveyors, all especially designed for handling grain in bulk. With these appliances and by the aid of a Priestman's bucket, it is astonishing how quickly a barge-load of wheat or maize is transferred from the craft to the warehouse floor. The cranes are on the double-power principle, so that with light loads there is a smaller quantity of water required. There is also a hydraulic pump used for draining the basement. The whole of the work here is of considerable interest, and has been executed by the Hydraulic Engineering Company, Limited, of Chester.

On the north side of the river the most instructive application of the system is that which is to be found in the large block of new warehouses in Wood-street. These buildings have been erected in the place of those destroyed by the memorable fire of December the 8th, 1882. In Messrs. Foster, Porter, & Co.'s really gigantic establishment the whole of the lifting and transporting of goods is carried on by power supplied by the Hydraulic Company. Here there are several cranes, together with lifts and elevators of many varieties, including those for goods, passengers, coals, &c. There is a separate lift used for carrying books from the counting-house to the various floors, and another working in connexion with the kitchen. In the same block of buildings Messrs. Silber & Fleming, and Messrs. Rylands & Sons, Limited, are also using the power of the company for handling their goods. In this densely crowded neighbourhood the conveniences of having a source of power always available without requiring thought or trouble are very highly appreciated. Carts are quickly unloaded, and the traffic in the narrow tortuous streets is much relieved. But in the particular instances we have under consideration, no doubt there were even stronger inducements to adopt the system. Putting aside the actual loss arising from a great fire in merchandise and buildings, which can be covered by insurance, the damage done to a business by being thrown into a state of utter confusion is a most serious matter, and has been keenly felt in the instances in question. In addition to removing a source of danger by doing away with the necessity of steam boilers on the premises, the application of the hydraulic power enables powerful hydrants to be placed in any required position where the hydraulic service is laid on. It is well known that, in a jet of water used for fire extinguishing, force of impact is almost as desirable as volume. By the use of the injector hydrant, which was designed by Messrs. Greathead & Martindale, and is being manufactured by Messrs. Sir W. G. Armstrong, Mitchell, & Co., both volume and impact can be obtained. In this apparatus a small jet of water from the high-pressure service is injected through a nozzle into a chamber through which flows a larger volume of water obtained from the water companies' mains, or from any other convenient source. By the lateral inductive action of the high-pressure water, the slowly-moving stream has the required velocity imparted to it, and the whole is forced through a nozzle in the ordinary way. It has been found by experiment that with a high-pressure service of 700 lb. to the square inch, which is that carried in the Hydraulic Power Company's pipes, and a low pressure service of 20 lb. per square inch, it will require 32·4 gallons of high-pressure water to throw a jet of 150 gallons per minute through an inch nozzle, and to a height of from 75 ft. to 84 ft. This would be equivalent to the pressure due to 100 ft. head at the back of the nozzle. The hose is taken to be 200 ft. long and is the ordinary 2½ in. brigade hose, the resistance of which may be considered as equivalent to 3 in. head per foot of hose. With pressures in the Water Company's mains of 60, 50, 40, and 30 lb. to the square inch, 3·7, 10·9, 18·1, and 25·2 gallons of high-pressure (700 lb.) water would be required respectively, the remaining conditions being as before stated. The difficulties attendant on fire extinguishing, as at present carried out, are constantly receiving too many practical and melancholy proofs to require urging here; the superiority of fixed hydrants, always on the spot and at any time ready for immediate service, over an engine that has to be brought from a distance, and may possibly be engaged elsewhere, is apparent; supposing, of course, the hydrants are sufficiently powerful for the work required from them. We, in London, have never yet had to deal with two fires of great magnitude at one time, although we have more than once been very near having to do so. It taxes all the resources of our present fire brigade to limit the ravages of a conflagration such as that of last December twelvemonth, to the confines of one block of buildings; the result of two such fires occurring on a breezy night might be little short of the disasters of Chicago or Boston.

There is a further point worth noticing in connexion with the Wood-street installation. The warehouses last referred to were outside the Parliamentary limit of the company at the time these pipes were laid down, and the local authorities had, therefore, to be petitioned before the streets could be opened up. In spite of the very great inconvenience that is inflicted on the owners of warehouses in this overcrowded part by the stoppage of a thoroughfare, nearly the whole of them signed the petition in question,—a fact which speaks strongly of the estimation in which the Hydraulic Company's labours are held.

The company has a pumping-station in Philip-lane. Here there are two 20-h.p. locomotive boilers by Robey & Co., and two pumping engines by the Hydraulic Engineering Company, of Chester, with 8-in. cylinders and 12 in. stroke. The accumulator is 18 in. diameter by 20 ft. stroke. It has not been found necessary yet to have recourse to this machinery, as the engines at Falcon Wharf have been found sufficient for the purpose. In this case the source of power is nearly two miles, in the line of the mains, from where it is used, but we understand that there is no appreciable loss of power or unsteadiness in working. This is no more than might be expected, for the loss in transit is less than is generally supposed. Sir Frederick Bramwell has put on record that power can be conveyed through pipes of small diameter at a speed of

one foot per second with a loss of only 2 per cent. per mile. The actual experience in the present case will, however, be of value in convincing those who doubted the practicability of conveying power at high pressure for public use through long distances.

## THE WORK OF THE ARCHITECTURAL ASSOCIATION.*

Those who were present on the corresponding night to this last session will, perhaps, remember that we considered the various statistics furnished us by the Brown Book, which, *en passant*, I rejoice to see has returned to its true colour this session. These statistics were not so encouraging as could have been wished, nor are those now before you this new year. It will be well as briefly as possible to consider the facts just presented to us. In the Elementary Class of Design there is a falling off of sixty-eight attendances and seventy designs submitted; on the average eight less attendances, nine less designs submitted. The Class of Design is, however, encouraging,—forty-four more attendances, fifty-four more designs submitted; on the average five more attendances, seven more designs submitted. Again, in the Colour Decoration Class, progress has been made. Last session no statistics were forthcoming. Comparing this one with that of 1881-2, we find thirteen more attendances, seven more sketches; on the average three more attendances, two more sketches. Turning to the Class for Study of Planning and Specification Writing, seventeen more attendances, eleven more sets sent in; on the average three more attendances, two more sets sent in. Class Construction and Practice, thirty-four less attendances, eighty-one less papers; on the average five less attendances, ten less papers. Advanced Class of Construction, seven less attendances; but on the average two more than the previous session. The Surveying Class shows a decrease of five members below the two previous sessions. The lectures in connexion with classes of design gain by two attendances, those for construction by twelve, on the average one. The library report shows a falling off of nine in the number of readers. You will see, therefore, that though the annual report is right in pointing to "some advancement in the work of the Architectural Association, and some improvement in those respects which were referred to as being unsatisfactory, especially in the case of the Colour Class," still it is not so great as we all hoped and expected, especially if you consider the large increase of members. The falling off in the Elementary Class of Design is very noticeable, but some consolation may be gathered from the encouraging increase in the Class of Design, and Mr. Stannus, the president of this class last session, must be congratulated on this fact. The Colour Decoration Class has, I rejoice to see, shown fresh signs of life and vigour. There is also an encouraging improvement in the Class for Study of Planning and Specification Writing.

Then we are met face to face with a very serious falling away in the Class of Construction and Practice, and that for the Advanced Class of Construction is not much better. Referring to the latter, the report of the secretaries points out that six out of eight meetings advertised were held, four out of seven papers promised were read, and these were by members who contributed the previous session; but it should be noted that the average of attendances was higher. Lastly, the reports of the teacher of the Surveying Class and the librarian are not such as could be wished. Taking all the above facts into consideration, I think it will be admitted that the appointment of a special committee "to inquire into and report upon the present system of education as carried on in the various classes and lectures of the Architectural Association, with the object of rendering them, if possible, more efficient, and in other ways considering how the quality of the instruction and work done in the Architectural Association might be raised," has not been undertaken too soon, and that we must one and all devote our energies to finding some means for altering this state of things by taking a new departure. This special committee has not been idle. Their first business consisted in sending out a series of questions for the purpose of eliciting opinions, facts, and suggestions from those considered best acquainted with the working of the Association, and from others competent to advise. The result of this has been a mass of most valuable information, which has been duly tabulated by the honorary secretary of the committee, Mr. Frederick E. Eales, in a very thorough and comprehensive manner. This information has been, so to speak, boiled down, and the essence drafted into a report, which, early this session, will be brought before the special committee, and, when passed, laid before the general committee to undergo further revision. Then the whole result of these deliberations will be presented to you. The gist of the questions issued in the first instance I will briefly summarise, in the hope and expectation that those members who, from inadvertence, were not applied to, and others who have the cause of solid advancement at heart, may be induced to lend their help and forward their views at the very earliest day possible to Mr. Eales, who will, I feel sure, welcome any contributions, despite the further encroachment it may make upon a busy life. Briefly, then, the questions run thus,—and I shall restrict my summary to those upon which we most need information, and in any answers you may favour us with, kindly make them in the order in which I put them. The numbers here given agree with the printed paper to which your attention was called. (1) Is the system of education the best one? In what way do you think it can be improved? (2) What are your views of the quality and amount of work done in the classes with which you are best acquainted? (3) What are the points of failure, causes, and means of obviating them? (4) Would it be advisable to reduce the amount of work set down for each class meeting, with a view of making it more thorough? (5) Would you advise any test for admittance to the advanced classes? (7) Is it desirable to limit the period of members attending the elementary classes? (8) How can the advantages of the Association be extended to country members? And, lastly, in No. 9 we asked, In what other ways do you consider the usefulness of the Association might be extended?

That last question opens up a wide field, and, like the postscript to a letter, is, perhaps, as important as any of the previous questions. I hope that all those who are in this room to-night, and who feel that they can do something to make our machinery turn out more work and better, will answer to this call, as well as those who may chance to read my address in the professional journals. It is not out of place here to say how very much we are indebted to the editors of these papers for the large amount of space they give us; the compliment is a very high one, and I feel sure I may, as your President, convey our best thanks to these gentlemen for the courtesy extended to us,—a proof of the interest felt in our proceedings, and their continued record of them goes to prove that our doings outside these walls are carefully watched by our professional brethren, and an interest taken in our welfare. Were it otherwise, we should not see, at meeting after meeting, the faces of the reporters, now so familiar and so welcome to us. We owe the press this recognition of their valuable and useful services.

With the exception of the advanced Class of Construction and Practice, and the Class for the Study of Planning and Specification Writing, all the other classes which meet in this building have this rule, "Each member *must* contribute to the work of the class whenever he attends." A glance at the statistics given in the Brown Book will prove that this rule is not enforced. The attendances during past sessions have largely exceeded the work submitted in the various classes. It would probably be very difficult, indeed, to enforce a strict observance of this very salutary regulation; the frequent and constant disregard of it is, however, very discouraging, and shows how many drones we have in the hive. What remedies can be devised to meet this difficulty will doubtless form an important subject for discussion in the special committee. The real solution of the difficulty must, after all, remain with the members themselves, and I hope when the next Brown Book is issued we shall see some improvement. To contribute work will materially assist you; do not fear criticism: you may not succeed so well as you could wish, but you will certainly be the gainers by entering boldly into the contest.

Last session a sub-committee was appointed to consider whether the time had not arrived when the Architectural Association should publish the lectures delivered in this room. No action has as yet been taken although some statistics of probable cost have been collected together. The expense of such an undertaking could not fall, I think, upon the funds of the Association, nor could members expect to be furnished *gratis* with copies considering the small annual subscription they now pay. Whether the scheme ever takes definite shape must depend upon your own wish. If a sufficient number of subscribers could be guaranteed the experiment might be made, and I think some index of the feeling of our community might be ascertained if members would be good enough in the course of a week or two to send a postcard to the honorary secretary of the committee, Mr. H. W. Pratt, one of our vice-presidents, stating whether or no you are in favour of the work being undertaken. The cost, if a fair number of subscribers could be got together, would not be large, and no one will be committed to any subscription who is good enough to comply with this request. This proposition of publishing the lectures is not a new one, but, as we are considering a revision of our work generally, the present seems a fitting time to come to some decision upon this point. One strong argument against the necessity for publishing the lectures is that they are so well reported for nothing in the professional journals. This is so, and most highly should we value this boon; but then, on the other hand, no journal can be expected to publish our papers *in extenso* except when they have less claims upon their space, and, year by year, demands upon that are made from all quarters. Again, it is next to impossible to edit the productions with the exactness which a careful author would wish. When a man sees his composition in print it generally reads differently to him, and needs careful revision and some re-castiug. Though the journals give all the time they can to the authors, it frequently happens that the printer's boy has instructions to wait while the proof is being corrected, and so it cannot be done with that thoroughness which such work requires, and only practised writers can hurriedly bring their thoughts to bear on the work before them. Another drawback is that the papers are bound up with the other parts of the journal, and are not nearly so handy for reference, as they would be bound up separately. It is also urged against the proposed scheme that we should find a difficulty in getting the younger men to contribute papers if they had to face the ordeal of this special publishing. I think that objection may be dismissed. I believe it would have a contrary effect, and that we should procure even better and more carefully thought-out papers, and that the honour of reading one would be more highly coveted. The publicity which the press gives to our meetings is surely a more trying ordeal than the one proposed. Again, it is urged that the discussion took place among us as students, and that the ideas evolved from a discussion are hardly worth perpetuating. To this it may be replied, That the committee appointed for the editing and publishing of the papers would in the natural course of things have discretionary powers. I have dealt at some length with this question, because I think it is an important one; and before leaving it I will again beg of you to let the committee know what your own views are upon the matter, for the decision rests solely with the members.

The judges of the Essay Prize recorded with satisfaction the success achieved by the recipient of it last Friday week, but the committee of prizes felt themselves compelled to notice how very little interest is felt in essay-writing, and they go the length of suggesting that it should no longer be advertised in the Brown Book. I hope this will not become necessary. I think the fact that students do not care to compete in literary work is a sad and serious one. Let us for a few minutes consider the matter. It should be our desire to fit ourselves for any position in our profession and in society; but to do this we must possess those literary attainments which a learned profession and society demand from those who seek to take up a position in it. To write a good essay is not within the ability of many, but to endeavour to do so is in the power of most. To write an essay at all demands an acquaintance with the subject set down for competition, and this necessitates looking up facts and perusing works on the

* Opening address, delivered by the President, Mr. Cole A. Adams, at the meeting on the 24th ult.

subject. The necessity for a logical order, careful composition, and neatness of expression and dictum, affords most valuable discipline and teaching, and the result of the sacrifice of time to this pursuit cannot but result in good to the student. One satisfaction will be, that with practice he will find his thoughts will run more naturally to tongue and paper, and assist him largely in addressing meetings, committees, or public bodies, or in writing reports.* Again, the pursuit of references must needs open up studies which will be of use in ways little dreamed of at the time, and probably foster a love for reading and research which cannot fail to achieve as a result a cultured mind, which, I take it, is the *raison d'être* of the Essay Prize. I fancy when the profession was not so crowded as it is at present, and when good draughtsmanship was not so much thought of and practised as it is now, that *bonâ-fide* architects had, on the whole, a better right to the distinction of being called "learned." Previously to the Gothic revival, men devoted more time to the literature of the art, and what they learned was more thorough. With the Gothic revival came that improvement in draughtsmanship which has been so marked of late years, but I fear in too many instances the love of this charming occupation has shut out of sight the need for literary studies, and the fascination of being a good sketcher in perspective has been detrimental to that more solid good to the student which comes from measured drawings. It needs no very high order of intellect to be a clever draughtsman, and a too close devotion to this pursuit must debar the student from storing his mind with that knowledge of the literary and scientific part of his profession without which he cannot hope to hold his own with *savants*, or take that place in his profession, and in society, which should be his lawful ambition. Every year education makes strides, and we can only maintain our position in the world by showing we are worthy to do so; to neglect all efforts at culture, and the scientific side of our work, is simply suicidal. I do not think I have taken an exaggerated view of this question. Believing it to be of the utmost importance, I have made these few remarks; test the soundness of them for yourselves, and take council with those men who are best qualified to direct your studies. Give a little less time to draughtsmanship and making pretty sketches, a little more time to mastering the literature of your profession; go beyond this as opportunity presents, and study literature in other branches, and pleasure and profit will be the result.†

**Society for the Promotion of Hellenic Studies.**—As our article on this subject last week has brought us some inquiries as to the Society, it is well to add that the Hon. Secretary of the society is Mr. G. A. Macmillan, 29, Bedford-street, Covent-garden. We may also add that the leading European archæological periodicals of the day, and other works the property of the society, can be seen and consulted by members at any time on inquiry of Mr. Vaux, at 22, Albemarle-street, where the meetings of the Hellenic Society are held. The journals taken include the publications of the Archæological Society of Athens, the *Mittheilungen* of the German Society at Athens, the "Bulletin de Correspondance Hellenique," the Berlin "Archäologische Zeitung," the publications of the Russian Imperial Archæological Commission, &c., &c.

**Leeds and Yorkshire Architectural Society.**—On Saturday afternoon the members of the above Society paid a visit to York on the invitation of the President and Council of the York Architectural Association. Mr. Geo. Bradley, the residentiary clerk of the works of the Cathedral, conducted the party round the building, and in the crypt Mr. Bradley read a long and interesting paper, in which he clearly traced the architectural history of the buildings which have preceded, and some of which now form part of the present cathedral. The restoration works now being carried on under the direction of Messrs. Fisher & Hepper, architects, at St. Crux Church, Pavement, York, were next visited, and Mr. Hepper conducted the party over the works and explained to them the nature of the restoration.

* If Mr. Adams could see some of the letters that we receive from the architects, sometimes of works of considerable importance, full of errors of grammar, and even of the most extraordinary mistakes in spelling, he would think they added to the force of his exhortation.—Ed.

† The remainder in our next.

## Illustrations.

### ST. MICHAEL AND ALL ANGELS, STOKE NEWINGTON COMMON.

THIS church, which is fast approaching completion, is planned to seat 750, including the choir. The church consists of chancel, nave, north and south aisles (the south chancel aisle forms a morning chapel), organ-chamber, clergy and choir vestries, and a tower. The walls are faced externally with red brick, internally they are stuccoed, the arches and all quoins being of red brick. A feature of interest in the building is cast concrete (Albion Concrete Company), which is used in every case where stone would ordinarily be used (including a tracery east window), except for the columns. The church is being built by Messrs. Holliday & Greenwood, of Loughborough Junction, whose tender for the work was 5,242*l.*, without the tower. The architect is Mr. J. Edward K. Cutts, of Southampton-street.

### DESIGN FOR WAR AND ADMIRALTY OFFICES.

BY MESSRS. SPALDING AND AULD.

WE give this week the Park view of Messrs. Spalding & Auld's design and plans, as usual, of the two principal floors. There are some fine points in the arrangement of the ground plan in regard to the disposition of the entrances, but a number of the rooms on both floors must surely be very insufficiently lighted. The architects send us the following statement in regard to their views in drawing up the design:—

"In the preparation of this design due consideration has been given to the matters especially dwelt upon in the conditions for the first competition, and emphasised more particularly in the revised instructions issued for the final competition.

In working out the scheme of plan the relative positions of the several sub-departments, the situation of the rooms on the various floors, and the order of their arrangement are all in strict compliance with the suggestions embodied in the official schedules, and follow as far as possible the sequence laid down therein.

The greatest simplicity has been aimed at in the block plan, which follows closely the natural outline of the site, the main object being to secure an ample provision of light and air and a general cheerfulness throughout. Small enclosed courtyards have been avoided, there being but two quadrangles, and these of large areas.

The space at command being limited for the accommodation required, the frontage to these quadrangles is appropriated to the official apartments, so that all rooms have a cheerful outlook to large open spaces, and the staircases and waiting-rooms are centrally disposed between the outer and inner ranges of offices.

Direct carriage communication between Whitehall and Spring-gardens is provided in compliance with special instructions.

The principal public entrances to the War Office and Admiralty are in the quadrangle next Whitehall, and are accessible from Spring-gardens by the carriage-ways above-mentioned.

Subsidiary entrances are provided for direct access to the various sub-departments. Private entrances also are given where required by the conditions.

Staircases are grouped near entrances, both being overlooked by messengers' lobbies, and having waiting-rooms in immediate proximity.

For convenience of access the repositories in connexion with ground and first floors are in basement, whilst those belonging to the second and third floors are in the attic over.

The warming, ventilation, and sanitation of the buildings, having to be specially provided for, a careful and complete scheme was submitted with this design."

*Key to References on Plan.*

THE WAR OFFICE.

A. Staff.
B. Surveyor General's Department.
  B 1. Director of Artillery.
  B 2. ,, Supplies.
  B 3. ,, Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. ,, ,, ,,
  C 2. ,, ,, ,,
  C 3. ,, ,, ,,
  C 4. ,, ,, ,,
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

### MANSION, WEST HARTLEPOOL.

THIS drawing, which was one of those hung in the present year's Academy Exhibition, represents a house to be erected at West Hartlepool, from the designs of Messrs. Banks & Townsend, architects. The plan, in connexion with the list of references, sufficiently explains itself, and shows some unusual and agreeable points in planning.

### SKETCHES BY A DISTRICT SURVEYOR.

III.

AMBOISE is celebrated as having been the scene of an interview between Clovis and Alaric before the battle of Voulon, and it was to this castle during troublous times that the Guises fled from Blois with the young Francis II. After the assassination of the Duc de Guise, the château became a state-prison, and in it were from time to time confined a cardinal, archbishop, princes, and other persons of importance. Abd-el-Kader was detained there for five years.

In the contests between Protestants and Catholics Amboise was the scene of most horrible atrocities, in which the whole court of Francis II. took part as a recreation after the latter had crushed the Protestants. Twelve hundred gentlemen of family were hanged, and the executions were witnessed by the king, who ordered them to take place after dinner for the delectation of the ladies. These religious wars devastated the country so much that the neighbourhood lapsed into a desert. The poor, driven from their homes, fled like wild beasts; bread could scarcely be found, and was made largely of walnut-shells; families eating roots and herbs boiled with remains of dead animals. The death-rate was frightful, and in one parish the return was "no more inhabitants."

The château building of the fifteenth to sixteenth centuries internally is much dilapidated; externally it has been reinstated partially. The Renaissance wing stands on one side of the court which has been converted into a public garden.

In the grounds were two chapels, one dedicated to St. Hubert, and in the other (St. Florentine) was buried Leonardo da Vinci in 1519, but this was destroyed subsequently, and in 1869 a small monument was set up on its site to the memory of the great artist.

The large building to the right and at the foot of the château is the Hotel de Ville.

T. E. KNIGHTLEY.




3 Castle St Holborn London

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

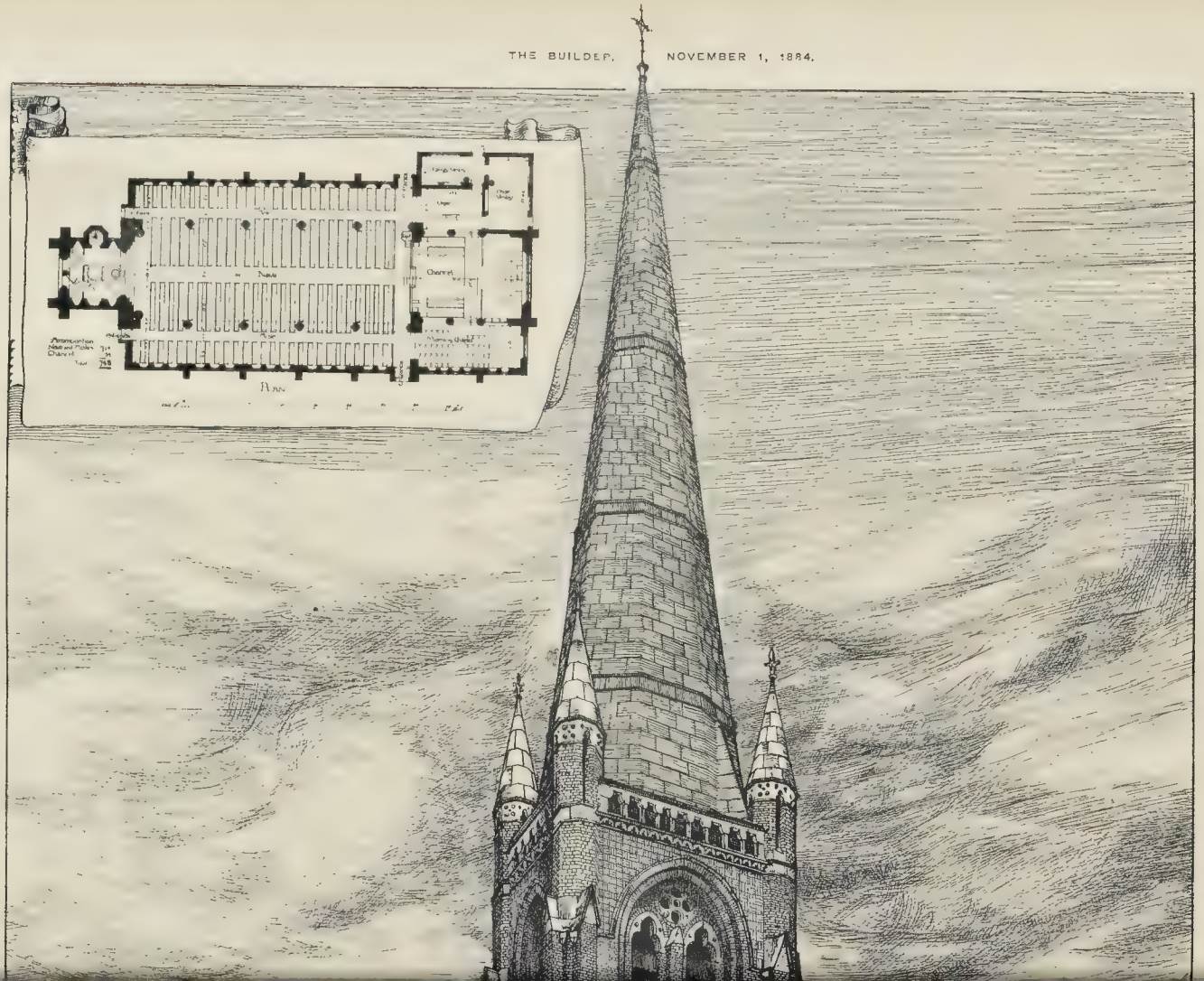
GROUND PLAN.

MESSRS. SPALDING & AULD, ARCHITECTS.




Wm. and A. Mc Phun Lith.

6 Queen St London W.


Nave
Chancel
Plan



*A. Beresford Pite, delt*

ST. MICHAEL'S CHURCH, STOKE NEWINGTON COMMON.—Mr. J. E. K. Cutts, Architect.



DESIGN FOR NEW ADM

By Messrs.



TY AND WAR OFFICES.

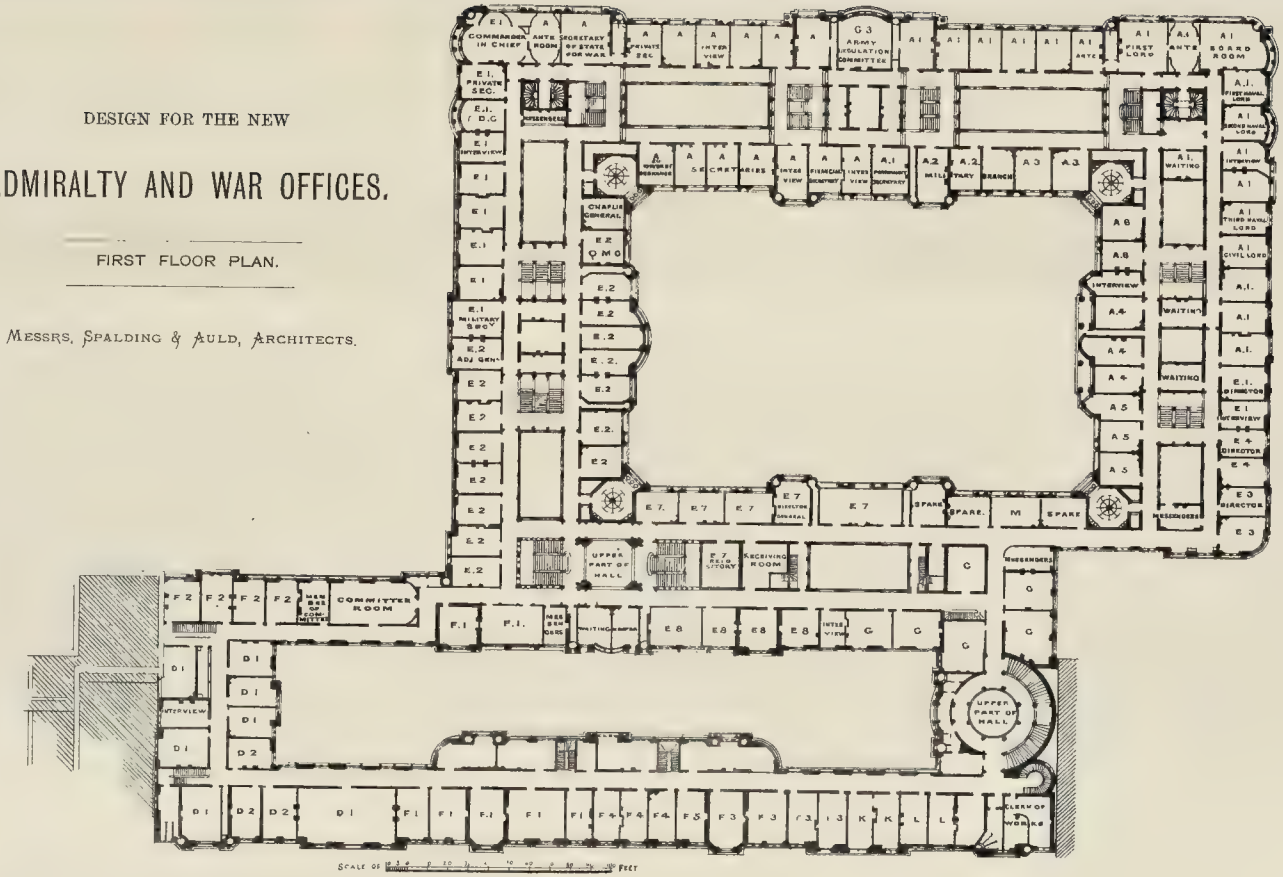
& AULD.

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

## FIRST FLOOR PLAN.

MESSRS. SPALDING & AULD, ARCHITECTS.




Wyman & Sons Photo Lith.

Queen, London W.C.



SKETCHES BY A DISTRICT SURVEYOR. No 3.

THE CHÂTEAU D'AMBOISE.

## THE WATER FAMINE IN BRADFORD.

The water famine in Bradford is a matter of extreme significance, not only as regards the inconvenience to that populous centre, but as throwing incidental light on the unsatisfactory position of the entire question of urban water supply. Bradford, in the year 1882, contained a population of 183,080, on an area of 7,221 acres in the borough, and of 180,960, spread over 68,676 acres in the out townships, making a total of 364,040. Under nine Acts of Parliament the Bradford Corporation, in January, 1883, had expended 1,869,737*l.* on their waterworks. The supply of water obtained was, for domestic use, 25 gallons per head per day; and within the borough 3,096,000 gallons were daily supplied for other than domestic purposes. It was estimated that the daily waste amounted to 15 or 20 per cent. of the total daily supply of 8,800,000 gallons.

The charges for supply are high, ranging from 7½ per cent. on annual value up to 20*l.*, to 5 per cent. on the annual value exceeding 100*l.* There are extra charges for extra supply; and for trade purposes the water is sold at from 3½*d.* to 1*s.* per thousand gallons. In the summer, it is significantly added, the charge is 20 per cent. additional.

The sources of supply are from mountain drainage areas, springs, and streams, in the valleys of the rivers Worth, Aire, and Wharfe, the water being conveyed to Bradford by conduits and pipes, and supplied by gravitation. Fourteen reservoirs were at work, one was in course of construction, and several others were authorised by Parliament, at the date of the return on urban water supply in 1879; and no information on this head was asked for or supplied in the Parliamentary returns of the 9th of November, 1882, and the 2nd of April, 1883.

Three distinct services are described by the Rivers Pollution Commission as in use in Bradford, viz., a high-level service from the millstone grit; an intermediate service, derived partly from springs; and a low-level service, partly from this formation and partly from limestone. The area of the watershed is, in all, 13,250 acres. As the area to be supplied varies in its elevation from 300 ft. to 1,400 ft. above the level of the sea, the water has to be collected at great altitudes and led from considerable distances. The rainfall in 1879 ranged from 28·02 in. at the Exchange to 30·73 in. at Hewenden Reservoir, 700 ft. above the sea. Owing to the mode of collection, the working expenses incurred for the water supply are low, being little more than half those incurred in London, and considerably lower than those of any town in England of first-rate magnitude, except Leeds. But the rates are twenty per cent. higher than in London in proportion to the rateable value of the property, and the water revenue of the Corporation, per million gallons supplied, is higher than in any great town in England, with the exception of Liverpool, Sheffield, Manchester, and Birmingham.

Of the different methods of procuring urban water supply, it will be seen that the Corporation of Bradford have adopted that which is most easily affected by a season of drought; and that they are now suffering in consequence.* The incident is a strong illustration of the importance of a complete hydraulic survey of England, and of the division of the country into great hydraulic districts, each under complete supervision. While the collection of surface water is generally regarded as the cheapest and readiest mode of obtaining a supply, it should be remarked that Bradford, increasing its area of collection by little and little, has managed to arrive at a cost, per million gallons of supply, higher than that incurred for the works of any other town in England, of above 100,000 inhabitants, with the sole exception of Sheffield; where the cost has been rendered formidable owing to the unfortunate catastrophe of the bursting of a great reservoir. A water famine after a single dry season, and notwithstanding so considerable an expenditure (amounting in 1881 to 5·13*l.* per head) in the construction of works, is not reassuring as to the success of a municipal arrangement in providing a water supply, or in providing that prime necessary of life at a moderate cost. The plan of charging half as much again, in percentage on the rent, on a 20*l.* as on a 100*l.* house, has the effect of putting the highest charge for water supply on the poorest of the population.

* From latest accounts it appears that the difficulty is for the present practically at an end.

## THE ARCHITECTURAL ASSOCIATION.

The first ordinary meeting of session 1884-85 was held on the 24th ult., at 9, Conduit-street, Mr. Cole A. Adams, the president, in the chair.

It was announced that the president had been invited to join the committee of welcome in connexion with the American Exhibition, proposed to be held in London in 1886. This invitation had been accepted by the president, and he had now been asked to communicate with their architectural brethren on the other side of the Atlantic, with a view to making the exhibition as interesting as possible.

On the motion of Mr. Conder, seconded by Mr. Gotch, the balance-sheet, as printed in the Brown Book, was adopted.

The President then delivered his inaugural address, which we give on p. 587.

In the discussion which ensued,—

Mr. Aston Webb, in proposing a vote of thanks to the President for his excellent address, thought that he had, perhaps, taken too melancholy a tone in thinking that the members did not work so well as they used to, and that there was not so much *esprit de corps* as in the earlier days of the Association. He believed for himself there was really a great amount of vitality in the classes, and as much interest now manifested in the work as ever had been. He congratulated Mr. Adams on being president for the second time, an honour which he deserved from the manner in which he conducted the work, and for the reforms he had suggested. The Association had undoubtedly outgrown its work, and required great extension, or its prosperity might bring about its overthrow. Their president had now become, as it were, a member of the House of Lords, and in that capacity they looked upon him as their representative in the solemn assembly upstairs. The members would be glad to hear some expression as to the way in which he proposed to represent their interests. Up to the present the results had been sparse; but he expected now to see the desired reforms rapidly carried through; therefore the meeting would be pleased to hear from their president that he was an ardent upholder of the Franchise Bill before the Institute, and that he would not allow the solemnity and chilliness of that august assemblage to interfere with the energy he had displayed in the lower house. With regard to sanitary science, he believed that architects knew all about it, and that there was no necessity to press the matter upon their attention. The President had touched upon the higher parts of the profession, and on an evening like this, which only came once a year, it was the point which should be more especially dwelt upon. The troubles and worries of ordinary workaday life were apt to engross their attention, to the detriment of the delights and charm of their profession; but there was no doubt that to produce good work they must ever have a high ideal before their eyes. They should look to art and not to science for the excellence of their work, not neglecting science, but recollecting that science without art would never produce a thing of beauty.

Mr. H. L. Florence considered there was a general improvement in the quality of work done in the classes. It should be remembered that the working strength of the Association could not be expected to be more than one-fourth of the whole number, therefore the proportion contributing to the classes could not be considered as unsatisfactory. At the same time he would like to impress upon the members the great advantages of the classes. It was impossible to obtain in an office that comparison of knowledge which was obtained in competition with others. He could speak on this point from experience, for he had learned more there than in any office he had been in. With regard to the system of education in this country and abroad, in the word "system" lay the whole secret of the case. In this country each one was left to work individually, and although in some instances it gave rise to great originality, yet the condition of architecture in England was not as artistic and complete as it was on the Continent. Mr. Florence seconded the vote of thanks.

Mr. J. A. Gotch remarked that one of the most important subjects which had been touched upon was the education of the architect of the future. The system of pupilage had answered to a certain extent, because it had produced all the architects we boast of; but, at the same time, it was very imperfect. Architects should not be compelled to seek their education in their spare time only, but should be able to devote the daytime to a regular system of education. The young architect too frequently occupied the whole day in doing little or nothing, while in his spare time he had to come there to acquire the often disagreeable rudiments of his profession. The question of the profession becoming a protected one was of the greatest importance; but he did not believe they would gain their point by merely appealing to the feelings of other people. What was requisite was to persuade the public that they were necessary to their health and comfort. It would be a pity to withdraw the competition for the Essay Prize, and he hoped that in future years they would get more and better essays.

Mr. Brodie hoped that more attention would be directed to the question of pupilage. He knew instances of men, with little or no work to do, taking five or six pupils, which he considered was obtaining money by false pretences.

The vote of thanks having been carried by acclamation,

The President thanked the members for the compliment they had paid him. With regard to his appointment on the council of the Institute, he had always been somewhat of a free lance, but it necessarily happened that the freest of lances, when he got into office, had to be reticent as to what he said in public. From the first time he took his seat at the council, however, he had been listened to with the utmost courtesy. He had been asked what he was going to do with regard to the important question of the franchise, and upon that point he had no reticence whatever. The Associates of the Institute ought to have a vote, and to the best of his ability he would argue this. No evil would result from their having this vote, but a great deal of good; and he believed there was really no opposition to it. With regard to sanitary science, it was necessary to view this matter soberly, if they were to maintain their position with the public. What was required was that the artistic man should become practical, while the practical man should strive to become artistic. Upon the correct writing of the quantities depended a knowledge of their work.

## HEALTH EXHIBITION AWARDS.

The following awards have been made of the prizes offered by the Society of Arts at the International Health Exhibition:—

Joint Stock Prize, a Society's Gold Medal, or 20*l.*, for the best example of Sanitary Architectural Construction, Classes 20, 28, 29, 30, 32:—

Messrs. Doulton & Co.

Shaw Trust, a Society's Gold Medal, or 20*l.*, for the most deserving exhibit in Classes 41, 42, 43, and 45 (relating to Industrial Hygiene):—

Compressed Lime Cartridge Company. (In Class 45.)

North London Exhibition Trust, a Society's Gold Medal, or 20*l.*, for the best set of specimens illustrating the Handicraft Teaching in any school,—Classes 49 and 50:—

M. Germain, on account of the Collective Exhibit from the Belgian Normal Schools for Women Teachers. (In Class 49.)

Fothergill Trust, two Gold Medals (or two sums of 20*l.*), one for the best exhibit in Class 27 (Fire Prevention Apparatus), and one for the best exhibit in Class 26 (Lighting Apparatus):—

Messrs. Nobel Brothers. (In Class 26.)

Trevelyan Prize, five Gold Medals (or five sums of 20*l.*), for the best exhibit in each of the following Classes,—2, 3, 6, 7, and 11 (all comprised within Group 1, "Food"):—

San José Fruit Company. (In Class 2.)
Mrs. Charles Clarke, of the School of Cookery. (In Class 6.)
M. Fasteur. (In Class 7.)
John Moir & Son, Limited. (In Class 3.)
Messrs. J. & E. Hall. (In Class 11.)

The "Siemens" Prize, a Society's Gold Medal, or 20*l.*, for the best application of gas to heating and cooking in dwellings, Class 24:—

Thomas Fletcher (for Articles shown by Messrs. Deane & Co.).

The "Stacy" Prize, a Society's Gold Medal, or 20*l.*, for the best exhibit in Class 30 (objects

for Internal Decoration and Use in the Dwelling; fittings and furniture):—

Messrs. Collinson & Lock.

*** In reply to several correspondents who have written asking us to mention that a medal had been awarded to them, we beg to say that we will print a synopsis of all the awards that have been made in regard to work connected with the building trades, and with sanitation and other subjects coming directly within the scope of this journal; but pressure on our space compels us to defer this till next week.

## BUILDERS' ACTIONS.

CULLEY *v.* YATES.

In this action, at the Aylsham County Court, on Oct. 16 (before Mr. Julian Robins, Deputy Judge), which had been adjourned from time to time, the plaintiff, a builder residing at Aylsham, sued the defendant, the Rev. E. T. Yates, for 19*l.* 5*s.* 4d., balance due for work and labour done.

Defendant pleaded a counter-claim for 40*l.*, moneys alleged to be due to him from plaintiff.

Mr. Linay represented plaintiff, and Mr. Chittock appeared for the defendant.

Mr. Chittock said the action, which came on at a previous Court, was brought to recover the sum of 19*l.* odd, and defendant then pleaded a set-off of 50*l.* Plaintiff sued for work done, and he had also cut down timber that belonged to the defendant. He sold the timber, and was indebted to the defendant for all moneys received. They charged him in the set-off for moneys received on account of defendant which had not been given credit for. This was a short history of the transaction.

After hearing further argument, his Honour gave judgment for 28*l.* 2s. 3d. in favour of defendant, and costs.

## THE DOME OF ST. PAUL'S.

My respect for the talents of Mr. Cave Thomas disinclines me to do more than express my own opinions and leave them side by side with his for the judgment of experts. As an architect I have spoken, as an artist he has replied.

But since it is most important that all argument on the subject should be based on a foundation of fact well authenticated, I venture to give my reasons for not accepting the statement which Mr. Thomas makes, that "Thornhill's architectonic arrangements were designed under Sir Christopher Wren's personal supervision, and that he not only sanctioned the scheme, but that it was carried out immediately under the eye of the great architect," who, by the bye, must have been about eighty years of age when it was done by Sir James Thornhill.

On page 441 in Dean Millman's "Annals of St. Paul's" it is stated that "The painting of the cupola had been taken out of his hands; it was now made over, contrary to his wishes, to Sir James Thornhill.

Again, in a letter by Sir Christopher to the Commissioners, dated January 25, 1710-11, he says:—"As for painting the cupola, your lordships know that it has been long under consideration that I have no power left me concerning it, and that it is not resolved in what manner to do it, or whether at all."

In fact, the directing of it had been taken out of his hands, to his great annoyance. See Longman's "History of St. Paul's," page 139.

I may say that I agree with Mr. Clayton that it would be unjust to the memory of Sir James to translate his bold design for a monochrome treatment (for which only it is adapted) into a brilliant polychromatic representation.

EDWARD C. ROBINS.

## CROSIER AND PASTORAL STAFF.

Sir,—I quite thought that your last issue would have contained some reference to the opinions expressed by Canon Venables on this question, first raised in the "Student's Column," and I was disappointed at finding that it did not.

In favour of the distinction which you say exists between a crosier and pastoral staff there is the authority of several well-known writers. Mrs. Jameson, in her "Sacred and Legendary Art," page 684, says, "what is properly the crosier, the staff surmounted by a cross, is borne by archbishops." In a "Manual of Monumental Brasses," published by Parker, of Oxford, it says:—"The crosier and the pall were peculiar to archbishops. The former was a staff ending in a cross or crucifix instead of a crook." In the "Liturgical Reason Why," page 251, it says:—"Crosier, the pastoral staff of an archbishop, which terminates in a cross, whereas a bishop's staff terminates in an ornamental crook."

Webster's Dictionary (a less reliable authority, perhaps) gives *crosier*, from *crois*, now *croix*,—*cross*. "The official staff of an archbishop terminating at the top in a cross." I have no doubt that besides these (and Dr. Lee whom you have quoted) there are other learned authorities who describe the crosier as a staff terminating at the top in a cross, and it would be of interest, I think, if some of your correspondents would make them known. Perhaps the best proof of the existence of a crosier or cross as peculiar to archbishops and distinct from the pastoral staff is to be found in examples of Mediæval times. In Westminster Abbey, upon the monument of Robert Waldeby, archbishop of York (1397), the crosier or cross is represented in the archbishop's left hand. In the chapel of New College, Oxford, is a brass representing Archbishop Cranley (1417) holding a crosier which originally had as its head a crucifix. Many other instances could doubtless be produced, but these, I think, suffice to show that Canon Venables is in error in supposing that the cross peculiar to an archbishop was a processional cross, for the instances which I have named prove that the crosier (*i.e.*, a staff surmounted by a cross) was borne by an archbishop just in the same way that a pastoral staff (*i.e.*, a staff surmounted by a crook) was borne by a bishop.

There are instances amongst Mediæval monuments where an archbishop is represented as holding a pastoral staff and not a crosier, but these do not interfere with my contention, the pastoral staff being the proper emblem of authority over the flock within the diocese in which the archbishop exercises the office of bishop. The Monument of Archbishop Walter de Grey, in York Minster, affords an instance of this, the Archbishop being represented as holding a pastoral staff in his left hand, but it is to be noted that he does not wear the pall over his chasuble, and that, therefore, he is represented as the bishop of the diocese, and not as archbishop of the province of York.

S. SLINGSBY-STALLWOOD.

*Reading.*

## SEA-SAND FOR MORTAR.

Sir,—No one who knows anything about mortar or limes would recommend salt, and no architect who knew the practical part of his profession would allow sea-sand to be used without its being washed.

If "F. L.'s" architect allows sea-sand to be used that is taken below high-water mark, the impression on his mind will end in a reality; but if the sand used is what is called "blown sand,"—that is, sand that has been blown up above high-water mark, and has been subject to rainfall,—it can be used without fear of unpleasant results. For example, at Exmouth there are mounds of sea-sand, covering several acres, which are not subject to the tide, which the sea never reaches, and which can be used without washing; while, on the other hand, sand taken from Dawlish or Teignmouth beaches must be washed, as it is covered by the salt water every six hours.

The plan adopted at most coast-towns in Devon is to store the sand and expose it to rainfall before using. The rain-water passes through the sand and carries away the salt as it passes off at the base of the heap. Sand treated in this way can be used without fear of bad results.

*Exeter*, Oct. 27th, 1884. CHARLES PINN.

Sir,—I quite agree with the remarks of "H. L." in your last number (p. 575) as to the use of sea-sand in mortar.

After fifty years' experience, and having seen some of the largest works in this neighbourhood, especially at Brighton, Hastings, and Eastbourne, where the sand has been brought daily direct from the sea and used without washing, I am convinced that where damp is discovered in a building other causes must be sought for rather than the sea-sand; and in our country districts where sea-sand cannot be procured the same appearances and efflorescence present themselves.

Both the old County Prison, with its thick brick walls grouted solid, and also the new County Prison, are built entirely of sea-sand, and I have never had cause to notice the slightest ill-effects from its use.

Before Portland cement was known the floors of barns, malt and coach houses, used to have a sprinkle of common salt put on them to harden the grey lime surface, and all old bricklayers will speak of the strength of sea-sand mortar over that of washed or land-sand.

HENRY CARD, County Surveyor.

*Lewes*, Oct. 27, 1884.

Sir,—Fearing your correspondent "F. L." might be led into the serious error of using *unwashed* sea-sand after reading the experience of your correspondent "H. L.," I beg to offer my advice on it, which is "Don't." I should think the *unwashed* sea-sand of "H. L." must have been taken far above high-water level, where it had been well bleached by the sun. I have used such without any ill effect. I have also used the sand taken below high-water level, and have found that when carelessly washed the effect on the plastering was most disastrous. It was always slightly damp in the driest weather, but during a damp season it was simply wet. When thoroughly well washed it will make good mortar, neither better nor worse than good pit or river sand, but it must be washed, particularly for plasterers' work. If "F. L." must use sea-sand on the score of economy, let me advise him to see that it is thoroughly washed, or he will not be so fortunate as "H. L." There will be no danger of his having complaints, for the reason that he will find no one to occupy the houses. F. DASHWOOD.

Sir,—As the question of the suitability of sea-sand as an ingredient of mortar has been raised in your columns, and, as I notice, denounced by you, unless the sand has undergone a thorough washing, I shall esteem it a favour if you will inform me whether you consider sand obtained from some distance from the sea shore open to the same objection.

I am engaged in building a house, the mortar for which is mixed with sand obtained some 200 or 300 yards from the shore, and which probably has not been submerged for centuries. Would not the salt in this case have evaporated to such an extent as to render the sand safe for making mortar?

J. S.

*** Possibly; though we opine that if "J. S." sinks a hole deep enough to come to water, 200 yards from the sea, he will probably find it salt; and that, even in this case, a cleansing of the sand would be an error on the safe side.

## EGHAM SCHOOL BOARD COMPETITION.

Sir,—In the last number of your journal I observed a letter from Mr. B. Tice, clerk to the above Board, stating that 103 architects applied for particulars, and informing the forty-nine competitors that the Board have now decided to seek competent assistance to enable them to make a selection. Doubtless the forty-nine will be pleased at this decision; but as one of the fifty-four who applied for particulars, but did not compete, I should like to say I think it would have been much more just if the Board had decided upon this course in the first instance, before receiving designs, as I have no doubt the majority of the fifty-four were, like myself, debarred from competing in consequence of having agreed, with about 1,400 of the profession, not to compete for any work unless one or more professional assessors of established reputation are appointed to assist the promoters in adjudicating on the relative merits of the designs submitted in competition; and in this case, Mr. Tice, in reply to my inquiries, stated that he was not prepared to say whether a professional assessor would be appointed.

R. T. ELSAM.

## A WAIL FROM SOUTH KENSINGTON.

Sir,—Disgusted inhabitants of South Kensington are calling out about the exhibitions of Fisheries, Healtheries, and all the other "ries" about to take place in their locality, and very justly so; but it is of no use without suggesting some way of getting out of their difficulty. May I therefore propose that the Council of such "Exhibitioneries" should be obliged to construct a tunnel from the railway, as proposed last year, into their own grounds, and to do away with the present principal entrance to the building, making another in connexion with a large yard on their own ground, where all omnibuses, cabs, and carriages would set down and take up passengers, the police having orders to refuse those noisy penny vagabonds who annoy the neighbourhood from entering such yard or loitering anywhere about the building?

The proprietors of such a paying concern as an exhibition such as the Healtheries should keep the nuisances they cause on their own ground, and not be the means of ruining a respectable neighbourhood. G. T.

**Leicester**. The Temperance Hall has recently undergone repairs and redecoration. While this work has been progressing the services of Mr. Frank Ashwell, heating and ventilating engineer, have been called into requisition by the directors, with a view of remedying the numerous draughts which have for several years past been complained of by those attending public meetings or entertainments in the building. The system adopted is Körting's patent. The main principle is to keep up a regular current of air, and by means of proper outlet shafts to provide that the foul air should be as regularly discharged, thus securing a constant supply of warm and pure air. By means of an anemometer, it has been ascertained that the whole body of air in the large room can be changed two or three times every hour.

## PROVINCIAL NEWS.

*Ashington.*—On the 18th ult. the foundation stone of a new co-operative store and of a new temperance hotel, for the Ashington Old Co-operative Society, was laid by Mr. Jonathan Priestman, J.P., of Shotley Bridge, at Ashington Colliery. The new institute about to be erected will stand at the entrance to the village, and will face the turnpike road leading direct to the Hirst Station. The front elevation will be 118 ft. in length, and will consist of shops and manager's house, with a lecture-hall, 68 ft. long, above. Behind these there will be ample warehouses, workshops, a drapery establishment, and other departments. At the extreme east end of the front part the temperance hotel will be situated. The new building will be built by Mr. Lilburne, from designs furnished by Messrs. Oliver & Leeson, architects, Mosley-street, Newcastle.

*Oxford.*—On Thursday, the 16th ult., a public inquiry was held in the Council Chamber, by Captain Hildyard, R.E., one of the engineering inspectors of the Local Government Board, with reference to an application by the Oxford Local Board, for sanction to borrow a sum not exceeding 2,000*l.*, for the sewerage of New Botley, and connecting the same with the Oxford main drainage system by pumping. The only persons present were the Chairman and Clerk of the Local Board and Mr. W. H. White, engineer. After taking evidence upon the financial and engineering features of the scheme, the Inspector visited the site of the intended works, and afterwards inspected the Sewage Pumping Station and Farm, at Littlemore and Sandford.

*Wakefield.*—A new billiard-room has just been added to the Bull Hotel, Wakefield. The room has been erected at the rear of the hotel, and is 45 ft. long, 18 ft. 6 in. wide, and 12 ft. 6 in. in height. It is well lighted by two lantern lights, and has a flat roof constructed with iron joists and concrete, and covered with Seyssel mineral asphalte, which has been laid by Messrs. Claridge & Co.'s own workmen. The ceiling is executed in plaster, and is divided into panels containing enrichments. Attached to the room is a lavatory. The billiard-room is warmed by one of E. H. Shorland's ventilating stoves, and fresh air is also supplied by his system. On the roof are fixed three of Boyle's extracting air-pump ventilators. The floor is laid with Lowe's herring-bone wood block paving, which makes a clean, warm, and noiseless floor for such a room. The work has been executed by tradesmen of the town, viz., Messrs. Flower, Bros., C. Driver, C. Squires, E. Kirk, and C. Turner, from the drawings and under the direction of Mr. William Watson, architect. The room is supplied with two tables by Burroughes & Watts.

*Stockport.*—Navigation Bridge is now completed, and we quote the following particulars respecting it from a description given by the engineer, Mr. Thomas Mitchell, of Oldham:—To economise money as far as possible the two side girders and an intermediate one (carrying the water pipes) of the late bridge have been used in the present one. The new roadway is formed with ten intermediate box girders, each capable of carrying 400 tons, thus giving a total carrying power of 4,000 tons. These girders are 2 ft. 6 in. apart, and at right angles to them and resting on the beam ranges are transverse joists, spaced 1 ft. 6 in. The roadway to the depth of the beams and including the interior of the beams is filled up and rammed full of strong cement concrete and finished with a smooth surface at the top, on which is placed a covering of strong waterproof asphalte so as to keep the ironwork drop-dry and from atmospheric exposure. The road paving comes last, bedded in sand, and grouted at the joints with pitch and gravel. In answer to numerous inquiries, Mr. Mitchell says that the strength of the concrete is such that in this case the ironwork would be the first to yield. He thus states his reasons for filling up the box beam with concrete:—

"1st. When the beams are solid, there is no chance of corrosion from the interior.

2nd. The webs are kept rigidly apart, and, from being unable to buckle, must necessarily be stronger.

3rd. As a natural sequence to No. 2, and proved by experiment, beams when filled with concrete attain a much higher breaking strain than when empty.

4th. To increase the *dead load*, as the weight of the structure is called (the beams in this case being very shallow), and thus reduce the vibration of beams during the passage of traffic."

He cites as an apt illustration of what he wishes to explain is found in the great tidal wave which followed the recent eruption in Java. This wave broke on the American coast a few hours after the explosion, having with enormous velocity travelled some thousands of miles. "Now," says Mr. Mitchell,

"It was not the mass of water which travelled, but simply the component individual molecules, which, impacting on each other, conveyed the force imparted to them by the explosion. So, too, the rolling of a wheel gives off impacted force at each point of its circuit, and the vibration caused in a beam over which it travels is due to the molecular action, which conveys the impact to the ends of the beam, and thence to the ground. Therefore, it follows that the vibration must be greater in a light beam than when fully loaded up, and consequently possessing more molecular inertia. Of course, this proposed additional loading only applies to structures such as this, where the live load may be at times in excess of the dead load. Any one going under the bridge will also notice the absence of that hollow ringing sound so usual in this class of bridge when traffic is passing."

The new bridge is 2 ft. lower in the roadway than the one projected by the late borough engineer, and 6 in. lower than the original Canal Company's bridge, and by lengthening the gradients from Lancashire-hill the Highway Committee have rendered this a much easier road than heretofore. The mishap that befell an old field drain by a pile being driven into it was not altogether a misfortune. If it had happened after the bridge and roadway were complete, then incalculable damage might have resulted. Says Mr. Mitchell:—

"The drain was in some places nearly silted up with mud, and generally in bad repair, requiring only a little further time to collapse of itself. From its devious course it must have followed the windings of a natural watercurrent, and the man who constructed it suited the width to his passing fancy or the materials at hand. Sometimes he would make it 15 in. wide, then work it down to 9 in., and gradually pull it back to 15 in. in the most free-and-easy fashion. He evidently used no setting-out lines, and although untrammelled by a School Attendance Committee, worked it nearly into the letter 'S' where it passed under the bed of the canal. As no Local Board or Sanitary Authority took particular notice of the drain, it was allowed to lie unhonoured and unknown until disturbed by the rude hand of modern improvement."

The contractors were Messrs. Froggatt & Briggs, the sub-contractors for the ironwork being Messrs. Homan & Rodgers.

*Stratford-upon-Avon.*—Provision has now been made for protecting the house in which Shakspeare was born from disaster arising from lightning. On the 9th of August last, Mr. W. T. Hawkings, manager for Messrs. W. D. Berry & Sons, electric engineers, of Huddersfield, noticed a paragraph in a Birmingham paper to the effect that a ball of fire had been seen to fall near Shakspeare's birthplace. It occurred to him that a building of so interesting a nature and containing articles of such great value should be protected from lightning, and he at once put himself in communication with the trustees through the secretary, Mr. Lever, and eventually received their instructions to erect conductors on the building according to specifications submitted. The work has now been carried out. Messrs. Berry have fixed their 1 in. by ⅛ in. solid copper tape conductors on each end of the building, and carried them direct to earth. The termination in every case is carried some feet away from the building, and the extreme end of the tape is riveted to an induction earth plate of gridiron form, made with the same material as the conductor. A third elevation rod is attached to the second chimney on the front of the building, and a ¾ in. by ⅛ in. copper tape is connected to it and carried to a fourth elevation rod on the gable-end at the back of the house, from which a 1 in. by ¼ in. tape runs direct to earth, and terminates with an induction plate, as before stated. Each of these plates is buried in carbon in order that the current may be more quickly dispersed.

*Exeter.*—The Exeter Town Council have accepted the tender of Mr. Samuel Pearse, of Exeter, for supplying the kitchen fittings for the new pauper lunatic asylum now being built at Exeter by Mr. H. Phillips, from the designs of Mr. R. S. Wilkinson, architect, of Furnival's Inn, London. Mr. Pearse's estimate is 654*l.* 5s. If a Perkins's patent steam oven be substituted for the baker's brick oven specified, however, he will receive the additional sum of 145*l.*——Extensive additions are now in progress in the rear of Mr. Harry Hems's ecclesiastical art works in Longbrook-street, Exeter. It is scarcely three years ago that he erected his present premises, and the extensions now mooted will give an entire run of shops of upwards of 300 ft. The new building has been designed by by Mr. R. Medley Fulford, architect, of the Close, Exeter, who was also architect for the first portion. The new works are being carried out by Mr. Hems's own staff of men.

*Truro.*—Extensive new premises have just been erected in St: Nicholas-street, Truro, for Messrs. Criddle & Smith, house-furnishers. The architect of the new buildings is Mr. Hicks, Redruth. The contract was taken by Messrs. Farley & Battershill. The painting and decorating was entrusted to Mr. Glasson, the plumbing to Messrs. Cock & Son, and the ironwork to Messrs. Harris & Polmear.

*Pudsey.*—A new boot and shoe factory, for Messrs. Scales & Salter, is approaching completion. The premises, which are very extensive, will cost about 10,000*l.* The works have been undertaken by the following contractors:—Excavating, mason, and brickwork, Mr. Wilks Greaves, Pudsey; carpenter and joiner's work, Messrs. John Thomas & Son, Idle; iron-founders, Messrs. E. & W. H. Haley, Bradford; plumber and glazier, Mr. George Lazenby, Leeds; plasterers, Messrs. J. & H. Etherington, Pudsey; slaters, Messrs. Hill & Nelson, Bradford; and painter, Mr. J. Dickinson, Bramley. The hot-water apparatus has been put in by Mr. E. Oldroyd, of Leeds, and the engines and pump are being made by Mr. R. Middleton, Leeds. Mr. J. Bennett has acted as clerk of the works, and the whole has been carried out from the drawings, and under the superintendence of the architect, Mr. C. S. Nelson, of Leeds.

*Eastbourne.*—Mr. J. P. Knight, the General Manager, and several of the directors of the London, Brighton, and South Coast Railway Company visited Eastbourne on the 23rd ult., with a view to inspect the site and definitely decide upon the plans for a new station, in accordance with the intimation recently given by the general manager at the mayor's luncheon, on the occasion of the laying of the memorial stone of the town-hall a few days since. It is intended to erect an entirely new building, and to greatly extend the present platform accommodation.

*Bedford.*—The new roadway bridge over the Ouse at Bedford, the foundation-stone of which was laid by the Mayor of Bedford twelve months ago, was opened to the public on Tuesday, October 21st, by Earl Cowper, K.G. Among those present were the Marquis of Tavistock, Lord Charles Russell, Mr. Whitbread, &c. The whole cost, exclusive of land, has been 8,000*l.*, which is within the original estimate of the engineer, Mr. J. J. Webster, of Liverpool. The contractors were Messrs. Pilling & Co., for the masonry, and Messrs. Goddard & Massey for the ironwork.

*Liverpool.*—The City Engineer of Liverpool (Mr. Clement Dunscombe, M.A., M. Inst.C.E.) has been awarded, by the Jury Commission of the International Health Exhibition, a gold medal for his designs for Artisans' and Labourers' Dwellings, and the Corporation of Liverpool have been awarded a Diploma of Honour for the exhibit. These designs embrace the Nash-grove Dwellings, now being erected by the Corporation, under Mr. Dunscombe's supervision, at a cost of 53,000*l.*, exclusive of the value of the site.

## CHURCH BUILDING NEWS.

*Birmingham.*—The church of St. Philip, to which a spacious chancel has recently been built in harmony with the original structure, has been fitted with carved oak choir-stalls, designed specially to suit the Classic architecture of the building. The whole of the work has been carried out, under the immediate supervision of the architect, Mr. Chatwin, of Birmingham, by Messrs. Jones & Willis, of Birmingham, who also made the wrought-iron communion-railings. This firm have also completed a pulpit in oak and iron for the same church.

*Sedgefield.*—The Church of St. Luke, erected at the Durham County Lunatic Asylum, Sedgefield, for the use of the patients and officers of that institution, was consecrated by the Bishop of Durham on the 3rd ult. The church is built of brick, in the Early English style, and consists of a nave, with north and south aisles, chancel, organ-chamber, and vestry (with heating-chamber below), while at each side of the west porch is provided a retiring-room and lavatory, &c., for the use of patients who may be taken ill during the service. The whole of the building, inside and out, is faced with Sherburn House bricks. The moulded strings, plinths, and arches are of pressed bricks made by the Commondale Brick Company; and the

terra-cotta is from the works of Messrs. Doulton & Co., Lambeth. Internally, the nave is divided into six bays by columns built of Commondale pressed bricks, with terra-cotta moulded caps, bases, and bands, and small clustered shafts of polished slate, carrying arches of moulded pressed bricks. The seats in the nave and aisles, and the roof-timbers and joiners' work generally, are of pitch pine; the chancel-seats, reading-desks, and reredos are of oak; the chancel-floor is laid in Maw's encaustic tiles. The pulpit is of Bath stone and alabaster, and has been executed by Messrs. Jones & Willis, of Birmingham, from the architect's designs. The organ was built by Messrs. Willis, of London. Sittings are provided for 715 persons, and the entire cost (exclusive of organ) has been 3,880*l.*, or 5*l.* 8s. 6d. per sitting. The church was designed, and its erection superintended, by Mr. William Crozier, jun., son and chief assistant of the Engineer and Architect for the County of Durham. Mr. Jonathan Johnson, of West Hartlepool, was the sole contractor for the work, and he has carried out his contract in a highly satisfactory manner; the plumbing and gas-fitting he entrusted to Mr. James Laidler; and the painting and glazing to Mr. Phillips, both of the city of Durham. Mr. T. Waite, clerk of works to the Asylum, was clerk of works. The buildings have been heated throughout by hot water by Messrs. Haden & Son, of Trowbridge.

*Huddersfield.*—St. Paul's Church, Armitage Bridge, was re-opened on the 15th ult., after undergoing interior decoration. The chancel walls to a height of 4 ft. are done in a rich russet-red, over which is a diagonal diaper in a lighter shade and in gold, and surmounted by a broad border of sacred monograms worked upon a dull gold ground. The wall space above this is divided by shafting and canopy work into compartments, to allow of the introduction of figure subjects, which latter are painted in a strong outline with the addition of a little colour here and there, and backed up by a dull blue ground. The chief subjects are excerpt from the life of the patron saint. In addition to these large cartoons there are smaller ones; and on either side of the east window figures of St. Peter and St. John. Immediately above the altar are four demi-angels, each holding a riband text "Alleluia," and a larger riband is carried over the table to contain the legend, "Proclaim ye the Lord's death till He come," the whole being worked upon a gold ground upon which is displayed the "fruitful vine." Above this subject-work, the remainder of the walls are diapered in gold and colours, texts being carried over each window and arch, borders and other ornaments emphasising the salient points of the architecture. The roof panels of the chancel are decorated in neutral tints and blue, upon a light stone colour; whilst the wood rafters and principals stand boldly forth in strong and vivid colouring, red, gold, and black predominating. The whole work is from the designs of, and has been executed by, Messrs. Powell Brothers, of Leeds, under the supervision of Mr. W. Swinden Barber, architect, Halifax.

*Bishop's Cannings (Wilts).*—The parish church of St. Mary the Virgin, having been under renovation for the past eighteen months, has just been re-opened. It is a cruciform edifice with a fine Early English tower, surmounted by a Perpendicular spire, which is a marked feature some three miles from Devizes upon the high road to Bath. The tower was very unsafe. It has been underpinned, and is now practically stronger than when first erected. The roofs are partially new, and of massive oak. The walls have been stripped of whitewash, and the masonry everywhere carefully dealt with. The avenues and approaches within the body of the building are laid with old flagstones, and the spaces under the seating with wooden blocking. The chancel has a new encaustic tiled pavement by Messrs. Craven, Dunnill, & Co. There are also some new stalls and an ornate pulpit. These are all of English oak, and by Mr. Harry Hems, of Exeter. The body of the church is filled by massive oak seating. These exhibit upwards of 100 bench-ends, all carved with different designs in figure or in foliage. These also have been supplied by Mr. Hems. The builder was the late Mr. A. Restall, of Bisley, near Stroud, who unfortunately died during the progress of the renovation. Mr. Charles E. Ponting, the diocesan surveyor and architect, of Lockeridge, Marlborough, was the architect. Some 3,500*l.* has been spent on the works.

## The Student's Column.

### ON THE CONSTRUCTION OF ROOFS.

I.

THE roof is in many respects the most important feature of a building, and its design calls forth more of the constructive skill of the architect than any other portion, as the character of the roof regulates to a great degree the strength that is given to the walls which support it. Where the roof is so constructed as to throw a horizontal thrust on the walls, either they must be made of extra thickness or buttresses must be built up against them to prevent them from being overthrown. But where there is no horizontal thrust from the roof we have only to consider what will be its dead weight, and build our supports accordingly.

The object of the roof is to form a waterproof covering that will keep out the weather from the interior of the building. There are several different kinds of material used for the covering of a roof, which is usually laid upon boards or battens nailed upon timbers called *rafters*, to be hereafter described. Roofs are generally inclined at a greater or less angle to the horizontal, in order that the rainwater may be enabled to run off freely into the gutters, and be conveyed away so as not to damage the interior; the angle of slope is called the *pitch* of the roof, and depends very much on the kind of material used for its covering. The materials in common use for this purpose are *lead*, *zinc*, *slates*, *tiles*, and *asphalte*. When either lead, zinc, or asphalte is used the pitch is generally low, but should never be less than 2°, which gives a rise of about 1 in 30. Lead and zinc are, however, frequently laid on roofs of high pitch. When slate or tile is used the angle of pitch should not be less than 27°, giving a rise of 1 in 2.

The best material, but also the most costly for roof-covering, is *lead*, which is laid upon close boarding on which rounded slips of wood, called *rolls*, about 2 in. in diameter have been first nailed from top to bottom in parallel lines 2 ft. to 3 ft. apart. The lead is cut in sheets 10 ft. or 12 ft. long and a few inches wider than the distance between the rolls. It is then laid on the boarding and the edges dressed over the rolls, each sheet lapping over the edge of its neighbour and held down by *lead-headed* nails driven into the rolls. If the pitch of the roof is not very flat, the lower end of the sheet is made to lap about 3 in. over the one below; but in very flat roofs a small step called a *drip* is formed about 2 in. deep at the bottom of the sheet, the end of the lower sheet being turned up against the drip, and that of the upper one turned down so as to lap over it and prevent the rain from driving under the lead. When there is a ridge, a similar roll is spiked to the ridge-piece at the top of the rafters, and a narrow slip of lead is laid thereon and dressed down over the upper edges of the sheets of lead, the ridge being held down by means of lead-headed nails. The weight of the lead for roofing purposes is 6 lb. or 7 lb. to the square foot.

*Zinc* is a material frequently used for roof-covering, and has the advantage of being very light in weight, 22 oz. to 25 oz. per foot being the weight usually employed. It is laid in a manner similar to that described above for lead, but is a very brittle material and much less durable than lead.

*Asphalte* can only be used as a roof-covering when the pitch is very low; it may be laid upon flat tiles placed across the rafters, on which a layer of cement is first laid, and the asphalte poured thereon in a semi-fluid state, when the cement is thoroughly hard. Fine sand may be sifted over the surface of the asphalte while soft, so as to increase its hardness. This material forms a good roof for walking upon, for which purpose it is preferable to lead or zinc, but throws a much greater load on the rafters than either of the former.

The most usual material for covering roofs is *slate*, which is cut into various sizes for roofing purposes, those commonly used being 20 in. by 10 in., called "Countess," and 24 in. by 12 in., called "Duchess." Slates of this kind, when used as roofing, weigh from 7 lb. to 9 lb. on every square foot. In laying slates it is usual to nail narrow *battens* or *slate laths* on the rafters, to which the slates are secured by means of copper or zinc nails driven through two holes drilled in each slate about one-third of its length from the top. Each slate laps half its length *plus* 1½ in. or 1½ in. over that next below it, and 2½ in. or 3 in. over the upper end of the next slate but one below it, this amount of 2½ in. or 3 in., being called the *lap* of the slate.

In some parts of the country *stone slates* are used for roofing, and sometimes called *grey slates*; these are really thin *flags* from ¾ in. to 1½ in. in thickness, and weighing, when laid, about ½ cwt. to the square foot. They have two holes drilled in them through which pegs of hard wood are driven, and by these they are hung on to the laths.

In buildings of a superior class it is usual before laying the slates, to cover the rafters with close boarding, and lay thereon a waterproof material called "asphalted felt"; this is laid horizontally in continuous lengths, each length lapping 1 in. over the one below. On this the slates can be nailed, or, what is better, the slate laths can be laid on the felt and the slates nailed upon them in the manner described above. The advantage of the felting is to keep out the heat in summer from the rooms immediately under the roof, as slate becomes very hot in the sun, and is a good conductor of heat. It also keeps the rooms warmer in winter. Another advantage is, that if any slates are blown off, or if snow drifts under them, the felt prevents the wet from penetrating to the interior.

*Tiling* is a common form of covering to roofs, each tile being generally made with two small hooks on the upper edge, by means of which it is hung on to the laths. There are two distinct kinds of tiles in ordinary use: those called *plain tiles* are made flat, their dimensions being 10½ in. by 6½ in.; these are laid with a *lap* in the same way as slates, and weigh about twice as much per foot. Some tiles have two holes in the upper part to allow of pins being inserted for hanging them on the laths, or for large nails to be driven through. Another form of tile is called *pantile*, which is curved in section, and, when laid, produces a series of ridges and valleys all down the side of the roof, each tile being made to lap over the edge of the one at its side as well as over that next below it. The weight of this tiling is but little more than that of slating. Ornamental tiles of various forms and sizes are also employed for roofing purposes.

The actual weight of the roof-covering is not the only load which the timbers of a roof have to sustain; in fact, it forms but a small part of it, for in northern countries the weight of snow is often a much heavier load, especially where the pitch is not high enough to cause the snow to slide off and prevent it from accumulating. But the chief strain which a roof has to encounter is that produced by the force of the wind when blowing strongly upon one side of it. This is much greater in a roof of high pitch than in one where the pitch is low, for if we consider the direction of the wind to be horizontal and pressing in a gale 40 lb. on every square foot of a surface perpendicular to its direction, then the pressure per foot on a roof having a pitch of 60° will be 30 lb.; on one having a pitch of 45° it will be 20 lb.; and on one of 30 lb. it will be 10 lb.; and, of course, it is nothing on a perfectly horizontal roof. Wind, however, is very capricious in its action, and does not always travel in a horizontal direction, so that at times it might act at right angles to a roof even of very moderate pitch; and, as it presses only on one side of the roof at a time, there is no counterbalancing force on the other side, and a racking strain is consequently thrown upon the timbers. For these reasons it is recommended that a load of 66 lb. per square foot should be taken as the pressure which roofs of ordinary pitch must be expected to bear.

We shall now proceed to consider the means by which the roof-covering is supported, according to the various forms of roof which are adopted.

*Flat Roofs.*—The simplest mode of constructing a roof is to place horizontal beams across from wall to wall, cover them with boarding, and lay thereon lead, zinc, or asphalte as above described; this plan is often adopted for moderate spans, and where it is desired to make use of the roof for some purpose or other. In the South of Europe and in the East flat roofs are more common than in the Northern countries. Such a roof is constructed in the manner we have previously described for "Floors," and the same scantlings of timber may be employed. For short bearings *single-joists* may be laid across and the boarding nailed on them. For longer bearings *binders* or *girders* should be employed. The timbers must never be laid quite level, but have a fall of at least one in

irty, so as to allow the rain-water to flow vay.

When the roof has to be made fireproof, we n lay rolled iron joists and concrete across e opening, and finish with a coating of cement id asphalte, as we before mentioned when nsidering fire-proof floors.

In a flat roof the whole of the weight is rown vertically on the walls, and there is no tward thrust tending to push the walls over, long as the beams retain their horizontal sition. Should, however, the beams be too ght for the load they have to carry, they will ssume a curved form, as A B D, fig. 1, in hich case the roof will act as a wedge to push ne walls asunder, with a force R in A C and

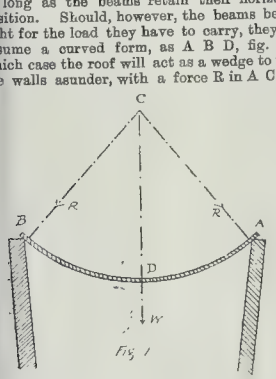


Fig. 1

B C perpendicular to the curved beam at A and B, and the value of R is rather more than one-half of W the load on the centre of the roof; C being the centre of curvature of the arc A D B. A very great outward thrust might thus be produced upon the walls at the part where they are least able to withstand it. This shows us the importance of making the supports of a *flat roof* amply strong and stiff, so as not to bend to any appreciable extent under any load that can possibly be placed on the beams.

## RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

294, Improvements in Ornamental Walls, &c. John Baker Gansby, Birmingham.

This invention principally has reference to the construction of ornamental surfaces for ceilings, walls, or pavements. Pieces or plates of glass, enamel, or other ornaments are fixed to the wall or other surface. Supposing a design is composed of several pieces or plates of different coloured enamels, and these pieces are of different shapes to be worked into the design. In order to connect them together, strips of brass or other ductile alloy are taken with a cross section in the form of a T; or narrow strips having something like a similar section may be employed. These metal strips have at their backs at short intervals pins, studs, or projections for the purpose of fixing the design to the wall or ceiling. The working out of the design by means of the strips, and affixing them to wood, plaster, or metal by this means, is the principal claim of the improvements.

7,546, Improvements in Open Fire-grates or Stoves. Samuel Pickersgill, Derby.

In this improvement of open fire-grates the bars at the front are so bevelled inwards as to make it impossible for the ashes either to lodge on or fall through them on to the hearth, but they will be thrown forward into the fire, where they are either consumed or fall to the bottom, which is provided with a secret ash-pan, which may be removed at convenience. By this plan perfect combustion is ensured, and fuel economised. The fireplace is made something similar to the ordinary manner, but the bottom of the fireplace is formed partly of iron bars so constructed as to allow little refuse or ash to fall between them,—and partly of fire-brick. It is attached to the back, which is also of fire-brick, and is so shaped as to radiate and reflect the heat into the room. The form is convenient, and it is claimed that more heat can be got out of the fuel with less smoke than by any other form of open fire-grate.

38, Improvements in Sanitary Traps. William Henman, Birmingham.

This is an improvement in the form of traps for water-closet and for bath, lavatory, sinks, and urinal wastes, by which security is obtained for the inflow of sewer-gas to buildings. The outer arm of the trap is funnel-shaped, and is made with the soil-pipe below, and with the ventilating or air pipe above. The inner arm or arms are placed at about an angle of 45 deg. to receive the connecting-pipe for the water-closets, baths, or urinals. The trap is of any suitable dimensions, and is made of glazed earthenware, stoneware, or of cast iron, or of iron or metal.

APPLICATIONS FOR LETTERS PATENT.

*Oct.* 17.—13,713, E. Preston, Birmingham, Improvements in Planes, Spokeshaves, and in other analogous Tools or Machines.—13,719, T. W. Helliwell, Halifax, Improved Method of Securing and Fixing to Roofs, Flats, or Sides of Buildings or other Structures, Sheets of Zinc, Copper, Plain, or Corrugated Metal, &c.—13,728, W. Morris, London, Construction and Erection of Bridges.—13,738, J. Carruthers, Carlisle, Shop-window Folding Shutters.—13,750, J. M. Capell, London, Ventilation.—13,761, M. Dennstedt, London, Manufacture and Preservation of Articles of Gypsum, Stucco, or the like.—13,764, R. Davidson and W. H. Wright, London, Immovable Wood Mosaic and Block Flooring, with Pyramidal Dovetail and Fish Joints, and Stain Prevention Chamber.—13,770, T. Elsley, London, Metal Frames for Casement Windows.

*Oct.* 18.—13,779, J. Walker, Birmingham, Attaching Door Knobs to their Spindles.—13,796, J. Smith, Peebles, Folding Tables, Forms, Chairs, Bedsteads, &c.—13,824, E. Grach, London, Mosaic and other Artistic Work.

*Oct.* 20.—13,830, T. H. Angles, Blackburn, Water-closet Flushing Apparatus.—13,841, J. Ennals, West Malling, Combination Closet and Dust-bin.—13,845, D. Cowan, Glasgow, Improvements in Cooking-ranges.—13,859, R. Winder, London, Castors for Tables, Chairs, &c.—13,864, A. E. Finch, London, Excluding Draughts from Doors.—13,867, A. J. Boult, London, Manufacture of Paint.—13,871, M. A. L. Ser, London, Fan for Ventilating Purposes.—13,874, G. Henderson and D. M'Neil, London, Water Waste Preventers.—13,878, W. R. Lake, London, Improvements in Bakers' Ovens.

*Oct.* 21.—13,890, W. Russell, London, Improvements in Stoves, Stove-grates, Mantels, and Overmantels.—13,891, C. J. Elkin, Birmingham, Improvements in Ventilators.—13,907, E. Newman, Birmingham, Window-sash Fastener.—13,909, T. Caink, Malvern, Link Sewer Ventilators.—13,912, C. G. Smith and F. Smith, Birmingham, Rack Action for Opening and Closing Fanlights, Window-Skylights, &c.—13,914, J. James and C. James, Cardiff, Machinery for Sawing or Cutting Wood or other Material.—13,915, P. Rees, Cardiff, Protecting the Edges of Saws and other Tools when not in use.—13,924, A. M. Clark, London, Improvements in Excavators.—13,932, J. C. Mewburn, London, Baking Ovens.—13,943, E. H. Clark, London, Floating Breakwaters.—13,947, W. R. Lake, London, Metallic Lathing.—13,954, W. R. Lake, London, Improvements in Wheels.

*Oct.* 22.—13,977, F. T. Harrington, Liverpool, Bodies of Wheeled Vehicles.—13,981, A. Yates and W. Smith, Halifax, Adjusting the Table of Circular-Saw Frames.—13,987, R. Eccles, Brixton, Improvements in Castors.—13,990, T. Thorley, London, Chimney-breast Ventilators.—13,991, H. Faija, London, Apparatus for Testing the Strength of Cement.—14,000, A. J. Alderman, Bow, Furniture Castors.—14,004, V. Di Tergolina, London, Underframes for Four-wheeled Vehicles.—14,010, H. J. Cooper, London, Manufacture of Portland Cement.

*Oct.* 23.—14,056, J. Macdonald, London, Smoke-testing Apparatus.—14,058, S. Guinery, Epsom, Improvements in Locks and Latches.—14,062, P. J. Wates, London, Improvements in Spanners.—14,064, A. Kohlhofer, London, Improved Construction of Domestic Stoves.

PROVISIONAL SPECIFICATIONS ACCEPTED.

10,982, H. V. R. Read, London, Automatically Opening and Shutting Gates.—11,273, M. Underwood, Devonport, a Method of Construction in Metal, Stone, Wood, or other Material, by Dovetailing.—12,615, A. Sweet, London, Improvements in Water-waste Preventers.—12,712, S. Frankenberg, London, Felt for Roofing and other purposes.—12,788, W. W. Crowder, Kennington, Automatic Bolt, Lock, and Burglar-alarm.—12,901, J. Budd, London, Imparting to Glass the Appearance of Marble or other Stone.—12,902, J. Budd, London, Ornamenting or Decorating Glass in imitation of Mosaic or similar work.—12,935, A. M. Clark, London, Improvements in Auger-bits.—13,076, F. W. Primrose and J. Mellowes, London, Supports for Workmen on Glazed Roofs of Building.—13,364, A. A. Joy, London, Improvements in Sash-fasteners.—13,066, H. H. Jones and B. Jones, Wolverhampton, Metallic Folding Furniture.—13,148, W. H. Lindsay, London, Improvements in Bridges.—13,233, R. Hunter, London, Improvements in Kitchen Ranges.—13,381, H. Wright, London, Mounting, Balancing, and Securing Window-sashes.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

68, N. G. Kimberley, Tottenham, Steam Pile-driving Apparatus.—144, H. Thompson, London, Construction of Domestic Stoves and Grates.—352, H. Knowles, Woodville, Leicester, Ovens for Burning Bricks, Pottery-ware, &c.—526, J. H. Chavasse, Kingswinford, Improvements in Pavements, Wall Surfaces, &c.—790, G. Homewood, Cuckfield, Water Waste-preventers for Water-closets.—907, C. Clayton, East Dulwich, Finger-plates for Doors, and Means of Fixing the same.—985, A. Walker, Falkirk, Kitchen Ranges.—12,115, R. Booth and R. W. Booth, Dublin, Flooring Clamp.—12,319, G. R. Postlethwaite, Birmingham, Drill Braces.—133, J. Croft, London, Wooden Pavements.—899, F. C. Biddiscombe, Manchester, Cisterns for Water-closets, Urinals, &c.—1,366, E. H. Baxter, Birmingham, Cupboard Fasteners.—3,998, C. J. Henderson, Edinburgh, Construction of Stoves, and Ventilating Apparatus for same.—4,802 S. Morley, Stockton-on-Tees, Whitewashing Brushes.—7,280, G. W. Potter, Hampstead, Door Letter Boxes.—9,450, M. Tobin, Uxbridge, Ventilating Dwellings and other Structures.

## RECENT SALES OF PROPERTY.

OCTOBER 24.

By BAKER & SON.

| | |
|---|---|
| Minories—1 & 4, Vine-street, 17 years, ground-rent 200*l.* | £800 |
| Westbourne Park—36, Fernhead-road, 79 years, ground-rent 6*l.* 10*s.* | 340 |
| Oxford-street—The lease of 27, Rathbone-place, term 18 years | 10 |

OCTOBER 27.

By J. H. GREEN & SON.

| | |
|---|---|
| Hammersmith—99, Brackenbury-road, 96 years, ground-rent 8*l.* | 400 |

By WESTON & SON.

| | |
|---|---|
| Peckham—225, Queen's-road, freehold | 680 |
| Canning Town—38—46 even, Fisher street, freehold | 1,240 |

By THOMAS WARNEFIELD.

| | |
|---|---|
| Barnes—1, 2, & 3, Charlton Cottages, freehold | 650 |
| Tottenham—13, Brunswick-road, freehold | 530 |

OCTOBER 28.

By ALFRED RICHARDS.

| | |
|---|---|
| Stoke Newington—68 & 70, Cowper-road, 74 years, ground-rent 7*l.* | 740 |

By VENTOM, BULL, & COOPER.

| | |
|---|---|
| Lewisham—44, Limes-grove, 70 years, ground-rent 5*l.* | 300 |

By HORNE, SON, & EVERSFIELD.

| | |
|---|---|
| Brixton—78-96 even, Barrington-road, 39 years, ground-rent 25*l.* | 3,020 |
| Walworth—54, Finchley-road, 66 years, ground-rent 4*l.* | 720 |
| 237, Hill-street, 66 years, ground-rent 6*l.* | 620 |
| 146, Lorrimore-road, 66 years, ground-rent 8*l.*, and a ground-rent of 13*l.* a year, term 66 years | 420 |
| Portman Estate—58, Crawford-street, and 19, Homer-street, 4 years, ground-rent 10*l.* | 100 |
| 59 & 60, Crawford-street, 4 years, ground-rent 11*l.* | 365 |
| Paternoster-row—Lovell's court, 2,880 ft., term 80 years, let at 290*l.* per annum. | |

By DRIVER & CO.

| | |
|---|---|
| Brunswick-square—Improved rents of 50*l.* a year, term 23 years | 505 |

By JOHN REVILL.

| | |
|---|---|
| Kentish Town—129 & 133, Prince of Wales-road, 67 years, ground-rent 14*l.* | 840 |

By HARDS, VAUGHAN, & JENKINSON.

| | |
|---|---|
| Lee—50, Church-street, 43 years, ground-rent 2*l.* 2*s.* | 210 |
| Sevenoaks—The freehold residence, Croftside | 800 |

By DEBENHAM, TEWSON, FARMER, & BRIDGWATER.

| | |
|---|---|
| Kent, Horns Cross—The residence "Barnesfield," and 2a 0r. 35p. freehold | 2,550 |
| Two freehold cottages, with gardens | 710 |

By PROTHEROE & MORRIS.

| | |
|---|---|
| Leytonstone—Ground-rent of 7*l.* 10*s.* a year; reversion in 75 years | 165 |
| Ground-rent of 6*l.* a year; reversion, 71 years | 120 |
| Leyton—Beaumont-road, a plot of freehold land | 160 |
| Milton-road, two plots of freehold land | 285 |

OCTOBER 29.

By FULLER, HORSEY, SONS, & CASSELL.

| | |
|---|---|
| Fleet-street, Bouverie-street—A plot of freehold land, area 300 ft. | 2,130 |

By BROWN, ROBERTS, & CO.

| | |
|---|---|
| South Lambeth-road, Nos. 74-84 even, freehold | 6,900 |

By JAMIESON & HANHAM.

| | |
|---|---|
| Putney—The Platt, Clarence House, 67 years, ground-rent 8*l.* 4*s.* | 540 |

J. G. & A. PREVOST.

| | |
|---|---|
| Mile End—37-49 odd, Ernest-street, 80 years, ground-rent 36*l.* | 1,080 |
| Nos. 354, 356, & 358, Mile End-road, 35 years, ground-rent 40*l.* | 790 |

FRANK JOLLY & CO.

| | |
|---|---|
| Mile End—25, 27, & 29, Ernest-street, 80 years, ground rent 18*l.* | 600 |
| Leytonstone—Barclay-road, "Belmont House," 93 years, ground-rent 5*l.* | 475 |

OCTOBER 30.

By C. & H. WHITE.

| | |
|---|---|
| Brixton—15, Ingleborough-street, 40 years, ground-rent 2*l.* | 260 |
| 41 & 42, Thornton-street, 40 years, ground-rent 6*l.* 15*s.* | 660 |

By RICE BROTHERS.

| | |
|---|---|
| Hove, Brighton—53, Waterloo-street, freehold | 1,500 |
| Hackney—Mare-street, "The Old Ship," freehold | 1,650 |
| 305, Mare-street, and a cottage, freehold | 1,500 |

By NEWSON & HARDING.

| | |
|---|---|
| Hoxton—11-23, Upper John-street, 15 years, ground-rent 35*l.* 2*s.* | 1,115 |
| Canonbury—20, Clephane-road, 63 years, ground-rent 5*l.* | 700 |
| Hackney—2, Bentham-road, 50 years, ground-rent 4*l.* | 230 |
| Homerton—53, Holmbrook-street, 43 years, ground-rent 4*l.* 5*s.* | 135 |
| Battersea—Ground-rents of 24*l.* a year; term, 82 years | 415 |
| Peckham Rye—Ground-rents of 45*l.* a year; term, 70 years | 805 |
| 38-44 even, Philip-road, 70 years, ground-rent 18*l.* | 1,005 |

By E. STIMSON.

| | |
|---|---|
| Bermondsey—Swan Mead, freehold manufacturing premises | 1,830 |
| New Cross—11 & 13, Briant-street, 36 years, ground-rent 8*l.* | 350 |

| | |
|---|---|
| Brixton—48, Josephine-avenue, 81 years, ground-rent 9*l.* | 700 |
| 52, Stockwell Park-road, 42 years, ground-rent 10*l.* | 395 |
| Nunhead Green—46, Tappesfield-road, 92 years, ground-rent 4*l.* 15s. | 90 |
| Brixton—23, Josephine-road, 83 years, ground-rent 9*l.* | 575 |

## MEETINGS.

SATURDAY, NOVEMBER 1.

*Association of Public Sanitary Inspectors.*—Monthly Meeting, 1, Adam-street, Adelphi. 6 p.m.

MONDAY, NOVEMBER 3.

*Royal Institute of British Architects.*—Opening Meeting of the Session. Address by the President. 8 p.m.

*Clerks of Works Association.*—Monthly Meeting, 31, Spring-gardens. 7 p.m.

TUESDAY, NOVEMBER 4.

*Society of Biblical Archæology.*—Meeting at 9, Conduit-street, W. The following papers will be read:—(1) Some Religious Texts of the Early Egyptian Period, preserved in Hieratic Papyri in the British Museum, by P. le Page Renouf. (2) Notes on some fragments of Papyri, exhibited by permission of the Secretary of the Science and Art Department, by Dr. Birch. (3) Notes on some Egyptian Sepulchral Tablets, principally of the XVIII. Dynasty, by E. A. Budge. 8 p.m.

WEDNESDAY, NOVEMBER 5.

*Institution of Mechanical Engineers.*—Meeting in the Lecture Theatre, University College, Nottingham. The following papers will be read and discussed, as far as time will admit: (1) On the Mineral Wagons of South Wales, by Mr. Alfred Slater, of Gloucester. (2) On the application of Electro-Magnets to the working of Railway Signals and Points, by Mr. Ellius A. Timmis, of London. (3) Second report on Friction Experiments, by Mr. Beauchamp Tower, of London.

*Shorthand Society* (Victoria-chambers, Chancery-lane). Opening Meeting of the Session. Address by the President, Mr. Thomas Allen Reed. 8 p.m.

THURSDAY, NOVEMBER 6.

*Builders' Benevolent Institution.*—Thirty-seventh Anniversary Dinner, at the Freemasons' Tavern, Mr. Stanley G. Bird, President, in the chair. 5.30 p.m.

FRIDAY, NOVEMBER 7.

*Architectural Association.*—Mr. J. D. Sedding on "The Modern Architect and his Art." 7.30 p.m.

## Miscellanea.

**Cambridge Antiquarian Society.**—At a general meeting of this society on the 20th of October, Mr. J. W. Clark, M.A. (president), in the chair, Mr. A. G. Wright, of Newmarket, exhibited (1878) a Roman bronze earring and a Mediæval bronze signet-ring, both found at Stony Hall, Lakenheath, early in this present year; also a photograph of a rare palæolithic implement from New Park, March. Mr. Lewis exhibited a well-preserved first brass of Marcus Aurelius, *rev.* HONOS, with portrait of the Emperor erect, olive-branch and cornucopiæ (141 A.D.), which had been found in 1883 at Litlington, in this county. Mr. Browne exhibited an outlined rubbing of the Wilne font, a very intricate and elaborate piece of Early work, with twelve bold characters round the base, supposed to be Runic or Oriental, and in the latter case probably Palmyrene. The font is a portion of what must have been a very remarkable column, turned upside down, and when the rubbing is turned the other way up it is found that the twelve bold characters are the feet and ankles of six human figures, cut off at the point where the pillar was broken before it was turned up and hollowed to form a font.

**Election of a Surveyor.**—At a meeting of the Chelsea Vestry on the 21st ult., the Finance Committee reported that they had considered the eighty-two applicants for the post, and out of the number selected, six, who were now in attendance, and each, in his turn, addressed the Vestry, and answered the questions put to him. The Vestry then proceeded to a ballot, the result being the election of Mr. Strachan, by a large majority. Fifty vestrymen voted, and of these the papers of four were declared informal. A corresponding clerk was also elected.

**Proposed New Post-office at South Shields.**—The Post-office authorities have decided upon building a new post-office at South Shields. The step has been decided upon in consequence of the present building being inadequate to meet the requirements of the largely-increasing business in the various departments. The new post-office will be designed on a large scale, and will contain ample accommodation for the public and officials.

**The Clock at Great Houghton Church.**—The church at Great Houghton has just been enriched by having a large new clock fixed in the tower, which strikes the hours on a large bell, and shows the time on two dials, each 4 ft. diameter. Messrs. John Smith & Sons, Midland Clock Works, Derby, have carried out the work.

**Glasgow Institute of Architects.**—At the annual meeting of the Glasgow Institute of Architects, the sixteenth report of the Council was read. It was mentioned that the draft of a proposed Building Act, separate from the Police Bill, having been drawn up and submitted by the president, a committee was appointed as to the matter. After various discussions the draft was printed, and a copy sent to each member of the Council. At several meetings of the Council the draft was gone over and revised, after which a printed copy was sent to all members of the Institute. Thereafter the draft Act was considered and adopted at a meeting of the Institute, and Messrs. James Thomson, president, Campbell Douglas, and John Honeyman, past-presidents, were appointed a deputation to wait on the Lord-Advocate and confer with him on the subject. It was agreed that while a separate Building Act would be most desirable, yet if absolutely necessary, rather than have delay they should agree to the Building Act forming part of the proposed Burgh Police and Improvement (Scotland) Act. The Burgh Police and Improvement (Scotland) Act having in the previous session of Parliament failed to pass the House of Commons, a new Bill was brought in by the Lord-Advocate in the course of last session. This Bill was found to be, so far as the architectural and other kindred clauses were concerned, substantially a reprint of the former Bill, no effect having been given to the suggestions of the Institute. The Bill was referred to a Select Committee of the House of Commons, and it was ascertained that the only way in which the members of the Institute might now have effect given to the suggestions was to forward a written statement of these to the members of the committee. A copy of the draft prepared by the Institute was accordingly forwarded to several members of the committee, but, owing to the Bill having been dropped by the Government, no legislation has yet taken place. The committee have given much attention to the examinations in architecture held in Glasgow in February, under the auspices of the Royal Institute of British Architects. The Council and the past-presidents were appointed a committee to take charge of the examination. In this they were assisted by Mr. Arthur Cates, chairman of the Board of Examiners, and Mr. J. Macvicar Anderson, honorary secretary of the Royal Institute of British Architects. The Council think that these examinations will prove very beneficial to the profession, and hope that a larger number will come forward when the next examination is held.

**Removal of Gates and Bars in the Metropolis.**—On the 16th ult. the Sanitary Committee of the Vestry of St. James, Westminster, recommended that the Vestry support the memorial adopted by a conference of representatives from various local authorities, recently held at St. Pancras, asking the Metropolitan Board of Works to introduce a Bill in the ensuing session of Parliament, for the removal of all gates, bars, &c., from the streets where the cost of paving and lighting, maintaining, and sewering such streets is defrayed out of the rates. Mr. Bonthron vigorously opposed the proposition that the ratepayers should give compensation. Let the ground landlords do it. By what natural right had these landlords put up bars and gates? He denied their right to block up the public thoroughfares on their estates. He did not deny that the tenants were entitled to compensation; but let them get it from the landlords who had put up the gates. The Vestries should act all together in this matter, for what affected one part of London affected every other part. The motion to adopt the recommendation was carried with only a few dissentients.

**Pontefract Drainage Scheme and Street Improvements.**—The Corporation of Pontefract have just completed the whole of the drainage scheme, extending throughout the borough, at a cost of about 20,000*l.* The works have been carried out by the contractor, Mr. John Simpson, of Hunslet, Leeds. The outfall works are situate about two miles from the town.

**Hydraulic Power.** — Messrs. Archibald Smith & Stevens, of Queen's-road, Battersea, have just completed a new hydraulic cylinder and crane for Southwark Wharf, Bankside. This forms another set of machinery worked in connexion with the Hydraulic Power Company's mains.

**"Buried" in a Caisson.**—An accide
singular in its character and most remarka
in the escape of those involved in it, is report
from Havre de Grace, Maryland. The Bal
more and Ohio Railroad Company are c
structing a new bridge over the Susquehan
river, and on October 1 the outer shell or coff
dam of the caisson sunk as the foundation f
one of the piers gave way. The crib and a
lock shaft were flooded, and the worki
chamber rapidly filled. Most of the men g
out safely before the accident occurred, b
six men were imprisoned in the submari
chamber. The caisson in question is larg
than any of the others sunk for the bridge.
is 60 ft. long and 40 ft. wide, and at the ti
of the accident the working chamber was 60
below the surface of the water. The entran
to the caisson proper is made through a p
pendicular iron shaft about 3 ft. in diamet
with foot and hand holes on either side. It
divided into locks, each lock having a ga
When the men descend, the lock tender wi
draws the air and the gate falls, and the l
man down lifts the gate. When the bott
gate is opened, the air rushes in, thus holdi
the top gate in position. The same process
repeated until the working chamber is reach
which is lighted by electricity. The air in t
chamber, beyond being a little oppressive,
said to be not unpleasant. The men w
working under a pressure of 28 lb. at the ti
of the collapse, and when the lock flooded,
only entrance or exit to and from the cais
was cut off. The air apparatus, howev
fortunately continued at work, and this w
the men's salvation. They remained
their prison helpless until rescued by
superintendent, Mr. John O'Brien, who c
ceived an ingenious plan, and proceeded to p
it into practice. The outer lock was 5 ft. un
water, and the next lock, which was 15 ft. de
was full of water. Mr. O'Brien made a coff
dam of boards, and caulked it tightly w
cakum and cement. Then he baled out t
water, descended, and raised the flooded lo
and baled that out. He then descend
through his rudely-constructed shaft, and s
cessfully rescued the six men from th
perilous situation, in which they had been
five hours. The operations were natura
watched with the greatest anxiety.—*Iron.*

**Proposed Ferry at Greenwich.**—At t
meeting of the Lewisham Board of Works,
the 22nd ult., Mr. Hughes said it had be
decided to have a ferry from Greenwich to t
other side of the river. The original propo
was a ferry from Horseferry-road to Greenwi
but he pointed out that that would com
people to go through back streets, and th
inasmuch as the Metropolitan Board would ha
to compensate the proprietors of the existi
ferry, it would be as well to have their premis
The committee agreed to recommend t
acquirement of the premises.

**The Tay Bridge.**—It is stated that i
portant negotiations are in progress betwe
the directors of the North British Railw
Company and the city of Perth, with the vi
of very considerably reducing the height of t
Tay Bridge. It is understood that the heig
proposed in the negotiations is 55 ft. at t
highest part of the bridge, and that the s
to be paid to the City of Perth by the No
British Railway Company in return for t
concession would be upwards of 90,000*l.*
alteration in the height of the bridge can
made without the sanction of Parliament.

**Completion of the Esk Viaduct.**—T
Esk Viaduct, which carries the new line of
Scarborough and Whitby Railway over t
river Esk, is now practically completed, a
on the 24th ult. a large party was conve
across it for the first time, in the presence
a crowd of people. The viaduct, which is c
structed of red brick, is 913 ft. long and 125
high, with twelve piers and thirteen arches
an average span of 60 ft. The viaduct is t
last link needed to connect Middlesbrough a
the teeming population of Cleveland with Sc
borough.

**Strike of Riveters on the Clyde.**—T
riveters of Messrs. Robert Napier & So
Govan, have struck work for higher rates
wages. Owing to the depressed condition
trade on the river, the strike is engaging a g
deal of attention in shipbuilding circles, wh
its latest development,—namely, the empl
ment of non-unionists,—seems to have crea
a bad feeling amongst the operatives m
immediately interested in the event.

**New South Wales Marble.**—According to the Immigration Agent for New South Wales, several beds of very fine marble or crystalline limestone occur in different parts of the Colony, as at Wollondilly, whence one of the marbles, used in paving the great hall of the University, the Post-office, and other public buildings in Sydney, has been obtained. Much of the Wollondilly so-called "white marble" is of a creamy tint, variegated with pale red and light blue streaks. A slate-coloured marble, used in the same buildings, is brought from Marulan, near Goulburn. There is a beautiful white saccharoid marble at Cow Flat, near Bathurst, a brecciated slate-coloured marble streaked with white calcite occurs at Wallerawang, county Cook. Beautiful marbles occur at Mudgee and Orange; also at Wellington, celebrated for its caves. At Bangalore, on the Goulbourn Plains, there is found a white crystalline marble; at Yass and Queanbeyan, county Murray; good grey and white crystaline marbles are found along the banks of the Murrumbidgee; the Belubula River and the Conomodine Creek, in the Orange District. Blue-grey limestone at Warialda, county Burnett. The outcrops of small seams of grey crystalline limestone or marble are seen exposed in the Minumurra Creek, near Jamberoo, county Camden, interbedded with the coal, shale, and sandstones of that district. A specimen from a 2-in. band in the Minumurra Creek was slightly crystalline, of a grey colour, with a few thin streaks of a lighter colour. Small patches of a pale green mineral were detected in parts, something like glauconite in appearance.

**Arbroath.**—Two more three-light Munich windows have been erected in St. Mary's Church, Arbroath; one by subscription, in memory of the late Rev. W. Henderson, fifty-one years pastor, and representing the "Good Samaritan," the other by Dr. J. Traill, in memory of his brother and his son, and representing "Christ Healing the Sick." The artists were Messrs. Mayer & Co.

**Scarcity of Water in Manchester.**—Manchester is threatened with a water famine, the continuous dry weather having so reduced the stock that four of the great reservoirs are quite dry, cattle grazing on ground formerly covered with water. The gathering-ground is 19,000 acres of moorland around the Longdendale Valley, between Manchester and Sheffield, and the supply is distributed not to Manchester only, but to Salford and the surrounding districts, so that a total population of 750,000 is involved. Mills, dyeworks, and other industries will be stopped unless there be rain. Thirlmere, which the Manchester Corporation obtained Parliamentary powers to purchase, is not yet available for water supply, and will not be for years. Inquiries made on Saturday, however, showed that the danger is not now so great as it was a month ago. The report then made was that there was sufficient water in the reservoirs to meet only thirty days' consumption; and upon this being made known to the committee, they ordered that watering of the streets should cease, and that the use in the parks should be restricted. It is believed that but for the fact that the Gorton reservoir allowed the storage of what would have run to waste at Longdendale, there would have been a famine ere now.

**The New Liberal Clubhouse in Northumberland-avenue.**—Immediately opposite to the Hotel Metropole in Northumberland-avenue, the new building for the National Liberal Club is to be erected, of which Mr. Gladstone and Earl Derby are to lay the first stone on November 4th. Mr. Waterhouse is the architect.

**Staple Inn, Holborn.**—*Truth* says that the "ancients" of Staple Inn have recently completed the sale of their property to Messrs. Trollope, the well-known builders, for 80,000*l*. If there be any truth in the rumour all lovers of the picturesque must hope that the quaint old houses and gateway at Holborn Bars are not to be removed.

## COMPETITIONS AND CONTRACTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Wrought-Iron Bridge | Swindon New Twn. L. B. | 25*l*. | Dec. 1st | i. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Outfall Sewers | Frome Local Board | P. Edinger | Nov. 3rd | ii. |
| Beech Wedges | Admiralty | *Official* | Nov. 4th | i. |
| Cast-Iron Work | Commissnrs of Sewers | do. | do. | ii. |
| Chocolate Cases | Admiralty | do. | Nov. 6th | i. |
| Broken Granite | Walthamstow Lcl. Bd. | do. | do. | xx. |
| House Paving | Dartford Local Board | do. | Nov. 7th | ii. |
| Broken Granite | do. | do. | do. | ii. |
| Alterations and Additions to Queen's Hotel, Leeds | Midland Railway Co. | A. A. Langley, C.E. | do. | ii. |
| Well Boring | Southampton Corporatn | *Official* | Nov. 8th | ii. |
| New Post-office, Bradford | Commissnrs. of Works | do. | Nov. 10th | ii. |
| Bridge on Fulsham Estate | Owners | Elworthy & Son | do. | xx. |
| Sewerage and Paving | Belfast Town Council | J. C. Bretland | Nov. 11th | ii. |
| Paving Works | Greenwich Bd. of Wks. | *Official* | Nov. 12th | xx. |
| Road Making and Paving | Fulham Board of Wrks | do. | do. | ii. |
| Erection of Retort House | Isle of Thanet Gas Co. | H. E. Jones, C.E. | Nov. 13th | ii. |
| Road Making, New Windsor | Barrett's Bottling Co. | T. V. H. Davison, C.E. | Nov. 15th | ii. |
| Factory, Vauxhall | | E. Rawlings | Postponed to Nov. 17th | i. |
| Construction of Embankment | Rochester Corporation | W. Banks | do. | xx. |
| Works and Repairs (Hampton Court, Kew, and Richmond District) | Commissioners of Works | *Official* | Nov. 24th | ii. |
| Construction of Sewers | Met. Board of Works | *Official* | Nov. 28th | i. |
| Main Drainage Works | Acton Local Board | do. | Dec. 2nd | ii. |
| Heating Apparatus | "Invicta" Club | | Not stated | xx. |

### TENDERS.

For new workhouse at Mitcham, for the Guardians of the Poor of the Holborn Union, to accommodate 1,000 inmates, and with administrative offices for 1,200 inmates. Messrs. H. Saxon Snell & Son, architects, 23, Southampton Buildings, London:—

| | |
|---|---|
| Nightingale | £64,636 0 0 |
| Kirk & Randall, Woolwich | 64,034 0 0 |
| Gabbutt, Liverpool | 61,495 0 0 |
| Adcock, Dover | 60,753 0 0 |
| Mowlem & Co. | 59,750 0 0 |
| Peto Bros. | 58,698 0 0 |
| Howell & Sons | 57,495 0 0 |
| Wall Bros. (accepted) | 57,461 0 0 |

Accepted for projected sewer work in Bath-street and King-street, for the St. Luke's Vestry:—

*Bath-street.*

C. Killingback ..... £490 0 0

*King-street.*

C. Killingback ..... 75 0 0

For the erection of premises at Limehouse, for the London and County Banking Company. Mr. Zeph King, architect:—

| | |
|---|---|
| Rider & Son | £8,158 0 0 |
| Higgs & Hill | 7,884 0 0 |
| J. H. Johnson | 7,880 0 0 |
| W. Shurmur | 7,583 0 0 |
| A. Bush | 7,320 0 0 |
| Holloway Bros. | 7,298 0 0 |
| T. Boyce | 7,275 0 0 |
| Perry & Co. | 7,220 0 0 |
| W. Bangs | 6,983 0 0 |
| J. Morter | 6,967 0 0 |

For alterations and additions at the Swan Hotel, Woburn Sands. Messrs. Usher & Anthony, architects. Quantities supplied:—

| | |
|---|---|
| E. George, Woburn Sands | £699 0 0 |
| G. Harrison, Bedford | 698 0 0 |
| S. Foster, Bedford | 695 0 0 |
| J. P. White, Bedford | 677 0 0 |
| W. Sharrett, Woburn Sands | 500 0 0 |

For building Sexey's County School, at Doulting, Shepton Mallet, Somerset, for the Visitors of Hugh Sexey's Hospital, Bruton. Mr. George J. Skipper, architect, Opie-street, Norwich. Quantities by the architect:—

| | |
|---|---|
| Jones & Co. | £13,713 0 0 |
| Clarke | 13,359 0 0 |
| Gibson | 13,131 0 0 |
| Sanders | 12,439 0 0 |
| Stephens & Bastow | 12,300 0 0 |
| Clarke & Son | 12,046 0 0 |
| Davis | 11,980 0 0 |
| Green | 11,980 0 0 |
| Bull & Co. | 11,798 0 0 |
| Krauss | 11,517 0 0 |
| Hawkins | 10,904 0 0 |
| Emery, Shepton Mallet (accepted) | 10,600 0 0 |

For the enlargement of school, Portman-place, Globe-road, for the London School Board. Mr. E. R. Robson, architect:—

| | |
|---|---|
| F. & F. J. Wood | £8,727 0 0 |
| J. F. Sargeant | 8,186 0 0 |
| Steel Bros. | 7,949 0 0 |
| W. Shurmur | 7,768 0 0 |
| J. R. Hunt | 7,695 0 0 |
| Perry & Co. | 7,633 0 0 |
| E. C. Howell & Son | 7,480 0 0 |
| Atherton & Latta | 7,450 0 0 |
| J. Grover | 7,445 0 0 |
| W. Scrivener | 7,445 0 0 |
| J. Pritchard | 7,345 0 0 |
| T. Oldrey | 7,200 0 0 |
| C. Cox | 7,158 0 0 |
| S. J. Jerrard | 7,149 0 0 |
| Stimpson & Co. | 7,086 0 0 |

For the erection of club house, Park Butts, Kidderminster, for Mr. D. W. Goodwin. Mr. J. M. Gething, architect, Kidderminster:—

| | |
|---|---|
| Binnian & Son | £2,075 0 0 |
| Howard & Sons | 2,009 0 0 |
| C. A. Horton | 1,956 0 0 |
| R. Thompson | 1,945 0 0 |
| H. Smith | 1,9 0 0 0 0 |
| Hilton & Sons | 1,900 0 0 |
| W. T. Bennett | 1,867 0 0 |
| Bradney & Co. | 1,799 0 0 |
| Jno. Guest | 1,775 0 0 |
| Dorse & Son | 1,728 0 0 |
| J. H. Bate (accepted) | 1,630 0 0 |

For house at Skipton, for Mr. George Robinson (exclusive of stable and coachhouse). Mr. F. J. Robinson, architect, Derby. Quantities by Mr. J. E. Smith:—

| | |
|---|---|
| Lewis & Son, Great Harwood | £3,340 0 0 |
| Haworth & Roberts, Skipton | 3,292 0 0 |
| Armitage & Hodson, Leeds | 3,218 0 0 |
| Wm. Clegg, Accrington | 3,216 0 0 |
| Abbott & Son, Blackburn | 3,200 0 0 |
| H. Brassington, Settle | 3,109 0 0 |
| Wm. Foster, Bingley (accepted) | 3,050 0 0 |

For the erection of a public hall, museum, and literary institute at Street, near Glastonbury, Somerset, for Mr. William S. Clarke, Greenbank-street. Mr. George J. Skipper, architect, Opie-street, Norwich. Quantities by the architect:—

| | |
|---|---|
| Merrick | £3,797 0 0 |
| Pollard | 3,753 0 0 |
| Hawkins, Glastonbury (accepted) | 3,675 0 0 |

Accepted for the erection of a school to provide accommodation for 1,000 children, on the site in Queen's Head-street, Finsbury:—

| | |
|---|---|
| J. R. Hunt, St. Paul's Works, Bow Common* | £12,389 0 0 |

* Subject to the assent of the Education Department of the School Board.

For barracks, Runcorn. Mr. E. J. Sherwood, architect, No. 101, Queen Victoria-street, London:—

| | |
|---|---|
| H. White, Runcorn | £2,303 0 0 |
| J. Wilson, Runcorn | 2,150 0 0 |
| Stelfox & Carter, Northwich | 1,934 17 5 |
| J. Littler, Fir Bank, Frodsham | 1,825 0 0 |
| Wm. Holt, Cheetham, Manchester | 1,833 0 0 |

[Architect's estimate, 1,811*l*.]

For building stable and washhouse in Sherwood Rise, First Avenue, for Mr. Charles Hibbert. Mr. Charles Wright, architect. Quantities supplied:—

| | |
|---|---|
| H. Lane, Park-street | £463 0 0 |
| Baines & Turton | 443 0 0 |
| H. Vickers | 423 0 0 |
| G. Smith | 414 0 0 |
| Taylor & Chester | 399 0 0 |
| E. Hind | 398 0 0 |

For the erection of Masonic Hall at Barmouth, for Mr. Samuel Pope, Q.C. Mr. Thomas Roberts, Assoc.-M. Inst. C.E., architect:—

| | |
|---|---|
| Jones, Arthog | £1,300 0 0 |
| Jones & Lloyd, Portmadoc and Criccieth | 1,190 0 0 |
| Jones & Edward, Barmouth | 1,180 0 0 |
| Jones Portmadoc | 1,135 0 0 |
| Roberts & Evans, Portmadoc and Harlech | 1,047 0 0 |
| Hughes, Portmadoc | 1,017 0 0 |
| Thomas, Parry, & Co., Llanbedr | 931 0 0 |
| Jones, Thomas, & Williams, Barmouth | 921 0 10 |
| Owens, Barmouth | 912 0 0 |
| Davies, Barmouth | 847 0 0 |
| Roberts & Williams, Talsarnau and Harlech | 840 9 2 |

* Accepted subject to a slight modification.

For the erection of model dwellings at Limehouse. Mr. Walter Stair, architect:—

| | |
|---|---|
| J. W. Bolding (accepted) | £4,300 0 0 |

For the erection of villa at Chingford, Essex. Mr. Walter Stair, architect:—

| | |
|---|---|
| Barkel | £536 0 0 |
| Cushen | 485 0 0 |
| Freeman | 459 0 0 |

For building new schools at Edward-street, for the School Board for London. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| Hobbs | £11,400 | 0 | 0 |
| Turtle & Co. | 11,094 | 0 | 0 |
| Grover | 10,567 | 0 | 0 |
| Cox | 10,556 | 0 | 0 |
| Stimpson & Co. | 10,535 | 0 | 0 |
| Scrivener & Co. | 10,520 | 0 | 0 |
| Downs | 10,484 | 0 | 0 |
| Wall Bros. | 10,462 | 0 | 0 |
| Atherton & Latta | 10,409 | 0 | 0 |
| Bangs | 10,340 | 0 | 0 |
| C. Wall | 10,330 | 0 | 0 |
| Hart | 10,300 | 0 | 0 |
| Lathey Bros. | 10,232 | 0 | 0 |
| W. Johnson | 10,182 | 0 | 0 |
| Kirk & Randall | 10,114 | 0 | 0 |
| Jerrard | 10,039 | 0 | 0 |
| Wm. Oldrey | 10,000 | 0 | 0 |
| Holloway | 9,861 | 0 | 0 |

For building new schools at Settles-street, for the London School Board. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| Holloway Bros. | £8,676 | 0 | 0 |
| T. & T. J. Wood | 8,514 | 0 | 0 |
| N. & F. Croater | 8,482 | 0 | 0 |
| W. Goodman | 8,473 | 0 | 0 |
| J. Outhwaite & Son | 8,466 | 0 | 0 |
| H. L. Holloway | 8,447 | 0 | 0 |
| Stimpson & Co. | 8,440 | 0 | 0 |
| J. Grover | 8,380 | 0 | 0 |
| Howell & Son | 8,376 | 0 | 0 |
| Lathey Bros. | 8,375 | 0 | 0 |
| Bangs & Co. | 8,3 0 | 0 | 0 |
| Steel Bros. | 8,285 | 0 | 0 |
| W. Shurmur | 8,271 | 0 | 0 |
| Wall Bros. | 8,266 | 0 | 0 |
| Chas. Cox | 8,240 | 0 | 0 |
| Kirk & Randall | 8,115 | 0 | 0 |
| W. Oldrey | 8,100 | 0 | 0 |
| S. J. Jerrard | 8,069 | 0 | 0 |
| W. Johnson | 8,034 | 0 | 0 |
| Atherton & Latta | 7,995 | 0 | 0 |

For building a new villa residence at Kilburn, for Mr. T. Brocke. Mr. W. C. Styche, architect:—

| | | | |
|---|---|---|---|
| Higgon | £3,310 | 0 | 0 |
| Writer & Sons | 2,886 | 0 | 0 |
| H. B. Oldrey | 2,840 | 0 | 0 |
| Dentin | 2,795 | 0 | 0 |
| Watson | 2,787 | 0 | 0 |
| W. Oldrey | 2,600 | 0 | 0 |
| Harris | 2,553 | 0 | 0 |
| W. J. Taylor | 2,444 | 0 | 0 |

Accepted for second hand paving works and relay of old materials, for the Vestry of St. Luke:—

| | | | |
|---|---|---|---|
| Mowlem & Co. | £1,933 | 0 | 0 |

And 1s. per yard respectively.

For mason's work in connexion with the Bedminster Pleasure grounds, Bristol:—

| | | | |
|---|---|---|---|
| Yalland | £1,041 | 0 | 0 |
| Howell & Son | 1,008 | 0 | 0 |
| T. Hatherly | 980 | 0 | 0 |
| Cryer | 864 | 0 | 0 |
| Osborne | 842 | 0 | 0 |
| Church | 794 | 0 | 0 |
| Rossiter | 785 | 0 | 0 |
| A. Krauss | 737 | 0 | 0 |
| H. Rossiter (accepted) | 640 | 0 | 0 |

For works at the open space, Newfoundland-road, Bristol:—

| | | | |
|---|---|---|---|
| Howell & Son | £589 | 0 | 0 |
| Yalland | 499 | 0 | 0 |
| Osborne | 479 | 0 | 0 |
| Williams & Prosser | 450 | 0 | 0 |
| J. Cryer | 430 | 0 | 0 |
| Hatherly | 427 | 0 | 0 |
| Church | 399 | 0 | 0 |
| A. Krauss | 374 | 0 | 0 |
| H. J. Rossiter (accepted) | 321 | 0 | 0 |

For the construction of roads, with kerbed path and surface-water drainage, on the Luton-road Estate of the National Liberal Land Company, Limited, Chatham. Mr. George Potter, surveyor, 26, Charing-cross:—

| | | | |
|---|---|---|---|
| S. Chafen, Rotherhithe | £875 | 0 | 0 |
| W. Nicholls, Wood-green | 875 | 0 | 0 |
| J. C. Trueman, South Hackney | 865 | 0 | 0 |
| W. Carter, Anerley | 842 | 0 | 0 |
| Thos. Adams, Tower-chambers, Moorgate-street (accepted conditionally) | 747 | 0 | 0 |

For new road and sewer upon the Britannia Park Estate, Hampstead. Messrs. Farebrother, Ellis, Clark, & Co., surveyors:—

| | | | |
|---|---|---|---|
| Watts | £2,379 | 0 | 0 |
| Eli Wilson | 2,300 | 0 | 0 |
| Bell | 2,297 | 0 | 0 |
| A. & F. Culverhouse | 3,270 | 0 | 0 |
| Killingback | 2,269 | 0 | 0 |
| Nowell & Robson | 2,250 | 0 | 0 |
| Rogers & Dickens | 2,233 | 0 | 0 |

For alterations to the Town-hall Tavern, Hammersmith, for Messrs. Acton, Phillips, & Son. Mr. H. I. Newton, architect, 17, Queen Anne's-gate:—

| | | | |
|---|---|---|---|
| Steel Bros. | £660 | 0 | 0 |
| Warne | 579 | 0 | 0 |
| Lamble | 565 | 0 | 0 |
| Cook | 525 | 0 | 0 |
| Walker (accepted) | 449 | 0 | 0 |

For repairs and sanitary works to six houses at Dorville-road, Lee, Kent, for Mr. J. Sherwood. Messrs. Wigg & Oliver, architects:—

| | | | |
|---|---|---|---|
| Hersee | £1,790 | 0 | 0 |
| Little | 1,573 | 0 | 0 |
| Sargent | 1,250 | 0 | 0 |
| Saunders | 1,196 | 0 | 0 |
| White | 1,189 | 0 | 0 |
| Exton | 1,180 | 0 | 0 |

For new fittings at the Black Dog public-house, Shoe-lane, Fleet-street, for Mr. Taunton. Mr. H. I. Newton, architect, 17, Queen Anne's-gate, Westminster:—

| | | | |
|---|---|---|---|
| Heath | £122 | 0 | 0 |
| Warne | 102 | 0 | 0 |
| Hellings (accepted) | 99 | 18 | 0 |

For stables, coachhouse, and dwelling-house in rear of No. 116, Brompton-road. Mr. Richard H. Hill, architect:—

| | | | |
|---|---|---|---|
| Perry & Co. | £1,370 | 0 | 0 |
| A. Bailey | 1,359 | 0 | 0 |
| J. Morter | 1,275 | 0 | 0 |
| Bangs & Co. | 1,220 | 0 | 0 |
| W. Gregar | 1,184 | 0 | 0 |
| Harris & Wardrop | 1,180 | 0 | 0 |
| Oswald Craske (accepted) | 1,153 | 0 | 0 |
| J. Holland | 1,123 | 0 | 0 |

For the erection of new show-room for Mr. Simmonds, Rye lane, Peckham. Mr. William Barnes, architect, 26, Cloument-grove, Peckham:—

| | | | |
|---|---|---|---|
| Hardiman & Watts (accepted) | £147 | 0 | 0 |

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### TO CORRESPONDENTS.

J. A. G.—A. B. J.—H. F.—W. C. T.—W. H. T.—W. G. C.—F. L.—S. B. G. (next week).—R. R.—F. W. R.—W. E. W. & Co. (it is not our business to make such an announcement. It can be inserted in our advertising columns on the usual terms).—E. B. (no space).

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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# The Builder.

VOL. XLVII. No. 2179. SATURDAY, NOVEMBER 8, 1884.


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### *Current Topics at the Institute.*

THE opening meeting at the Institute of Architects on Monday was an unusually full one, the attendance being, no doubt, in part augmented by the interest felt by many of the Associate-Members in the question of the memorial which was to be read on their behalf in favour of what may be called an extension of the franchise, by admitting the Associates to the privilege of voting at the meetings. The memorial in regard to this subject, which will be found embodied in our general report of the meeting, was read by Mr. Richards Julian,—"Well recited, with good accent and good discretion," like Hamlet's quotation from Pyrrhus,—amid the applause of his colleagues. From the tone in which the address was received by the President we may probably assume that there is every disposition on the part of the Council to accede to the views embodied in it; and, after careful consideration of the matter, we come to the conclusion that they will act wisely in doing so, and that the proposition, provided it is not set up as a precedent for rash and unholy tampering with the charter, is both reasonable in itself and for the good of the Institute. It has been urged that to give votes to the Associates will be practically to put them on a level with the Fellows, and, in fact, to give them the privileges of Fellows for a lower subscription. But, in the first place, it may be hoped that there is something more in the position of full membership than mere voting power, more especially as the Fellows alone are eligible for election to serve on the Council, and there is no talk on the part of the Associates of asking for this privilege also. In the second place, it must be admitted that a considerable proportion of the attendance at each meeting is furnished by the body of Associates, who take a lively interest in the proceedings, and some of whom speak with ability and force in the debates; and it is likely that a good deal more interest and life will be imported into the meetings of the Institute if the large body of junior members, many of them talented men who are likely to have a considerable effect in making the future of the Institute, are permitted to express their opinion in a practical as well as a theoretical manner, instead of sitting by and merely watching the solemn but generally rather small procession of Fellows file out at one door and in at the other to make their offerings at the shrine of the ballot-box.

So far, we imagine, the House is with us on the whole; nor are we likely to encounter any material opposition of opinion when we express our cordial appreciation of the tone and style of Mr. Christian's address, characterised as it was by a sincerity, earnestness, and good sense well calculated to confirm the feeling of respect and regard with which its author is universally regarded in the profession. The sequel of the proceedings was probably not regarded with equal approval and respect by the majority of the meeting, although courtesy and the (we believe) usual precedent of not entering into any debate on that occasion, kept some members silent who might otherwise have felt inclined to enter a protest against some of the utterances of the evening, which, as it was, passed with no outwardly dissentient voice. Some of us may be inclined to ask, for instance, why it should be thought necessary to import into the proceedings, for the purpose of proposing a vote of thanks for the presidential address, the assistance of the permanent Secretary of the Office of Works, whose name, despite his official position, has no weight whatever on architectural or artistic subjects, with any portion of the public who really understand such subjects; whose attitude towards the architectural profession has always been the reverse of respectful; and whose powers of oratory did not enable him to rise to the fluent expression of even the most ordinary platitudes of the occasion. Some of us may be inclined further to ask whether it is particularly suitable that the opening meeting of the central body of architects should be made an opportunity for their being good-naturedly lectured by the First Commissioner of Works on subjects which many, if not most of them, understand much better than he does, and hearing from him, without any decent chance of reply, a statement of his entire satisfaction with his own course of procedure in regard to matters in which they are much more fitted to instruct him, and on which many of them differ *in toto* from his theory and practice alike. In one respect, indeed, we may heartily congratulate the First Commissioner. The reward of a good conscience, the sense that we have done exactly what is right in every respect, the state of perfect and sincere satisfaction with ourselves, is a blissful frame of mind to which we would all aspire, but which few of us ever succeed in realising. In this respect, at least, the name of the First Commissioner of Works may be inscribed among those of the blessed who have attained Nirwana.

Upon the subjects in regard to which Mr. Shaw-Lefevre displayed so much satisfaction he had no doubt a lead from the presidential address in the first instance. In regard to one of these, the recent War Offices competition the President of the Institute and the First Commissioner, of course, stand in a special relation to one another, having been both acting as members of the Committee of Selection; and it was inevitable, therefore, that the president should support the award in the competition, having been himself directly concerned in determining it. And there was much in Mr. Christian's tone in speaking of this matter with which we must fully sympathise. As to his claim that the decision was arrived at in the most fair and honourable manner, and with the most absolute intention to do justice to every one, we have already expressed our full conviction on that point; we believe no competition was ever decided with more absolute purity from interested or partial motives, and we have declined to entertain or publish any suggestions to the contrary, some of which have reached us. And every one will sympathise with the kindly and generous tone of Mr. Christian in the portion of his address in which he spoke of the success which had attended the labours of two young men, solitary students in a provincial town, who were able with no special advantages to produce "so fine a plan and so good an elevation, and drawings which have never been surpassed for perfect execution." Under the circumstances now known the success achieved by the architects referred to is certainly remarkable; they are entitled to the full credit of it, as well as to the solid advantage and position which they have attained by the decision of the Committee, which is, of course, binding on all concerned. But it is at the same time rather to be regretted that the President of the Institute should have appeared to give the authority of his position to the idea that beautiful drawing is a matter of any real importance in an architectural competition. It is one of the standing complaints against the competition system that success often depends so largely upon the beauty of the drawings; and it is perfectly evident that in the present case this element has not been without its effect on the minds of even the professional judges. If these things be done in the green tree, what shall be done in the dry? If eminent professional judges cannot resist the blandishments of drawing, how can we expect it of amateur judges? We might rather have expected the President of the central Architectural Society, above all other persons, to emphasise the fact that draughtsmanship is *not* architecture: there certainly never was a period when the lesson was more needed than at present. But this is nothing to the extraordinary anti-climax made by Mr. Shaw-Lefevre in reference to the same subject. They

had gone into the examination of the drawings, he told us, with the greatest care and impartiality, and the result, he pointed out, with a smile of congratulation, was that they had brought forward two architects absolutely unknown to fame: in other words, that the carrying out of the greatest building of the day was to be placed in the hands of untried men, who are to complete their architectural studies over the edifice, at the public expense. That the committee are bound in honour to abide by their decision is unquestionable; that the result should be matter of special congratulation is another affair altogether; and that Mr. Shaw-Lefevre should deliberately have told the meeting at the Institute, as he did, that the decision "appeared to have given universal satisfaction," is a statement which we really hardly know how to characterise. We are probably as favourably placed for forming an estimate of general opinion on the subject, professional as well as amateur, as Mr. Shaw-Lefevre, and our experience is that the result has mostly been regarded as exceedingly unsatisfactory.

One word as to the comparison between this and some former great competitions, which was suggested by the First Commissioner. We were given to understand that now at last there was to be not only a perfectly fair competition (a promise which has been fulfilled), but that there was to be one based on the practical requirements of the case, and that the best building for its practical purpose was to be evolved. We doubt very much whether the latter end has been attained, and whether there were not plans, both among the nine and among those who were passed over in the first competition, which, in important practical points, are much superior to the one selected. We doubt very much whether the mere drawing has not had an effect on the minds of the judges, beyond what they are even quite conscious of themselves. But, architecturally, the contrast between this and the last great competition is extraordinary and rather painful. In the competition for the Law Courts, not only were the leading men of the day represented, while they are all conspicuously absent from the recent competition; but there were coruscations of architectural genius about the Law Courts competition which left an impression not easily to be effaced. No one who studied that set of designs is likely to forget Burges's elevation, or Mr. Garling's powerful and original design, or Mr. Seddon's bold conception of the Record Tower; not to recall other designs which presented a total effect of grandeur and dignity, even without riveting the attention by special originality; and the President of the Institute himself took especial occasion, in the address, to defend and praise the existing result of that competition. In comparison with that, how does the recent competition look? Making due recognition of some refined detail in one or two of the elevations, of a very charming interior perspective which will be remembered as the most prominent feature of the competition, and of exceptionally beautiful draughtsmanship in the selected design, the second competition has produced nothing beyond architectural mediocrity, intermingled with absolute architectural vulgarity in some instances. We do not wish to go into personalities, but there are things among the nine favoured designs of which it may be said that the very proposition for their execution in such a situation, and for such an important building, is utterly incomprehensible, and little short of an enormity; and is this a result for the responsible Government official to blow such pæans of self-congratulation over?

Another subject on which the members of the Institute had the advantage of hearing the First Commissioner's own estimate of his work was in regard to the proposed treatment of Westminster Hall, and the modern Mediævalising process at the Tower. On the subject of Westminster Hall we have already expressed our opinion strongly; and we publish, in another column, a letter from an independent witness, Mr. Tarver, who is certainly more competent to speak on such a subject than any one in the Office of Works, and who denounces what he rightly calls "playing at architecture." Mr. Shaw-Lefevre shelters himself under the authority of Mr. Pearson, as his professional adviser in the matter; but it has been stated by the Precentor of Lincoln, in the *Times*, that to his knowledge Mr. Pearson's own wishes in the matter had been overruled; and we have never seen any contradiction of the statement.

Such a question as the treatment of the side of Westminster Hall, under the present circumstances, is, of course, both an interesting and a difficult one, and would have been well worth discussing with the official authority at a meeting of the Institute. But the official authority seems to have no notion of the kind. His attitude is expressed in the couplet that opens one of the "Rejected Addresses":

"I am a blessed Glendoveer,
'Tis mine to speak and yours to hear."

The architects may certainly be excused if they find the position a little illogical. Friendly reciprocity between the Office of Works and the Institute is, no doubt, desirable, but we do not expect the reciprocity to be all on one side. It was the crowning point of the character of Chaucer's most model personage or "persoun" that—

"Gladly wolde he lerne, and gladly teche."

The First Commissioner of Works showed a great practical reverence for the latter half of the maxim. Perhaps, in addressing a body of professional experts on matters concerning which he is only nominally and *ex officio* an authority, a little more recognition of the other half of the sentiment would not have been out of place.

## WORKMEN'S HOMES AND THEIR ADJUNCTS.

THE question which has been exercising the minds of philanthropists for half a century, and which has more lately been pressed home on the consideration of the Legislature in our own country, is a problem calling for solution more or less in every European State. Private beneficence has always led the way, and in many instances has successfully provided for the wants of immediate dependents. Wealthy manufacturers and commercial men have devoted large sums towards the welfare of their workmen and servants, as regards both their physical and moral needs. Since the enormous development of the railway system most of our great companies have recognised that there are duties devolving on them beyond the mere punctual payment of the weekly wages; and that, if only with a view to secure faithful service, money is well laid out in assisting their *employés* to maintain comfortable homes, in encouraging them to exercise habits of thrift by the creation of benefit and other societies, and in providing them with means and places for indoor or out-door recreation. But, notwithstanding all that has been done, the fact confronts us that in our large industrial centres there still exists an amount of squalor and wretchedness, with their attendant physical and moral evils, utterly beyond the ability of individual effort to overtake, and with which properly organised co-operation only can effectually deal. A precisely similar state of things is found to exist in Paris and other great cities of the Continent; and it is with a view of suggesting the various modes of dealing with this crying need of the day that M. Emile Cacheux has published his elaborate treatise on the construction and management of workmen's dwellings, *crèches*, and kindred institutions,* which can be made to contribute to the comfort and welfare of the labouring and poorer classes of the community. He commences by observing that, according to recent statistics no fewer than 90,000 persons in France annually succumb to the pressure of want, and that, owing to the prevailing high prices of the absolute necessaries of life, this number must infallibly go on increasing until more stringent efforts are made to remedy the evils which exist. Several instances of the action taken by distinguished commercial men in France to grapple with the problem are well known to those who have similarly devoted themselves to its solution, notably that of M. Godin, the originator of cast-iron stoves, who not only erected extensive buildings for his workmen, but dwelt in the midst of them himself, and personally superintended the management of every detail. Another instance is that of the town of Mulhouse, with which the name of M. Dollfus must ever be gratefully connected, and which has attained a high degree of prosperity as an industrial centre, the more remarkable from the fact that none of the raw material used in its factories is produced in the neighbourhood, but has all to be imported from distant localities. That prosperity is said to be attributable in no small measure to the care taken of its working men, who are objects of solicitude to their employers from the cradle to the grave, and whose welfare is secured, not by an abnormal rise in wages, but by first locating them in suitable and comfortable dwellings, in next providing *crèches*, or nurseries for the infants while the mothers are at work, schools for the younger children, workshops for the elder, and training establishments for each special industry which is carried on in the town; in fact, in the words of M. Cacheux, Mulhouse gives its children a theoretical and practical education sufficient to enable them to become useful citizens, capable of earning a livelihood for themselves as long as they are able to work, and of securing a provision against the advent of old age. Owing to its excellent institutions, Mulhouse was enabled to tide over the terrible crisis of 1870, and to furnish support for its 40,000 working men. What has been done in Mulhouse, M. Cacheux would fain see carried out in Paris, where philanthropy, he laments, is confined to the distribution of money, and though it is to be had in abundance, yet no trouble is taken as to the mode in which, or the persons amongst whom, it is distributed.

The remedy which occurs to him as best calculated to put an end to the existing state of wretchedness in Paris is the formation of a Society of Public Welfare, which should search out and carry into effect the measures best adapted to attain that end. These measures he explains to be:—

1. To train up the greatest number possible of individuals so that they may be healthy, strong, and fitted for work.

2. To find for them suitable employment at such wages as will afford a livelihood for themselves and families, besides a provision against times of sickness, stoppage of work, accidents, infirmities, old age, and death.

3. To develope the moral, intellectual, and material welfare of working men by all the means hitherto adopted, and by such further measures as may seem to the Society to be conducive thereto.

4. To provide as effectively as possible for such individuals as for some cause or other have to be supported at the expense of their fellow-citizens.

The scope of such a Society, as M. Cacheux observes, is truly very extensive, and to ordinary minds it would seem almost impossible to attain the ends set before it; but he is not alarmed at the prospect, and thinks it perfectly feasible, if only existing societies and charitable individuals could be persuaded to work together with a determination to carry it to a successful issue. For this purpose he set himself the task of compiling his work, and he has certainly succeeded in treating his subject most exhaustively; for he has collected together almost all the available information regarding it, and has then added a valuable contribution towards the difficult problem which is awaiting solution. The first part of the book is devoted to the subject of workmen's dwellings, specimens of which are given in the excellent series of plans which illustrate his work, together with explanations of the methods which have been pursued in various countries to provide for their erection, and of their relative accommodation and cost, the latter varying from 100*l.* in Mulhouse to 240*l.* in Paris for a house

* L'Économiste Pratique: Construction et Organisation des Crèches, Salles d'Asiles, Écoles, &c. Par Emile Cacheux, Ingénieur des Arts. Paris: Librairie Polytechnique; Baudry & Co., 15, Rue des Saints-Pères.

containing three rooms, besides kitchen and out-offices. The general conclusion he has arrived at is the same that has been considered to be most advantageous in England, and that is, to offer facilities such as building and land societies afford, to a tenant to become the owner of his tenement by the payment of a small annuity extending over a term of twenty years, more or less, in addition to the rent. In a paper read before the Society of Arts in February last, Mr. William Westgarth, who has proved the great interest he takes in this particular subject by offering prizes to the extent of 1,200*l.* for the best essays on dwellings for the poor, observed that he should like to see the plan tried "of giving to tenants a proprietary interest in their respective rooms or houses. A redemption fund spread over a term, say of thirty years, would add but 4d. to 6d. per week to rent." Of course, the objection to a workman buying a house in the neighbourhood of his factory is the risk of the failure of his employer; but notwithstanding this the practical result proves that working men are willing to undertake this risk, and that when the facility is afforded they take advantage of the opportunity of becoming the owners of their houses.

A section is devoted to the legislative measures which have been adopted in different countries with respect to workmen's dwellings and lodgings; those which obtain in England, especially the Common Lodging House Act, and the regulations for ensuring proper sanitary conditions being particularly approved. The failure in Paris to secure attention being paid to ordinary sanitation in furnished lodgings leads M. Cacheux to the conclusion that the only way of curing this evil is the truly Gordian solution of banishing from the capital every one who is unable to meet the expenses of living there; but as the State would not be prepared to carry out such a drastic measure, he considers that it should use every possible means to stimulate the construction of suitable workmen's habitations, by promoting exhibitions of model houses, courses of sanitary lectures, and the like, for the purpose of teaching men to realise the dangers they incur by residing in overcrowded tenements, and neglecting to observe the most ordinary laws of health. The best method of removing night soil, a necessity in France, is discussed at length, and plans are given of many ingenious contrivances for the purpose, but as they are not applicable to the existing state of drainage arrangements generally in England it is unnecessary to allude to them further. There is one proposed improvement in lodging-houses, however, which seems desirable, and which has already received consideration in this country. It was alluded to by Mr. Westgarth as having been found successful in rudimentary forms in present cheap lodging-houses, and from it he considers "great social and recreational as well as economic benefits" are likely to ensue. His proposals of improvement on the modern great lodging-houses in this particular accord very much with the suggestions made by M. Cacheux, both advocating that where there are separate homes consisting of one or more rooms they should be grouped around a commodious hall or common sitting or recreation room, and should comprise a common kitchen, manager's shop or store, from which articles of food, cooked or otherwise, could be supplied. "Such a common hall when well lighted and warmed would admit of fires, kitchens, and lighting apparatus being dispensed with in the separate homes, and would likewise tend to diminish the risks from fire." Doubtless in the essays for which Mr. Westgarth has offered such handsome prizes, arrangements such as these will receive due attention, and in regard to them M. Cacheux's work contributes valuable suggestions.

The second part is devoted to the elucidation of the first of the measures which the Public Welfare Society is to take up, viz., creating a race of healthy, strong, trained men, fit for employment by the Society. As it is during infancy that the seeds are sown of that mortality and physical degeneracy from which the labouring classes suffer, M. Cacheux proceeds to examine into the causes of infantile mortality, and to devote special attention to the *crèches* or nurseries which have been created to remedy the two principal evils from which that mortality arises, viz., the custom of parents in making over their infants to the care of paid attendants, and the absence of that watchful care which infancy needs. In these institutions the French have undoubtedly been long in advance of us, for it is but comparatively lately that *crèches* have been established in this country, and to France belongs the credit of starting them. Notwithstanding certain objections, the gravest of which is the propagation of infantile diseases, yet it is an ascertained fact that the mortality of infants has considerably diminished since the establishment of *crèches*. In the table quoted by M. Cacheux the highest death rate, with the exception of Calvados, where an epidemic of measles broke up, was at Milan, where it amounted to 18 per cent., while in the city itself it reached to no less than 40 *per cent.*! M. Cacheux does not hesitate to assert that the State would be conferring a public benefit by encouraging and assisting the establishment of *crèches*. Such action, however conformable with Continental ideas of state functions, does not fall in with English ideas, and happily the need for it does not exist, as private benevolence has already recognised to a great extent the benefits of such institutions, a notable instance of which is cited by M. Cacheux in the case of Manchester, where, at a single meeting called by the Mayor to discuss the subject, sufficient funds for founding and perfectly equipping a *crèche* were at once subscribed. Several designs of suitable buildings are to be found in the folio of Plates, as also estimates of cost of erection and equipment, from which it appears that a *crèche*, capable of holding fifty infants, costs in Paris about 700*l.*

From *crèches* the author passes on to the subject of Infant Schools, which were commenced in France by Pastor Oberdin in 1775; but it was not till 1827 (when a Madame Millet, on her return to France after a sojourn in England, where she had studied the organisation then existing, started one) that Infant Schools took root, and subsequently came under the care of the State. Similar particulars as to the design of buildings, the management and interior economy of these schools, are entered into with great detail; but in this branch of education the system pursued in England has, after seventy years, reached great perfection, so that we have little to learn from other countries. We have more to say on the subjects suggested by this voluminous and valuable publication.

## NOTES.

THE New Liberal Club, of which the foundation-stone was laid on Tuesday, will afford some relief to the monotony and commonplace which is the characteristic of too much of the new architecture of the locality. The mere introduction of a tower will be a welcome contrast in the neighbourhood of such dull bulks of building as the Grand Hotel and the Hôtel Métropole; and in other respects the design will be one of the most effective of its architect's recent works. We defer illustrating it till Mr. Waterhouse has completed his coloured drawing of it, which we shall then have the opportunity of reproducing by a new process.

IN reference to the same subject, the reproduction of coloured drawings, we may here draw attention to the two illustrations in the present number, the interior of Lloyd-square Chapel and the view of some cottage architecture by Messrs. Holme, of Liverpool, which are reproduced by Messrs. Waterlow, the first from a washed drawing in Indian ink, the second from a water-colour drawing, by a process which has not, we believe, been before employed in any architectural journal. We think our readers will agree with us that, as a method of reproducing the light and shade effects of a water-colour drawing, it is very satisfactory, in regard to the cottage picture especially; the fully coloured drawing coming out better than the monochrome one. As this was in the nature of an experiment, we purposely selected small works; but if the result is liked, we shall be happy to produce larger water-colour drawings of important buildings in the same way. We may add that this is only one of two or three other means which we have in contemplation for the more varied and effective reproduction of architects' drawings.

WE should hardly serve any purpose by publishing over again the distressing particulars of the terrible disaster at the Glasgow Theatre, with which all our readers are already acquainted through the medium of the daily papers. The event is somewhat removed from the usual category of such calamities, in as far as its origin is concerned, if it be really true that the man at present in custody was wicked enough to give an intentional and false alarm of fire. Putting aside that, it is an old and too-often repeated story. Given a narrow landing, upon which the traffic from the pit and gallery met together, and an iron gate to check the ingress of the audience while taking tickets, and which probably (for the evidence is conflicting on this point) acted as an additional and formidable bar to their exit,—there are the elements of a fatal calamity when once the audience are under the influence of panic. The most practical deduction to be drawn from the event is as to the great additional risk and danger incurred by turning two streams of people on to one landing. The exit from each part of the house ought to be separate and unconnected with any other; and this is even more important in the case of pit and gallery, where the roughest and least self-restrained portion of the audience are usually found, than in regard to stalls and boxes. The width of the staircase was less than it ought to have been, but additional width would not have prevented, or probably even much modified, the results in this case; and excessive width may even, as we pointed out in the case of the terrible affair at Sunderland, be an additional source of danger. But the great moral which underlies the whole matter is one which, it is to be feared, it is useless to insist upon, viz.: the weakness and folly of giving way to sudden fright. Cannot all these repeated and melancholy results of foolish and unreasoning cowardice have any effect in leading people to make an effort at coolness and courage, in such cases, instead of rushing on their own destruction, with no more sense than a flock of sheep?

THE experimental opening, during the second week in October, of the great Sea Canal from Cronstadt to St. Petersburg is, for many reasons, a very suggestive event. It shows that, however supine we may be in this country as to the improvement of our inland water ways, Russia is not so slack; but that, following the lead of Holland, France, Belgium, and Germany, she is providing for the increasing necessities both of commerce and of maritime warfare. The river Neva is shallow for the twenty miles from Cronstadt to St. Petersburg, and vessels drawing more than 9 ft. of water have been hitherto compelled to lighter their cargoes up to the capital. Not only are cost and delay thus greatly increased, but the military character of Cronstadt is interfered with by its compulsory use as a mercantile port. To remedy this a channel, 300 ft. wide and 22 ft. deep, has been dredged up for ten miles from Cronstadt, leading to a canal with two branches, narrowing from 240 ft. to 180 ft. in width, and of a depth of from 20 ft. to 16 ft. The southern branch enters the Ekaterinhoff Canal, and the northern branch, intended for the transit of ships of war, enters the Neva. In the recent trial an American-built cruiser, the *Africa*, 300 ft. long and drawing 17 ft. of water, passed up the canal without difficulty, but stranded at the entrance to the Neva. The passage, however, has been effected by three Russian ships of war, and the existence of the canal, when satisfactorily finished, will be equivalent to a considerable addition to the available force of the

Russian navy, and will effect a reduction of the cost of transport to the capital. The cost of the work thus far is estimated at 10,265,400 roubles.

THE great attraction in Mr. Wallis's gallery in Pall-mall, where the usual autumn exhibition was open to the public on Monday last, is in the collection of works painted during the last two years from studies made in the neighbourhood of Rome by Carl Heffner. It must be admitted that there is somewhat too much of picture-making in these as well as in other works by the same painter; but, accepting his art for what it is, he has surpassed most of his previous efforts in these four large works, entitled "The Campagna," "Desolation," "Solitude," and "Repose;" pictures representing that strange mingling of desolate plains with the remains of great engineering and architectural works, places haunted, as Browning says, by "Rome's ghost since her decease." Pictorially, the finest work is "Solitude," the old cemetery of Rome in the time of the Cæsars; but a more interesting work in subject is, perhaps, the "Desolation," showing the columns of the temple of Jupiter and the ruins of the Castle of Ostia in the middle distance. Architecturally, however, it must be observed the columns are not as well drawn as they might be; and, if the two or three at equal distances are intended to represent part of the colonnade as it stood, the intercolumniation is certainly wider in the picture than it ever was or could have been. Despite these technical errors, and a certain hard and slightly stagy effect which hangs over Herr Heffner's work, these pictures are in themselves worth a visit. A very clever example of Professor Müller's mannered but very broad and powerful style is to be found in "Tric-trac Players" (23), and a large and exceedingly spirited painting of a "Horse Fair in Bessarabia" (109), by Professor Brandt, occupies a central position. There is a Corot or two; Windmaier, Munthe, and other old favourites, are fairly represented; and a design for a fan by Professor Kaulbach (the German painters seem all to be Professors) is a pretty bit of decorative art.

FROM the *Melbourne Age* we learn that the progress of Railway Extension in Gippsland is much retarded, and that the district in what is termed "The Garden of Victoria" is languishing in consequence. The nature of the country, it is said, renders the construction of roads very expensive, and, as the income of the shires is not adequate for the purpose, the settlers are forced to remain idle, after having faithfully performed their duty in clearing the wooded hills and valleys, and will be obliged to abandon their homesteads if some effort be not made to enable their produce to be conveyed away. The Morwell to Mirboo line, after being once commenced, had, through the failure of the contractor, to be suspended, but is about to be started again, though it will cost much more than originally estimated. Seven years ago this portion of the country was taken up, and the "selectors" brought to the notice of the Railway Minister that, unless communications were opened, it was impossible for them to achieve success; but that with a railway the wealth of the colony would be increased by 100,000*l.* a year. In addition to its agricultural and grazing resources, recent discoveries have proved the existence of a large tract of coal-bearing country,—one seam of which, 5 ft. in diameter, has been pronounced by the Government geologist to be of workable size and excellent quality. Blackwood and blue-gum timber, superior to any other found in the colonies, is there in abundance. The difficulty hitherto of finding a practicable route from the North Mirboo terminus across the Tarwin River to Stockyard Creek, and ultimately to the sea at Corner Inlet, has been surmounted by taking the Morwell line across the Tarwin, and joining it with the Great Southern Line four miles further south,—and thus the connexion between the Main Gippsland Line and seaboard will be rendered complete at the smallest cost.

PRINCIPAL Sir Alexander Grant, in his inaugural address at the opening of the winter session at Edinburgh University, on October 27, referred to the desirable object of establishing an Edinburgh Union Society, for which large funds are necessary. The Prytaneum, of 3,000 students, with debating-hall, gymnasium, reading and writing rooms, committee-rooms, and other appurtenances, must, he said, necessarily be a large building, which, with its site, would cost no less than 15,000*l.*; and of this sum, he believed, only about one-fifth had been as yet provided. The scheme, however, is such a good one, and so well worthy of realisation, that it is to be hoped it will only require to be made known in order to receive the necessary encouragement and support.

THE success which has attended the recent Forestry Exhibition has given rise to the suggestion that an International Exhibition should be held in Edinburgh during the summer of 1888. A petition to the Lord Provost and Council has been prepared and already signed by a considerable number of manufacturers, merchants, and others setting forth that a movement has been made, both in the Council and outside of it, and proposing to strengthen the hands of the Council in giving effect to efforts made in the direction referred to. It is recommended that the exhibition should not be confined to Scottish industry and art, but should be international, or should, at least, embrace the Colonies as well as Great Britain and Ireland. The initiatory steps were, we understand, taken by an old society called the Edinburgh Merchants' Association.

THE Winter Exhibition at Messrs. Tooth's Gallery includes some good works, both by well-known artists and others with whom we are less familiar. M. Leon Lhermitte's large life-size figure-picture, "La Moisson," appears to us, however, an indication that this in many ways remarkable artist is seen to more advantage on a smaller scale, an opinion which a companion of his smaller work in the same collection, "Mid-day Rest," goes to confirm. Some architectural subjects, Venetian chiefly, by José Gallegos, are worth attention; also a clever work by José Benlluire, "Christmas Eve, in the church of Aleira, Valencia," with the choristers singing at the top of their voices, and with no very reverential manner, to the accompaniment of an ophicleide. There is a sense of giving plain prose realities in this work which gives a certain sarcastic flavour to it, and the accessory figures and architecture are well studied. The Exhibition includes works by Van Haanen, Brett, Hook, Israels, and other painters of repute.

THE "Nineteenth Century Art Society," in whose catalogue, as we have before remarked, scarcely a single name known to fame in the annals of the said century finds place, opened also their winter exhibition at Conduit-street. Except a nice bit of work here and there, the exhibition seems as hopeless a collection of mediocrities as ever, and we are at a loss to understand the reason of its existence except for the benefit of persons who cannot get their works exhibited elsewhere. Having no pictures worth looking at, the Committee adroitly seek to divert our attention by a special reference to the albo-carbon light, of which we spoke in praise a short time since, and which they claim to have now introduced for the first time as a means of lighting a picture-gallery. It is no doubt a much better light for picture-galleries, both chemically and in illuminating quality, than ordinary gas. We could contentedly accept a worse light, however, if there were better things to be seen by it.

IN the ensuing Winter Session of the University of Edinburgh, Professor Baldwin Brown proposes to deliver a course of forty lectures on the History of Architecture in Europe from the Hellenic period to the Renaissance. The origin and connexion of the principal styles will be described, and their characteristics illustrated by representativ examples. The historical aspect of the buildings will be shown to be in each epoch the outcome of certain social and religious tendencies varying according to the spirit of the times. The constructive forms embodied in each epoch, with their special capabilities, will be explained and illustrated, showing how the mode of construction affected the form and æsthetic character of the edifices. The ornamentation and decorative details of the best examples will be illustrated, showing how by their form, fitness, and position they contributed to the architectural effect of the structures.

IN Mr. Ruskin's last lecture at Oxford he stated that he was showing a Birmingham friend "the collection of antique casts which Mr. W. B. Richmond had so wisely brought to supersede 'the modern stuff of Chantrey,' and on stopping under the Athena Regina, Mr. Baker exclaimed, 'Hallo! Why there's the chopped Norman arch!' And there, sure enough (Mr. Ruskin added), it was, and I had never seen it. The chopped Norman arch and the fringe in which you young ladies delight come alike from the forehead of Athena." We can only say that we hope Mr. Ruskin's audiences will take such remarkable statements on the genesis of architectural ornament with a great many grains of salt.

## THE QUANTITY SURVEYOR.

You at once know him to be a person of distinction by the superior fragrance of the cigar which he smokes on his morning's walk from "Victoria" to his comfortable West-end office,—on fine mornings, that is to say. When the weather is inclement the fleet Hansom protects him from the rain and deposits him dry-shod at his door. As he reposes in his well-padded arm-chair, his feet deep in the pile of a Turkey carpet, reading and docketing the morning's letters, we will try to snatch a hasty note of his character and appearance. He is past middle age. His surroundings show him to be a successful man of business, and success now-a-days comes not before the marks of age. We have no longer boy Premiers, such as Pitt. Our statesmen are well up in years before they assume the rod, and our judges are not raw youths. And the professional man is no exception to the rule. A flatterer would say that our friend's hair was grey, the world might even call it white. But he is hale and lusty nevertheless. A man of less force of character than he would stoop a little in the shoulders; but he resolutely maintains an almost military bearing. His hat and boots and gloves,—sensitive indicators all,—are works of art of their respective kinds, and his whole costume, "suiting with forms to his conceit," is most carefully designed and executed "of the best materials and workmanship." His figure inclines slightly to *embonpoint*,—a characteristic of his class. Time was when the business of the surveyor was a good deal mixed up with elaborate luncheons, provided by hopeful builders,—days when the soundness of the after-dinner port had more to do with the financial result than the soundness of the work. These things are now only matter of history. If the surveyor, from motives of policy, occasionally prolongs the social meal which conveniently divides the day's labour, it is not by way of fine and penalty upon the long-suffering builder. Our friend is neither a total abstainer nor a vegetarian, but he enjoys in moderation the goods the gods provide. He respects the traditions of his profession, and the result is just indicated by the "graceful bend and the voluptuous swell" which the tightly buttoned surtout with difficulty restrains. He comes of a long line of surveyors, and his almost preternatural professional astuteness is partly hereditary and partly acquired. His "forbears" were renowned for skill in the dissection of builders' work, and their acquaintance with the most recondite secrets of its anatomy. This had, moreover, a practical acquaintance with one or another of the branches of the builder's trade, and derived thence a prestige in dealing with matters which came before them, denied for the most part to their successors, who are strong mainly in the "bookish theory." They have, however, cultivated some collateral arts to the highest pitch. Our friend astonishes by the rapidity and precision with which

"takes off" the most complicated work,—squaring the dimensions in his head as he goes along, and dictating the result to his lagging scribe. If the measuring books which this expert artist has filled in his time could be recovered, it is believed that "the whole world would not contain them." The surveyor holds a unique position in the building world. He must possess, amongst other gifts, and sometime exercise, the skill of the advocate and the impartiality of the judge. He acts as a sort of "buffer" between the conflicting claims of the architect representing the building owner and the builder. He has consequently cultivated the art of conciliation, and brought it to a rare perfection. It is pleasant to see the tact with which he conducts a conference on the "variations," as he pleasantly calls the extras, on a contract, securing reasonable concessions from both sides,—giving and taking with wise discretion, and turning aside the signs of rising temper with a well-timed witticism or opportune story. Of these he has a store, decorous and otherwise, adapted to all sorts and conditions of men. He is a court of equity in himself, and a mortal foe to lawyers, whom he robs of an untold amount of "contentious business." His functions have been widely extended by the now universal contract system, and he is the indispensable ally of the modern builder. His services to the architect might be called indispensable but for the fact that so many architects continue to dispense with them, holding that he carries his analysis too far, and that the intervention of the surveyor by suggesting a multitude of small items for pricing tends to swell the builder's estimates. This our friend very warmly repudiates, and we cannot here discuss the vexed question. The young architect will find much help from the surveyor if he be kept within his proper domain. In following the architect's work he will act as a useful check, and his greater experience may occasionally suggest better and less expensive methods of construction. But the young architect who allows a surveyor to write his specifications for him is lost. He scarcely knows what he is supposed to prescribe, and becomes, as it were, a lodger in his own house. The profession of the quantity surveyor has the valuable quality of being quite unattractive to the average youth. The endless squaring of dimensions and dreary years of abstracting are by no means compensated for by the delirious joys of "taking off," even when that happy stage is reached. The youthful temperament has always a tinge of poetry, and there is no such word in the surveyor's vocabulary. He is dry, exact, painstaking, unimaginative,—your only true methodist. A poetical quantity surveyor would be a more astounding prodigy than a tipsy quaker. "'Songs and Sonnets,' by a Sentimental Surveyor"; "'Poems,' by a Practical Man." The thing is incredible,—inconceivable. His hard matter-of-fact occupation is repellent to all but specially-constituted minds. Hence the surveyor's profession is free from trespassers, hedged round with a *chevaux-de-frise* of routine; adventurous and unqualified interlopers and pretenders are quickly exposed and expelled. He must, however, be contented to forego the pleasures of fame. The applause of the crowd is not for him. He is as utterly out of the sight of the multitude as the theatrical machinist,—a kind of architectural organ-blower, useful but unseen, and ignored alike by those who produce and those who enjoy the music. But as a set-off, his calling is a more lucrative one than that of his "client" the architect, who is struggling up hill when the surveyor has thought of retiring upon a handsome competence. But he rarely does retire. He buys a little property on the borders of the great city, and builds himself a good house. Being a pure Cockney he affects in his leisure hours the *rôle* of the country gentleman. In moments of extreme wickedness he will sometimes undertake to act as architect to others, performing the duties vicariously with chance success or unaided and therefore badly. But he is far too wise to design his own house. Your duly-qualified doctor does not prescribe for himself; much less so the quack. And the best of quantity surveyors can be but a quack architect.

It should be recorded to the credit of his profession that it is singularly free from black sheep. Delinquencies on the part of his brethren are of the rarest occurrence. With very onerous and responsible duties to perform, with demands upon his patience which would have taxed a Job to the utmost, and subject at times to great temptations, the quantity surveyor is trusted all round for a skilful, painstaking, intelligent, and honourable man of business. May he continue to reap the fit reward of so much solid and unassuming merit!

## PRESIDENT'S ADDRESS, ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE following is the address delivered at the opening meeting of the Institute on Monday evening last by Mr. Ewan Christian, the President:—

GENTLEMEN,—On bidding you farewell at the closing meeting of last Session I expressed a hope that in the beginning of this you would come here refreshed both in body and mind after rest from your labours. I trust that hope has been fulfilled, and though it has been said that the enforced recess is a point on which the Institute requires reform, I must say for myself that I do not in any way agree with that opinion. We all work hard, and rest is needful; and to the officers of this Institute, who to their ordinary vocations add the labour of attending to its interests, I can assure you the vacation is uncommonly welcome.

As regards students, the library is only closed for one month, and that the month above all others in which they can be most usefully learning from nature* and not from books; therefore, with an easy conscience, I bid you welcome to the work of the opening session.

The year has been a notable one, both as regards this Institute, and the interests of architects. Fifty years of existence have had to be remembered and pondered on. Valuable papers have been read and discussed, especially one with reference to the question of education. Alterations in the government of the Institute have been suggested; an important competition has been entered upon and decided,—a conference has been held between the members of our own body and others outside; and, lastly, we were asked to take part in a conference of importance at the Health Exhibition on matters in which architects ought to be specially interested.

On each of these subjects I shall have a few words to say; and I trust you will bear with me in traversing the ground.

First, then, in this our jubilee year, let us contemplate for a few moments that which, whether for good or for evil, is now irrevocably past; and then consider for a while, whether in all respects, we have fulfilled our duty on the lines laid down by the founders of this Institute. And looking back on the fifty years of our existence, what a wonderful half-century it has been. It has witnessed almost the commencement and the great development of the railway system; the invention and progress of the electric telegraph, the enormous expansion of postal facilities not yet fully developed; the bridging of the ocean by swift and safe steamers of ever-increasing power and convenience; the introduction and development of photography; the conception and execution of some of the largest and most important works of engineering the world has perhaps ever seen; the great series of International Exhibitions, commencing with that of 1851, of which the late Prince Consort was a most ardent and earnest promoter; besides almost numberless achievements in all departments of science, literally fulfilling the prophecy that "many shall run to and fro, and knowledge shall be increased," in a manner that could only have been dimly imagined by the commentators of old: and, not to travel beyond the bounds of our own art and country, it has witnessed a most remarkable revival of ecclesiastical architecture; the rise and full development of the power, happily not yet extinguished, of the great art-critic whose fervid eloquence has done so much, not only to open the eyes of the general public to the beauties of art in all its phases, and of the glories as well as the minutiæ of nature; whose writings on the subject of our own particular art have had, and I venture to think, will have, a wider influence on its study and practice than those of any other man who preceded him, for no nobler writings than those of John Ruskin have graced the half-century of which I have to speak.

It has witnessed almost the whole career of one of the greatest architects of modern times,—Charles Barry,—and of another man of genius, architect and writer, Aug. Welby Pugin; the whole career of George Gilbert Scott; and unhappily, also, as regards their termination, those of George Edmund Street and William Burges, whose loss we have so sorely mourned as all but irreparable; not to speak of those who, before its commencement had made their names famous, including our first professional president, the eminently learned and graceful Charles Robert Cockerell, nor of those whose careers commencing within its area, are still happily amongst us.

What the next half-century may produce if the world lasts so long, God only knows; but if I may compare the privileges now possessed by the young men of our fraternity with those with which the great men I have named were familiar in their youth, presuming there is in the rising generation as yet undeveloped genius equal to that which has preceded it, much ought to be expected.

I cannot but remember that in the year this Institute was founded I entered the Royal Academy as a student. In those days there was indeed a Professor of Architecture who gave a biennial course of lectures to students read by the Professor of Painting, which, commencing with primitive huts, described all the dry bones of the art, with but little allusion to its glorious beauties.

When there was only a small architectural library open one evening in the week, and no special architectural journal had as yet been started; when I compare this state of things with the advantages now possessed by students in the fine library of the Institute, almost always open; in the regular instruction at the Royal Academy of a professed teacher of architecture, supplemented by the personal supervision of eminent members of our profession; the courses of lectures given by able professors at the University College, and King's College, which all pupils may attend at small cost, besides the very valuable assistance rendered by a special architectural press, which, commencing with the *Builder* more than forty years ago, has developed so largely, affording opportunities for the acquisition and discussion of every branch of knowledge connected with our art, almost always profusely and sometimes beautifully illustrated; not to speak of the host of other illustrated publications, bringing home to all of us an amount of knowledge of the scenes and buildings of far-off lands, often very valuable, and almost always replete with interest to some of us. When I contrast, I say, these differences, what large results ought to be produced, if the industry of students is at all equal to their valuable privileges!

But notwithstanding this advancement, and in such a period of progress, it would indeed have been surprising had we all stood still; let us turn to our charter and ponder awhile on the petition of those who asked for it.

It recites to his Majesty, King William IV., that his "right trusty and right well-beloved cousin and councillor, Thomas Philip Earl de Grey, hath, by his petition, humbly represented unto us that he and divers others of our loving subjects have associated together for the forming an institution for the general advancement of civil architecture and for promoting and facilitating the acquirement of the knowledge of the various arts and sciences connected therewith, it being an art esteemed and encouraged in all enlightened nations as tending greatly to promote the domestic convenience of citizens and the public improvement and embellishment of towns and cities, and have subscribed and paid considerable sums of money for those purposes, and have formed a collection of books and works of art, and have established a correspondence with learned and scientific men in foreign countries for the purpose of inquiry and information upon the subject of the said art."

And I would ask, Is it certain that we have done all that in us lay "for the general advancement of civil architecture, and for promoting and facilitating the acquirement of the knowledge of the various arts and sciences connected therewith"?

Professor Cockerell, in his address of April, 1860 (twenty-three years after the charter was granted), said,—"Hitherto we have looked to the Royal Academy, the Government Schools of

* We fail to see why September, of all months, should be so described.—ED.

Design, and more recently the museums at Kensington and the two colleges of the London University, for those means (of education) which they command and offer for our benefit. We hope to form schools of our own, together with those advantages, and to offer higher collegiate grades which would reward eminence and recommend by certificates to the public patronage. These last already established in the shape of diplomas in the Colleges of Law and Physic, and every learned society of the present day, prove the advantage of their being also adopted no less in the Institute of British Architects. Our funds, being of our own creation, are necessarily too moderate to embark in such increased means of instruction and usefulness as we have long contemplated, but the time is now approaching for the enlargement of these means to this effect." Whether this hope of the worthy Professor is ever likely to be realised, time alone can fully reveal.

That we as architects, absorbed in fulfilling all the arduous duties of a most laborious profession, can ever become a teaching community in the professional sense, I do not believe; and notwithstanding all that we have been told of the management of these things in France, I venture to think it is not altogether desirable that we should.

I am old-fashioned enough to put faith in the self-reliant qualities of individual Englishmen; and am afraid I must continue to think that the very eminent men whose names I have mentioned would hardly have attained their vigorous stature, had they been drilled and organised in the days of their youth after the Governmental fashion which has been so fully described to us by our secretary, Mr. White.

But those men were giants in intellect and industry, and difficulties for them would only add to the delight of final success; and it is not for such men that such systems are needed.

That the Obligatory Examination for Associateship with this Institute has been established, is indeed a great fact in our history, and when it is made complete, as in all fairness it necessarily must, by extension, with certain exceptions, to those who, not having passed as Associates, are seeking the rank of Fellows, one of the great results foreshadowed by Mr. Cockerell will, perhaps, in this most valuable sense, have been accomplished.

But Examinations necessarily presuppose preliminary instruction, and the question arises, Can anything be done by this Institute for its development or improvement?

Presuming that all young men proposing to enter such a profession as ours have received a complete and liberal education, I agree with the late Mr. Street in thinking that the system of pupilage which enables men to learn exactly how those who have succeeded in making their mark are in the habit of working, is no doubt the strong point of our English system; and, if it be only of sufficient duration, and is properly followed up by taking advantage during its continuance of the artistic instruction offered by the Royal Academy, and that more practical by the professors of architecture, and, more important perhaps still, the thorough study both at home and abroad of the works of the great masters of old; I believe that as much will be done as is really practicable in giving a man an entrance to what must necessarily be a course of life long study.

But no instruction that can be devised will make men architects who have not the inborn genius to become so. It may, however, make them well-instructed practitioners, and everything that can be done towards raising the general standard of knowledge must necessarily be in the highest degree advantageous.

Much excellent and highly commendable work has been, and is still being done, by our younger sister the Architectural Association, and if by any means the work of that valuable institution can be supplemented and aided by our elder body, in liberally sharing with them any advantages which our more matured status may enable us to supply, I think it would be desirable for both, and should by us be ungrudgingly given.

The President of that Association is now, happily, a member of our Council, and it is to be hoped we may always have one at least of its most influential members in that position, so that, while working on different lines, the elder and the younger may move harmoniously towards the common goal of each, the end so carefully foreshadowed in the preamble of our charter.

But while advocating, as I would very strongly, the utmost possible strengthening of this bond of mutual assistance, not less strongly would I advise the keeping of the two bodies thoroughly distinct.

Anything that would tend to depress the vigorous elasticity of the more youthful members, would, in my judgment, be a thing to be deplored, but everything that we can do to aid them in qualifying themselves to take their places amongst us, first as Associates, and finally as Fellows, will prove I hope, to be an unmixed benefit.

But that, irrespective of direct teaching, the past years of the Institute have not been unprofitable in result cannot, I think, be denied by any one who takes the trouble to peruse the record of its transactions. Mr. Eastlake's paper on this subject, read in 1860, was an exceedingly interesting and instructive *resumé* of what had occurred before that time, and I do not think the historian of the future will find the later proceedings, when carefully considered, at all less valuable.

As regards our ordinary meetings, we have been told that our proceedings are for the good of architects and not of architecture, which is true in a sense, though possibly not in that it was intended to convey. Solomon says that as "Iron sharpeneth iron, so a man sharpeneth the face of his friend," and I heartily agree with what fell on a recent occasion from our friend William White as regards the knowledge to be acquired, in that sense, from attending our meetings; for many an observation, it may be, casually made in our rooms, has struck, and been valuable to myself for life. But while admitting that, and freely acknowledging the very great value of many of the papers read, and the discussions that followed them, there can be no doubt that in ours, as in every human institution, there is room for improvement, and it behoves each one of us, if we desire the continuance of our society, to put his shoulder to the wheel.

Each member of the Royal Academy, when admitted within its ranks, has, I believe, to present, within the year of his admission, a work of his own, illustrative of his powers as an artist.

Would it be too much to ask of each of our Fellows or Associates, as they join our ranks, the contribution of an essay or paper on some subject connected with architecture or its practice of which he had made a particular study?

I well remember that, at the first meeting I attended as a visitor in the Institute rooms, Mr. George Godwin's valuable essay on "Concrete," which gained him a prize, was read, and I believe on that occasion, or very soon after, he was admitted an Associate. That essay stamped the character of the man, and we all know how ably and honourably it has been maintained throughout the course of a long and laborious life.

Are there none of our younger brethren equally anxious to show what they can do, and would it not be good for them and useful for us, that they should take the opportunity offered by our meetings of testing their powers?

Good papers, and free and full discussions, must continue to be the life of our meetings, and the better the papers the more assured will be the reputation of those who read them; and the criticisms afforded by discussion will be alike useful both to writers and hearers.

Nothing is more important than that our meetings should be always made interesting, and if interesting they can scarcely fail to be instructive. Our aim, as members of this Institute, should be, in the words of our charter, "the general advancement of civil architecture, and the promoting and facilitating the acquirement of the knowledge of the various arts and sciences connected therewith" in every possible way; and so long as we act on these lines, our work will clearly show, that the protection of our own material interests is *not* the great end of our corporate existence.

The honourable practice of a noble profession is what our charter requires, and should be one great object of our lives as architects; and, in my judgment, nothing is more likely to conduce to the attainment of this end, than the free intercommunication of ideas which must almost necessarily result from loyal association with one another as members of this Institute.

As regards our future: in the early days of the Institute, its correspondence was almost entirely limited to the Old World, and naturally so, because there alone are to be found the glorious structures of the architecture of the past; but when we consider the enormous expansion of the Greater England beyond our shores, and yet within such easy reach; when we see or hear of the wonderful cities that by the energy of our fellow-countrymen have been entirely built since this Institute was founded, it cannot, I think, be doubted, that more active measures should be taken for enlarging the area of our sympathies and our correspondence, and to aid in the development of the work of those younger people, of whom so much may hereafter be expected.

Statesmen are turning their attention to the Federation of the English-speaking colonies, and if the Institute of Architects can do anything to aid the bonds of union, it will, in my judgment, be a mutual benefit. Nothing is more remarkable than the clinging of the colonists of Canada, Australia, and New Zealand to the old country, and anything that can be done to foster this attachment, must, I think, be a step in the right direction. Already there are in Australia and New Zealand members of our body, and we hope that their numbers may be increased, and that in India also we may be more strongly represented than at present.

While speaking on this point, I may remind you that, at our meeting of the 24th March last, in response to application from abroad, a by-law was so altered as to provide that examinations can now be conducted with a view to the admission of any architects beyond the sea who desire to share in the privileges of membership.

But, gentlemen, there is, as you are aware, a further question as to the future which requires to be faced. Hitherto I have spoken chiefly of our past and present existence as a body corporate under a charter, and have said but little as to internal government. I must confess that until I needed it for the purpose of this address, I had never very carefully studied that charter, and consequently did not know as I ought, how much we were really indebted to the men who framed it. Only one of them now remains, the loved and honoured Nestor of our Institute, Professor Donaldson, and, therefore, we cannot now thank them for the pains they took in providing for its settlement: it is a very valuable document, and, for the times in which it was granted, everything that could be desired, and, as I hope I may have shown you, has been useful as a text for myself.

But times and practices have greatly changed since it was framed, and the bonds in which in some respects it holds us, are hardly consistent with the expansion which in others has enlarged our view.

Whereas, in our older days, London architects were almost a class apart, and provincial men seldom wandered beyond their own cities or districts, it may now almost be said that there is no such thing as provincialism.

Our members are to be found everywhere; from the East to the West, from the North to the South, and it should be our aim to bind them all together in one strong brotherhood of mutual regard and confidence, and to make their privileges equal to our own.

Outside our ranks, also, there are able and honourable men who cannot join us, owing to minor technicalities, which we would willingly brush aside,* were it not for the fetters which by our charter are imposed.

There is, further, a strong section of our body which feels,—and, as I think, justly feels, now that the examination test has been finally settled,—that Associates have a right to a larger share in the management of our affairs than by the charter is allowed them.

All these facts point to the necessity of change, and provided it can be prudently accomplished, I for one shall rejoice in the improvement. Naturally, as Englishmen, I hope we all detest revolution; but the best way of avoiding such catastrophes is by the timely institution of necessary reforms.

With this view therefore, and for the purpose of meeting all questions that have lately arisen with reference to the points I have named, or otherwise, a special committee has been appointed, and is in communication with the honorary solicitor, first, as to the possibility of amending the existing charter, or of supplementing it by additions; and, secondly, failing the possibility of such changes, of ascertaining

* Surely not that which provides against an architect having any commercial interest in building materials or inventions? That keeps out one or two able men, we know; but there ought to be no talk of relaxing it.—Ed.

whether a charter with new provisions could be obtained, without sacrificing the traditions of that which we at present possess.

These are important questions, which require time for safe solution; but I think you may rely on the desire of the Council to bring them as speedily as possible to a satisfactory termination.

A charter is undeniably a good thing; it gives to an institution like ours a breadth of base, and solidity of structure, such as we, as architects, ought greatly to prize.

Most of us, I hope, have some reverence for that which is old when it has been proved to be valuable in the times that are past; and if without danger to the future we can amend and retain what we already possess, it will be the part of wise men not to let it slip.

*Competitions.*

On the subject of a recent competition, you will probably expect me to say a few words.

On competitions in general, so much has been, and so often, said, that I need not detain you by further remarks of my own.

That competitions are an inevitable characteristic of the age; that they were not altogether unknown in the earlier days of our art, and that when conducted on the strictly honourable principles, such as should always characterise the practice of the architect, they are by no means the unmixed evil that some would represent, has long been my own opinion; and it has not been shaken by what, from time to time, has been said on the other side.

I cannot myself see why, if we offer prizes to young men for the best designs or drawings produced by them as students, and which most of us think is an incentive to industry in acquiring a knowledge of their art, they should in after years be debarred from securing by similar means, that employment in professional life for which their former efforts have been the best preparation.

But, be that as it may, competitions cannot be got rid of; and all we can do in this Institute is to use our best endeavours to get them conducted on sound and fair principles.

I think we are all agreed that no competition should be decided without the aid of a professional referee. This necessity is now much more frequently recognised than was formerly the case, and applications are not unfrequently made to the President or the Council for advice as to the appointment of architects as adjudicators; but it must rest with competitors themselves to insist on the adoption of this safeguard to their interests.

Human nature being constituted as it is, it is not to be expected that any decision, however just, will satisfy all competitors; but if, instead of railing against the inevitable, men would take pains to search out the reason of their failure, we should perhaps hear less than we sometimes do, as to corruption and unfairness, where none may at any time have really existed.

As regards the Admiralty and War Offices competition, for the decision of which I had the honour to be selected as one of the professional judges, it would not become me to defend the action of the judges, or to criticise the views of those in authority, who prepared the instructions upon which their judgment was to be founded. I will only say this, which I believe may be taken as entirely true, that the sole object of the latter was to get the best possible building for the detailed requirements of the public service, and of the former to discover, without fear or favour, the men best qualified to carry their instructions into effect. Whether that end has been accomplished, it must be left to the future to declare; I can only say that no pains were spared by any of us for arriving at a just conclusion, and whether our judgment was right or wrong, it was that which each one of us honestly believed to be right, and, right or wrong, it was absolutely and entirely fair.

It had been said that none of the designs selected were of a monumental character; but when a problem is put before architects, not chiefly for the production of a grand national edifice, but for the convenient accommodation in their every-day work of some 1,500 clerks of varying grades, all requiring the primary requisites of light and air, easy access and communications, and comparatively few of the higher officials and chiefs of departments, and practically no rooms needed for State receptions, and all to be got within a very limited area,—it would be a difficult task indeed to combine so much of common place with an exterior of monumental character.

Truly to my mind the conditions of the problem were barely reconcileable with architectural magnificence, such as might possibly please outsiders, but be in many respects opposed to the everyday wants of the working bees to be accommodated within. Much has been, and much more will doubtless be, said in criticism of the selected design. I shall not add to those criticisms; but, to my mind, it is little short of wonderful that, whatever its faults of detail may be, so fine a plan, and so good an elevation, should have been entirely wrought out by men, solitary students in a provincial town, with no special advantages, untravelled, unknown to the world of art, and who have produced drawings of the most remarkable delicacy, which may have been equalled, but never, to my knowledge, surpassed for perfect execution; that such drawings as those submitted in each competition should have been prepared in so short a time, as I understand, by two men (one an invalid) and a youth working together without extraneous assistance, excepting as regards perspective and figure drawing, whatever else may be said, is undoubtedly a very remarkable example of that "well-directed labour," to which, as the great first president of the Royal Academy said, "nothing is denied."

I will not refer to any other case of competition, but it may not be inappropriate to say a few words on the treatment proposed for one of the noblest of our ancient monuments; and, just as the Chief Commissioner of Works deserves our thanks for his determination to see absolute fair play in the decision as to the new buildings, so, I think, is he to be congratulated on what he has done with reference to the opening-up and preservation of Westminster Hall.

The clearing away of the old Law Courts has revealed to us a picture such as we could hardly have anticipated, a vision of magnificent simplicity and proportion, which, having once seen, we can hardly bear to lose again.

The appointment of Mr. Pearson as architect for the restoration of the old building, showed a wise discrimination and determination to do the best thing possible, and the very able and exhaustive report presented by him, is a further confirmation of the wisdom of the choice.

But, while there can be no doubt whatever as to the necessity of the structural restoration of the great Hall itself, it is permissible to regret that it should ever again be concealed from view by any new buildings, however correctly designed on the ancient lines, that may not be absolutely necessary for permanent sustentation.

I think in this case the action of Parliament is hardly to be regretted, if it gives further time for the consideration of a subject of unquestionable difficulty, and one which so deeply concerns all who care, as we should do, for the preservation of the ancient monuments of this great city.

*Conferences.*

With regard to the conferences held in our rooms in the month of May, complete reports of which will be found in the volume of Transactions, it will, I think, be unnecessary to detain you with many observations.

Admirable memoirs were, as you will remember, read by Mr. Wethered on Viollet-le-Duc; Mr. Beresford-Hope on Street; and Mr. Aitchison on Burges; each replete with interest for us as architects.

Valuable papers also on architectural practice were contributed and discussed by members of our own body, and visitors from various parts, the reports of which have been duly recorded, and will, I hope, be found profitable reading in the future.

Professor Kerr wound up the conference with a paper, which Mr. Beresford-Hope rightly termed "a very brilliant one," on English Architecture thirty years hence; but although it was an essay of very great interest, I am not sure that the learned Professor has drawn aside the veil which covers the future so completely as he would desire; and he would indeed be a bold man who would venture to prophesy what is immediately in store for us.

I cannot but agree with him, however, in hoping and thinking, if I may quote his own words, that "it may not improbably be the destiny of England at a period by no means remote, in the development of the advancing scheme of Anglo-Saxon civilisation, to assume a leadership,—such as she already possesses in so much besides,—in the illustrious art which it is the pride and the joy of this assembly to represent."

I trust the gentlemen who visited us from the Provinces were not otherwise than gratified with the reception accorded them, and have taken back to their homes a pleasant and profitable recollection of this happy re-union.

The Conference at the Health Exhibition stands on a different footing to that to which I have just briefly alluded, but as many of us took part in it, and a full report of its proceedings will shortly be published, I do not think I need refer to them in detail; most of the subjects treated on were familiar to us as architects, and it was rather for the benefit of the outside public, than for our own instruction, that the papers were prepared.

Let us hope that some few individuals out of the millions who visited the Exhibition may have taken to heart a few grains of knowledge and common sense which may hereafter expand and bear fruit, and be useful to many besides those who were the immediate listeners. Perhaps, however, exception should be made in calling attention to the papers read by Mr. Aitchison and Mr. William White respectively; the former on "The Sanitary Aspect of Internal Fittings and Decoration," and the latter on "The Hygienic Value of Colour," both ably treated, and valuable alike to the architect and to the general public, if they care to profit by them.

The remarkable success of this Exhibition has indeed, been one of the great features of the year now drawing to a close, and I think it may be gratifying to us as architects to know that the interesting work of one of our own members, Mr. Birch, in reproducing the picturesque features of the streets of Old London, which he has done so learnedly and well, has not been one of the least attractive features of the show.

Before concluding my remarks, it is right that I should say a few words on the losses we have sustained in the thinning of our ranks by death, and the position in which we now stand as regards numbers and financial prosperity.

In respect to the first, we, in common with the whole English people, have had to mourn the untimely removal of a Prince pre-eminent alike in natural gifts and cultivated intelligence,—one whom we had fondly hoped would not only have been an honour to our country, but of great service in all questions relating to our art,—a hope, alas! not to be realised. The Council thought it their duty to present an address of condolence to our patron, H.M. the Queen, which in due course was graciously acknowledged.

We have also had to regret the loss, though in the full ripeness of years, of a most valuable member of our body, Mr. Knowles, a man who, having passed a most laborious life in the active performance of professional duties, might well have claimed in his declining years entire rest, but who preferred to remain amongst us as an Examiner and Member of Council, where I may safely say his presence was always as welcome, as his opinions were valuable. His last appearance at the Council-table only preceded by a few days that of his death.

In Edwin Nash we lost a most excellent man and an architect of no mean power,—one always ready to help as a member of the Institute, and a genial and honourable practitioner in our craft. He left an example in his will which may be usefully followed, in devising a legacy of 100*l.* to the insufficient funds of the Architects' Benevolent Society.

Charles Henman, less known to most of us, was one of my earliest professional friends; an able man, who, if he had not been possessed of independent means, would probably have made his mark more strongly than he did. He has left two sons still happily numbered in our ranks.

Many of you will have known, though I did not, William Pettit Griffith, one of our Fellows, who, I believe, was very highly respected.

In Sir William Siemens not only we, but the whole civilised world, sustained the heavy loss of a prince amongst inventors, and a most genial man, always ready to impart to others, as he did to us at this Institute, some portion of that store of knowledge of which he was so largely possessed.

The name of that enthusiastic antiquary,

John Henry Parker, the publisher of the "Glossary of Architecture," and the ardent explorer of the antiquities of Rome, must also not remain unmentioned, but as you will find in the Sessional Paper No. 8 of the present year an interesting notice of him, I need say no more to show how valuable were his labours to architects.

Amongst eminent foreigners our losses have been still more considerable; two Gold Medallists, Professor Lepsius, of Berlin, and Jean Baptiste Lesueur, of Paris, besides two other Honorary and Corresponding Members, Paul Abadie, of Bordeaux, and M. Chenavard, of Lyons. And, lastly, our Honorary Associate, the eminent physician, Sir Erasmus Wilson, to whose munificence I believe, we owe the bringing to our shores of the obelisk now standing on the Embankment.

But, notwithstanding these losses, our numbers have increased, and we may be said in that respect I believe, to be in thriving condition. Also, it may be very safely said, that our financial condition is thoroughly sound.

Finally gentlemen, although there are several other subjects on which I could have desired to speak, I think I have detained you quite long enough.

The past and the future of our own body is to us a theme of no little importance, and in this fiftieth year of our existence I have thought it better to confine myself mainly to its consideration, rather than to wander on the wider field of survey, which might possibly in some respects, have been more congenial both to you and to myself.

We have seen, I think, that the aim of the founders of this Institute was high and noble. Let our standard in the future be reared still higher. Their work was begun in weakness; let ours be continued in strength; and putting aside all petty jealousies, let us combine, not for mere personal advantage, but in the truest and most liberal sense, for the advancement of our art, and the establishment of its practice on that broad basis of honourable principle, which alone is worthy of the noble profession to which we belong.

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A report of the discussion which followed, and of the preliminary business, will be found on the opposite page.

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## THE WORK OF THE ARCHITECTURAL ASSOCIATION.*

In considering how the teaching in our society may be made increasingly useful to the members, the advisability of establishing a class for instruction in taking out quantities will certainly have to be carefully considered. The proposition is no new one: it has been before discussed, but a feeling seems to exist among some members that it is no part of an *architect's* training. I confess I take an entirely different view, and consider it a very important and useful part. A knowledge of how to take out quantities implies an acquaintance with construction, and those details of the different trades, together with a knowledge of materials, their strength and suitability for the various purposes for which they are required. The care with which quantities must be taken out brings to light and sight what had otherwise escaped notice, and has a distinct tendency to foster that spirit of carefulness and forethought in making drawings which cannot fail in the long run to be beneficial to the pockets of the client. The value of this knowledge in preparing estimates can hardly be exaggerated, and were this necessary part of our profession more generally known, we should not see those great discrepancies which a glance at the tenders in the professional journals weekly discloses. I am not arguing whether architects should take out their own quantities or not; every man must settle that point for himself. I do not think any rule can be laid down, but it is hardly necessary to point out, that if the requisite knowledge is cultivated and gained, a young practitioner may legitimately swell a small income, and if it is his lot to practise in the provinces, the necessity for this accomplishment will soon present itself. We have in our ranks many gentlemen who practise as quantity surveyors, and I am sanguine, that if a class is started we should not lack teachers, and I believe it would soon become one of the most popular classes of the Association. If a strongly-supported wish exists that the experiment should be made, I feel sure that the committee, as your representatives, will give the matter the most careful consideration. This, as well as other work in the Association, lies in your own hands mainly, and it is for you to say clearly what your wishes are, so that we may be guided in our judgment by the expression of opinion that is presented to us.

We hear a great deal talked about sanitary science, and I fear the profession is a little weary of the subject; but it is one we cannot afford to ignore, and it would be a most foolish thing to do so. At the risk of wearying you, and repeating what I have said about this matter on other occasions, I must say a few more words on the subject. Every one almost now who takes a house or intends building one asks the question, "How about the drains?" and when we consider that on whether these are right or wrong depends the health or sickness of the household, the importance of the subject from every point of view is brought before one, and unless, as the professional adviser, an architect can advise and carry out sanitary work in the latest and most approved way, he stands a very fair chance of finding that his income will suffer very materially. So putting the matter on those selfish grounds alone, the value of the requisite knowledge will be conceded by most. But let us consider it on the highest grounds, that upon our skill depend the lives and well-being to an almost incalculable extent of the inmates of the houses with which we are concerned. Suppose a young architect, in the face of the information now at his disposal, were to disregard it, and leave all the sanitary arrangements of his building to chance, and that shortly after it was occupied illness should occur, perhaps a death, and that inquiry, which in these days would assuredly follow,—for doctors are fully alive to the evils resulting from defective sanitary arrangements,—should bring to light that these were so badly constructed and arranged in the building we are considering, that the cause of the illness and death could be traced directly to this want of care and skill on the part of the young architect. This is not an unlikely case; it has occurred over and over again, and is too often solely due to culpable neglect. Bring home to your minds the sorrow this must cause in the household, and resolve that the charge of neglect in this respect shall never be laid at your door. In times past no one recognised the full extent of the danger involved in the water-carrying system, until medical science turned its bull's-eye lantern into the dark places of the system, and disclosed what frightful evils might lie hidden in our houses, ruining life, health, and happiness. The principles of house sanitation are now well known, and can be learned with patience and practice. To neglect this branch of the profesion is the most foolish policy, and can only end in discomfiture. Bear in mind, also, that a man conversant with modern sanitary science possesses an investment which has a valuable pecuniary interest attached to it, and his employment upon such work may lead to his securing more of another kind, perhaps more congenial to his tastes; at all events, in these days of competition in every walk of life, it is hardly prudent to let any chances slip through our fingers. The study and pursuit of this science is not dull or uninteresting; go into it with thoroughness, and I believe you will find that this is true.

What is the future of the Architectural Association? It was founded several years ago for the same aims that now exist, but I think if we were carefully to analyse the work done, with the number of members that belonged to it in its earlier years, it would be found that the proportion was a larger one than it is at present. We now number all but one thousand members, and, financially, our balance-sheet shows that the amount to our credit is considerable; but is the proportion of workers, and the amount and quality of the work done, in favourable comparison with past years? We are looked upon as a successful Institution, and that very fact carries with it a warning and a danger. Any community in its younger days is simpler in its tastes and pursuits than it is as it approaches maturity, and, little by little, if affluence falls to its lot, luxury creeps in, unless the rulers are wise and resist its insidious poison. It is the fashion now in the profession to belong to the Architectural Association, and, in a way, a very good fashion too; but I think I may say, without being accused of sounding the alarm unnecessarily, that there is at the present time a want of that early vigour and earnestness which was, as far as I can learn and judge, present in this body in the years of its infancy. The proportion of workers to the number of members last session I calculated was just about one-fifth,—that alone is not a very healthy sign,—even making fair deductions for those members who have passed through the classes, and others in practice who still, happily, keep their names on the list. But we want the younger men to come forward, not to be content with being members only, attending the classes and lectures and doing no practical work, but to work in sober earnest and to contribute that bone and sinew to the Society which shall make it strong, powerful for good, and respected. If students, as they join, will do this, then the future of the Architectural Association may be a bright and prosperous one, and we may see it grow, year by year, into an institution which shall possess valuable facilities for instruction far beyond what we have at present. The vision of a college where the art and science of architecture shall be taught, and the services of our greatest architects secured for teaching the various branches of the profession, is a vision that has been before our eyes for many a long year; and when one reads the valuable papers contributed by Mr. William H. White, Mr. R. Phené Spiers, and others, on the thorough system of art-education as carried on in France and Germany especially in the former, and learns what great results follow and how highly the profession and its professors are esteemed, one's heart sinks and mourns over the want of system and thoroughness which characterises the education of architects in this country. As Englishmen we should perhaps rebel at the strict academical course of teaching which is adopted abroad, but how much we might learn from it, and how valuable it would be if we could adopt some such system, so that the profession should in this country take the high position it does in France, when the State should recognise the duties it owes to art in the education of the people and the pre-eminent position of the Empire in the eyes of the world, and not, as now, entrust their buildings to the engineers and officials of South Kensington, and maintain an office of salaried architects for carrying out public architectural works, but seek out for employment and counsel those architects who have fairly won their reputation. A profession we have been much to blame in the past for allowing this state of things to be brought about; the very want of such a system as for something like 200 years has existed in France, has resulted in want of sympathy and union between the members of the profession and the profession and the public, which, had it been otherwise, would have given strength, as that we should have compelled recognition by the highest quarters by the right of having conquered difficulties, and have been able to show that men who had studied the art and science of architecture, and won distinction in their profession, were the men to whom public buildings of importance should be entrusted. The commercial spirit of this country has too little sympathy with the artist. If we are to succeed in turning out architects highly educated in their profession we must have better machinery than at present exists. If we were in thorough earnest as a profession in this endeavour, the good might be accomplished; and at a time when the legitimate prey of the architect is being constantly pounced upon by the vultures, the necessity for combination and self-preservation needs but little argument. We in this Association may do much; and, in honest rivalry one with another, cultivate the art with ardour, raise it in the eyes of the public, and not rest until it is placed high in the estimation of men so that they too shall love it and be proud of their public buildings and monuments, and proud, too, of the men who have raised them: so that if the ghost of Sir Henry Cole should rise from the grave, and repeat the question "What is an architect?" the answer may be taken from the tomb of the great Sir Christopher Wren, and, slightly modified, be, "If you seek to know, look around."

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**A New Franciscan Monastery** will shortly be commenced at Upton, Essex. The architects are Messrs. Pugin & Pugin, of Westminster.

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* Continuation of the opening address, delivered by the President, Mr. Cole A. Adams, at the meeting on the 24th ult. See p. 557, *ante*.

## OPENING MEETING, ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The first meeting of this Institute for Session 1884–85 took place on Monday last, Mr. Ewan Christian, the President, in the chair.

Mr. William H. White (the Secretary) intimated the decease of Mr. John Holloway Sanders, of Derby, one of the Fellows of the Institute. He also referred to the death of M. Paul Abadie, of Paris, Hon. and Corresponding Member. Professor Raschdorf, he stated, had during the recess visited London. The Professor was the architect of the new English Church at Berlin, and the Crown Princess had requested that he might be assisted in his inquiries in London by some English architects. The President, Mr. Grüning, and Mr. William Simpson had therefore accompanied him on several occasions. Mr. F. R. Farrow, the holder of the Godwin Bursary, had been very kindly received in Vienna by Herr Leonard, the secretary of the Guild of Architects, by Baron von Hansen, Baron von Hasenauer, and the son of the late Baron von Ferstel. Mr. Farrow had spent a week on the works of the new Town Hall, which Herr Schmidt, Royal Gold Medallist of the Institute, was erecting. Mr. Farrow had also been assisted with letters to architects at Buda Pest, and every facility appeared to have been afforded him to study points of construction in some of the new barracks, and in a new hospital now being completed.

Several donations of books were announced. Professor Meldahl, Rector of the Royal Academy of Fine Arts, Copenhagen, sent a folio work on "Mediæval Churches, and other historical Monuments of Denmark." Herr Schmeiden, of Berlin, presented the third part of his illustrated work on "Decoration of Interiors,"—a work commenced by the late Herr Gropius, Corresponding Member. A series of plates, representing the buildings erected by the late M. Rohault de Fleury, were presented by his son. M. Ruprich-Robert sent the second part of his new work on "Norman Architecture"; and the following works had also been received:—M. Viollet-le-Duc's "Drawings and Designs," M. Hénard's memoir of Lesueur, and M. Lucas's memoir of Chenevard. M. Lucas had also forwarded a pamphlet on the proposed rules or statutes of an Association of Architects for the defence of professional interests in such questions as responsibility, public competitions, artistic copyright, &c. M. Questel, the Senior-Architect-Academician, is president of the new body, and the members propose to establish a fund for affording pecuniary assistance in judicial and administrative cases. Votes of thanks were passed to the several donors.

Mr. J. Macvicar Anderson (the Hon. Secretary).—I had the pleasure, some little time since, of intimating that the Council had determined to accompany the prize for the Pugin Studentship with a medal, by way of giving a more enduring memorial than mere money, in recognition of the zeal and ability of the Pugin Students. That medal is in course of preparation. It has also occurred to the Council, with regard to the Godwin Bursary, that it would add to the value of the prize if a similar medal were given with it. The Council have communicated with Mr. George Godwin, and asked whether it would be in accordance with his wish that such a medal should be given; and I have the pleasure of intimating that he has informed us the proposal meets with his entire concurrence. He has also requested that he may be permitted to subscribe towards the expense of the die, accompanying his request with a cheque, which will go a considerable way towards defraying the expense. Mr. Anderson further intimated that he had received a communication from the solicitors of Miss Hannah Jane Jones, the only surviving sister of the late Owen Jones, stating a desire to found an Owen Jones Scholarship, for the purpose of enabling the holder to travel in Europe or elsewhere, for the cultivation and improvement of his knowledge of architecture. The scholarship is to be tenable for two years, the nomination being with the Council of the Institute, and the nominee to be a present or future pupil of some member of the Institute, or of the Professor of Architecture in University College, or of the Birmingham and Midland Institute, to be deemed eligible by reason of proficiency in the leading subjects treated by Owen Jones in his "Grammar of Ornament." Miss Jones contemplated providing for the endowment fund the sum of 1,250*l.* Midland Railway Four Per Cent. Debenture Stock, producing 50*l.* per annum.

The President.—I think you will consider these communications as of the very greatest interest to us. Mr. Godwin has shown again how much he is ready to do in everything that can promote the study of art, and I think it is right that this medal should be given to those who fulfil his wishes in terms of the Bursary he has founded. As to what Miss Jones has done, this additional prize will be of the greatest advantage in future to our students, and I am glad that it should be coupled with the name of one whom we must always hold in the highest respect, as one of the most earnest, and hard-working architects this century has seen.

Messrs. Josiah Conder and George Rackstraw Crickmay were elected Fellows, and Mr. Charles H. H. Cazalet an Associate, of the Institute.

Mr. G. Richards Julian then presented a memorial signed by 453 Associates, 308 being resident in London, and the remainder scattered throughout the United Kingdom. The memorial was in the following terms:—"We, the undersigned Associates of the Royal Institute of British Architects, desire respectfully to direct your attention to the fact that, although professional members, Associates under the existing charter and by-laws are debarred from taking any part in the regulation of the affairs of the Institute, and to urge the following considerations,—Every step which renders our Institute more truly representative will add to its influence and its popularity, and any change which improves the position of the Associates will add to the dignity of the Fellowship. Moreover, the authority of the Council will be enhanced by making the electing body consist of all professional members. It should be borne in mind that at present the Associates subscribe about one-half of the total amount contributed by professional members, and yet they have no control over the expenditure. A large number of the Associates are actively engaged as principals, and are, therefore, equally interested with the Fellows in questions of professional practice. In the Institution of Civil Engineers, and in the Surveyors' Institution, professional Associates vote on the same terms as Fellows, and in these kindred societies the practice is found to work satisfactorily. We, therefore, most strongly urge you to determine the best method of giving to professional Associates the right of voting on all matters relating to the regulation of the affairs of the Institute, and suggest, in the interest of country Associates, that the votes be recorded by means of voting papers, transmissible by post."

The President said he was very happy to receive this memorial, which would be laid before the Council with the least possible delay. He sympathised with the memorial, and believed he had anticipated the matter in the address he was about to deliver.

The President then read his address, which we print in this number (see p. 617).

Mr. Mitford, of the Office of Works, and an Hon. Associate, proposed a vote of thanks to the President for his able address. The Institute was to be congratulated on its flourishing condition, and had attained no mean amount of success for so comparatively young an institution. The fact that their young members were now admitted into the body by examination proved that the Associateship and Fellowship was no dead letter, but a real thing, only to be obtained by labour, and that of a severe character. In fact, the Institute now offered what might be termed an Academic degree.

The Right Hon. G. J. Shaw-Lefevre, M.P., the First Commissioner of Works, was glad of the opportunity of stating publicly the great services rendered to the Government by the President and Mr. Hardwicke, in consenting to act as judges in the recent competition. Few besides himself knew the labour this had entailed upon those gentlemen, or the conscientious zeal with which they had devoted themselves to the difficult task of adjudicating on so important a matter. He might take the opportunity of pointing out that the competition involved two innovations, as compared with previous competitions for the great buildings of the Government. In the first place, he might point out that in previous competitions for public offices architects were requested to act, not as judges, but as assessors; while on this occasion the two eminent architects he had named were invited to act as judges with the Chancellor of the Exchequer, the First Commissioner of Works, and Mr. W. H. Smith. In this respect he thought they would agree that a proper and due position had been accorded to the profession. In the next place, the competition was the first example in connexion with Government work, in which double selections were made. It was open to all the world to send in sketch plans, from which a certain number were ultimately to be selected, and a second competition of a more elaborate character entered upon. Those who entered on the second competition received a premium, which he hoped would be some consolation for the great labour they had devoted to the matter. The profession of architects readily responded to the invitation addressed to them, no fewer than 158 designs being received. He believed he was the only person who was in a position to state that the competition was of a fairly representative character, including in it a certain number of the most eminent members of the profession, though some very conspicuous gentlemen were not engaged in it. The result of the competition was in itself a voucher to the complete fairness with which it was conducted. No one was more surprised than he was with the result of the selection of two gentlemen thoroughly unknown to fame beyond their native town in Yorkshire. This, as he had said, was a voucher that the competition had been carried out with the utmost fairness. One of the chief conditions laid down by the judges was that the designs should answer the purposes for which the buildings were intended,—that they should be suitable for great public offices, and that the interiors should not be sacrificed for external effect or mere architectural display. He regretted to say that a good many of those who failed to appear amongst the first nine, showed defects in the plans. With regard to the style which was finally selected, it might be interesting to architects to state that of the 158 designs sent in not more than five, and he was not quite certain if more than three, were in the Gothic style. Now, twenty-five years ago, when the designs for the Foreign and India Offices were sent in, more than half of them were Gothic; and so again in the more recent competition for the Law Courts nearly all were Gothic. It was, therefore, evident that there was a great change in public opinion. They might accept it as the general opinion of the profession, having regard to the uses for which the building was intended and its position and surroundings, that a Classic design was more suitable than a Gothic one. [This statement elicited different expressions of opinion.] He did not wish to raise any controversy, and he hoped they might be spared a repetition of the battle of the styles. He believed he might say that on the whole the verdict of the judges had been approved by the profession and the public; and the Government intended in the coming session to submit a vote to Parliament for the purpose of enabling Messrs. Leeming & Leeming to carry out their designs. But these were not the only important works which were being carried out by the Government. Allusion had been made to the improvement connected with Westminster Hall. It had been his duty to clear away the old Law Courts, and to consider how the west front of Westminster Hall should be restored. He had made it his duty to have the advice of Mr. Pearson, an architect recognised as one of the most competent for a task of this kind. His plans were now before the public, and involved the restoration of the west front to the condition in which it existed from the time of Richard II. to the commencement of the present century, when the old Law Courts were built. This involved the building of a double-storied cloister to the flying buttresses of the old Hall, and the principal justification for this was the preservation of the Norman wall of the west front, with its beautiful old work, including the masons' marks. If the front were left exposed, the London atmosphere would produce its effect upon the old wall. There were differences of opinion in connexion with this, and he had determined to refer the question to a Select Committee of the House of Commons during the coming session, when evidence would be heard for or against it. Another great improvement was the work now in progress at the Tower of London. This consisted of two kinds: first, of demolition, and, secondly, of restoration. The demolition entailed the removal of the hideous warehouses, which for

many years had interrupted the view of the Tower from the river, while the restoration consisted of the re-building of the inner ballium wall, and the Lantern Tower. The first half of the work was completed. One great block of warehouses had been demolished, and in its place the ballium wall and Lantern Tower had been finished. In the course of a few days the other half of the work would be begun, and the work finally completed. This work had been under the charge of Mr. Taylor, a gentleman connected with the Office of Works, and he wished to express his high sense of the ability and the services rendered to the Government by that gentleman. He believed they would consider that these were no unimportant works now in course of construction, or contemplated, in reference to public buildings in London. He would remind them that there was no city in the world where there was such a field for architectural investigation and study as that of the great metropolis in which they lived. There was no city in Europe where there was such a long and unbroken series of great buildings, containing every phase of architecture during the last 800 years, beginning with the old Norman works of the Tower and Westminster Hall; then proceeding to the Abbey, which showed almost every phase of Gothic ecclesiastical work, from the time of Henry III. to Henry VII. They had two of the most beautiful specimens of Domestic Tudor work in Holland House and Charlton; they had the Renaissance work of Inigo Jones; the splendid series of works by Wren; and finally in the works of Sir Charles Barry and Mr. Street, the completion and possibly the end of the Gothic revival. He meant, of course, as far as secular buildings were concerned. It was quite possible that Gothic architecture might be used for a long time to come in ecclesiastical buildings, but looking at the tendencies of the present day, he believed they had seen its close as regards secular buildings. But who should venture to say what was the immediate tendency or the future prospects of architectural style? In the presence of so many experts he would not venture to express an opinion upon it. He might remind them that the style, especially of our public buildings, was not merely due to the architect, but to the taste, or want of taste, and the requirements of the public. He believed that even Sir Charles Barry was forced by public opinion to adopt the Gothic style for the Houses of Parliament, almost against his natural judgment; and certainly public opinion, in the shape of Lord Palmerston, forced Sir Gilbert Scott to abandon his Gothic designs for the Home and India Offices, and to adopt a style he did not at all like. He would conclude by saying that though the profession had suffered from severe losses of late years through the death, and sometimes the premature death, of many of its leading members, he ventured to hope that it contained within its ranks many able, competent, and willing, to carry on the great work of English architecture, and who would leave behind them memorials as great and beautiful as those which remained from the past.

Mr. Charles Barry seconded the vote of thanks, and, referring to the memorial which had been presented, said that, as a member of the Council, he echoed the words of the President. There was every desire on the part of the elders to endeavour to give proper effect to the wishes which had been expressed. They were desirous to initiate several reforms, but not to tend towards anything like revolution. They might congratulate themselves on the presence of the First Commissioner of Works, and his important adviser, Mr. Mitford, who had assured them in no measured terms that they had to a great extent the same views, hopes, and aspirations as the architects themselves, so far as their art was concerned.

The vote of thanks was then carried by acclamation.

The President returned thanks, and added that he could not agree with the First Commissioner of Works that Gothic architecture was in a sense dead. He did not agree with him at all. If they had found a Gothic plan of equal merit to that which had been selected, with a really fine and suitable elevation, it would have had the best consideration they could give it. But unfortunately the Gothic designs had not the best plan, therefore they were necessarily rejected, as convenience and accommodation were the first requisites. He hoped that in some future competition, men who had really studied Gothic architecture as it ought to be treated, in a free way so as to suit every modern requirement, would not be deterred from entering the lists by words used by the First Commissioner. They all knew how strongly Mr. Street insisted upon the subject of plans, and no man was more careful and more thorough in his production of them. If there were defects in his Law Courts, it was not the fault of Mr. Street, but of those who bound him in iron chains, which he could not burst.

The meeting was then adjourned to the 17th inst., when a paper will be read by Mr. Stannus on the "Architectural Treatment of Cupolas in general, and that of St. Paul's in particular."

## Illustrations.

### MONUMENT TO THE LATE DEAN STANLEY, WESTMINSTER ABBEY.

AT the time this monument was placed in its position in the Tudor Chapel, we commented upon its excellence as a likeness and its expressiveness and suitability to the place as a monument. Few recent sculptured portraits have been more successful in giving the character and expression of the original face, and there is a fine breadth of treatment in the drapery. Like Browning's bishop in St. Praxed's Church, the figure lies,—

> "Letting the bed-clothes, like a mort-cloak, drop
> Into great laps and folds of sculptor's work";

but there are far other associations connected with it than those which clustered round the life of the gay Renaissance bishop, who was so anxious to have the best nook in the church reserved for his monument. Like him, indeed, Stanley may be said to have "fought with tooth and nail" while living, but it was not to "save a niche" for himself in the Abbey or elsewhere, much as he loved his great historic church, but as a soldier in the battle for good against evil, for breadth and charity against narrowness and bigotry and sectorianism. The subdued light of the stained glass adds to the feeling of repose which pervades the monument and its surroundings, and contrasts strangely, but not unfittingly, with the recollection of the eager and strenuous character of the man who is thus commemorated. The engraving, which, like all the English wood-engravings published in the *Builder* during the present year, is from the *atelier* of Mr. Cooper, appears to us to convey admirably both the features and details of the sculpture and the rich subdued light under which it is seen; and we are glad to be able to add that Mr. Boehm, the sculptor of the figure, has expressed himself much pleased with this translation of his work. The pedestal is designed by Mr. Pearson, the architect to the Dean and Chapter.

### DESIGN FOR WAR AND ADMIRALTY OFFICES.

BY MR. THOS. PORTER, F.R.I.B.A.

WE give the two principal plans, and a view engraved from the architect's drawing, of Mr. Porter's design, the last of the nine of the second competition. One of the points of the plan, it will be observed, is the provision of a courtyard to the Whitehall side, throwing the building into two wings at this point. Mr. Porter sends us the following statement of his views and intentions in the working out of the design:—

"The author of this design has adopted the Italian style as being in his opinion the best suited to harmonise with the neighbouring Government Offices, and also as affording the means of securing ample light.

The frontages toward the Park follow closely the boundary-lines of the site, thereby avoiding loss of valuable space.

The narrowness of the street opposite the site in Whitehall induced the author to abandon an unbroken façade on the east side, and to gain additional apparent width by deeply recessing the centre portion of the Whitehall front, and thereby opening up a handsome forecourt screened from the street by a stone balustrade and dwarf carriage gates. The forecourt would afford greater quiet and privacy to the Offices than an unbroken frontage. In the centre of the recessed portion of the forecourt a lofty archway for carriages and side archways for foot-passengers lead to the quadrangle, 282 ft. long by 113 ft. wide. Second archways of similar character give access to the quadrangle from Spring-gardens.

The whole of the rooms in the building are well lighted, and of comfortable proportions. Long narrow rooms have been avoided, and all important rooms either face the street, or the Park, or the great quadrangle.

The rooms of the principal officers of both departments are placed on the first floor, fronting St. James's Park. The room for the Commander-in-Chief is placed at the south-west angle of the building, and that of the Secretary of State for War faces the Parade. The room for the First Lord of the Admiralty is placed at the north-west angle.

The arrangements of the rooms on the second floor are similar to those on the first floor.

A mezzanine floor (between the second and third floors) is devoted entirely to repositories, lavatories, and water-closets. The latter are well lighted by the inner courts, around which they are arranged. The repositories are intended mainly to be lighted by electric light. The lower basement floor accommodates the repositories not provided for on the mezzanine floor. A lofty crypt under the whole of the quadrangle is also devoted to repositories.

The entrance-halls, saloons, and corridors are well lighted, and would form ornamental features internally.

The buildings are intended to be faced with brown Portland stone.

The first-floor rooms are about the same height as the first-floor rooms of the New Government Offices."

*Key to References on Plan.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
B 1. Director of Artillery.
B 2. ,, Supplies.
B 3. ,, Contracts.
B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
C 1. ,, ,, ,,
C 2. ,, ,, ,,
C 3. ,, ,, ,,
C 4. ,, ,, ,,
D. Finance Department.
D 1. Finance Department.
D 2. Auditors.
E. Military Department.
E 1. Military Secretary.
E 2. Adjutant-General and Quartermaster-General
E 3. Intelligence Department.
E 4. Deputy Adjutant-General R.A.
E 5. Deputy Adjutant-General R.E.
E 6. Army Medical Department.
E 7. Military Education Department.
E 8. Commissary-General's Department.
E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
F 1. Army Purchase Commission.
F 2. Judge Advocate General.
F 3. Pay Office. Commissariat and Transport a Ordnance Store Corps.
F 4. Pay Office. Army Hospital Corps.
F 5. Army Sanitary Committee.

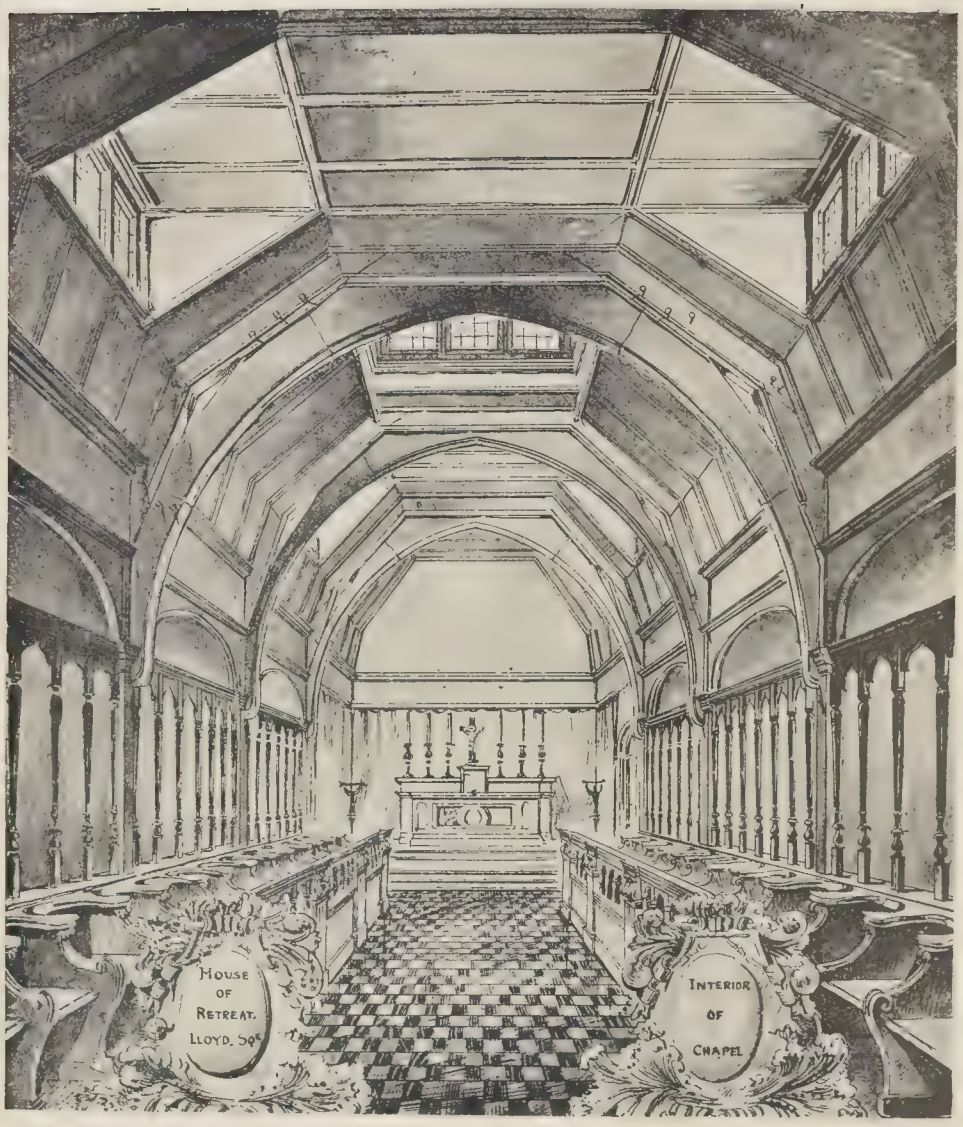
THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
A 1. Board-room Suite.
A 2. Military Branch.
A 3. Intelligence Branch.
A 4. Naval Branch.
A 5. Civil Branch.
A 6. Legal Branch.
A 7. Registry Branch.
A 8. Record Office Branch.
A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
E 1. Director of Naval Construction.
E 2. Engineer-in-Chief.
E 3. Director of Naval Ordnance.
E 4. Store Branch.
E 5. Dockyard, Ship, Gunnery, and Registry a Copying Branches.
F. Accountant-General's Department.
F 1. First Division.
F 2. Second Division.
F 3. Third Division.
F 4. Fourth Division.
F 5. Fifth Division.
F 6. Sixth Division.
F 7. Greenwich Hospital Division.
F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

### MONSTRANCE IN THE MÜNSTERKIRCHE AT ROERMOND, HOLLAND.

ROERMOND,* in Holland, is an interesting o town, containing two very interesting church The cathedral dedicated to St. Christopher i large plain brick building, dating from t fifteenth century, with long apsidal transep a rather short nave, and a rather long chanc

* This has been unfortunately mis-spelt "Roesmon in the lettering of the Plate.

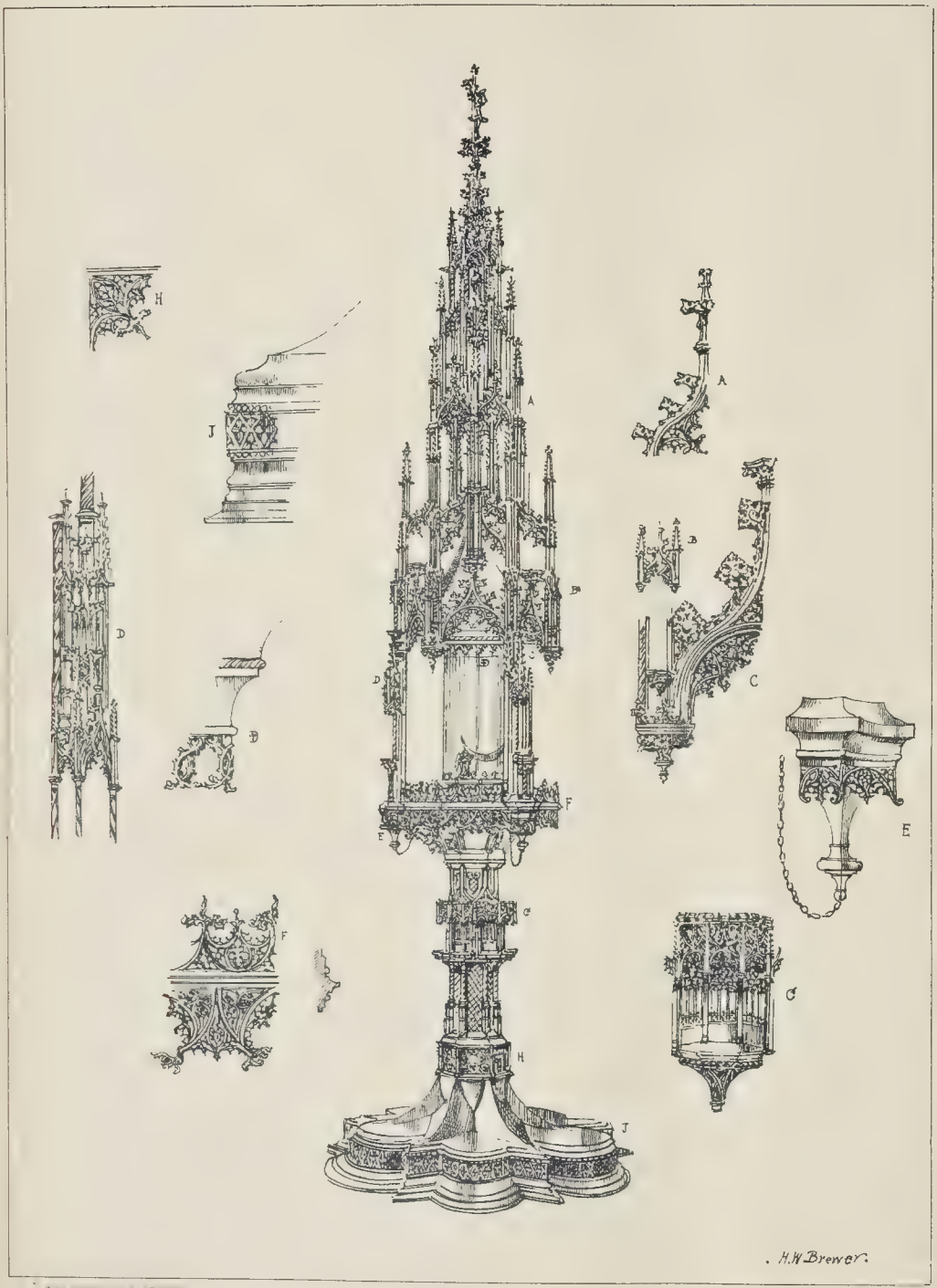



*Photoprint, Waterlow and Sons Limited, London.*

HOUSE OF RETREAT, LLOYD SQUARE.

Mr. Ernest Newton, Architect.

*Reproduced by "Photoprint" from the Architect's Drawing.*



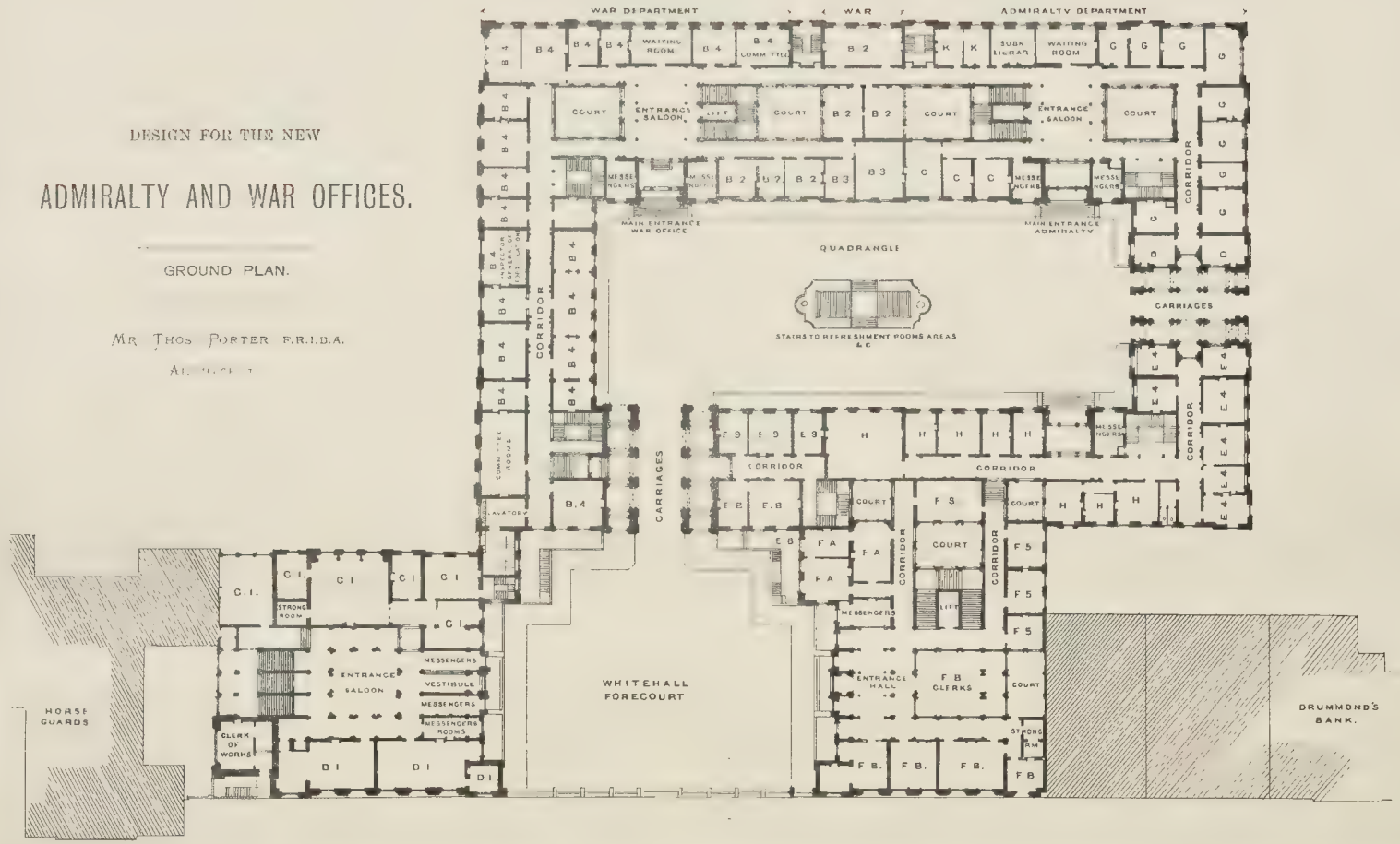

MONSTRANCE AT ROESMOND, HOLLAND.

DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

GROUND PLAN.

MR THOS PORTER F.R.I.B.A.




Wyman & sons Photo Litho

C. Queen St. London. W.C.



DESIGN FOR NEW ADMIRALTY AND WAR OFFICES.

By Mr. Thomas Porter, F.R.I.B.A.

*Park Front.*



MONUMENT TO THE LATE DEAN STANLEY, WESTMINSTER ABBEY.

Mr. J. E. Boehm, R.A., Sculptor; Mr. J. L. Pearson, R.A., Architect.

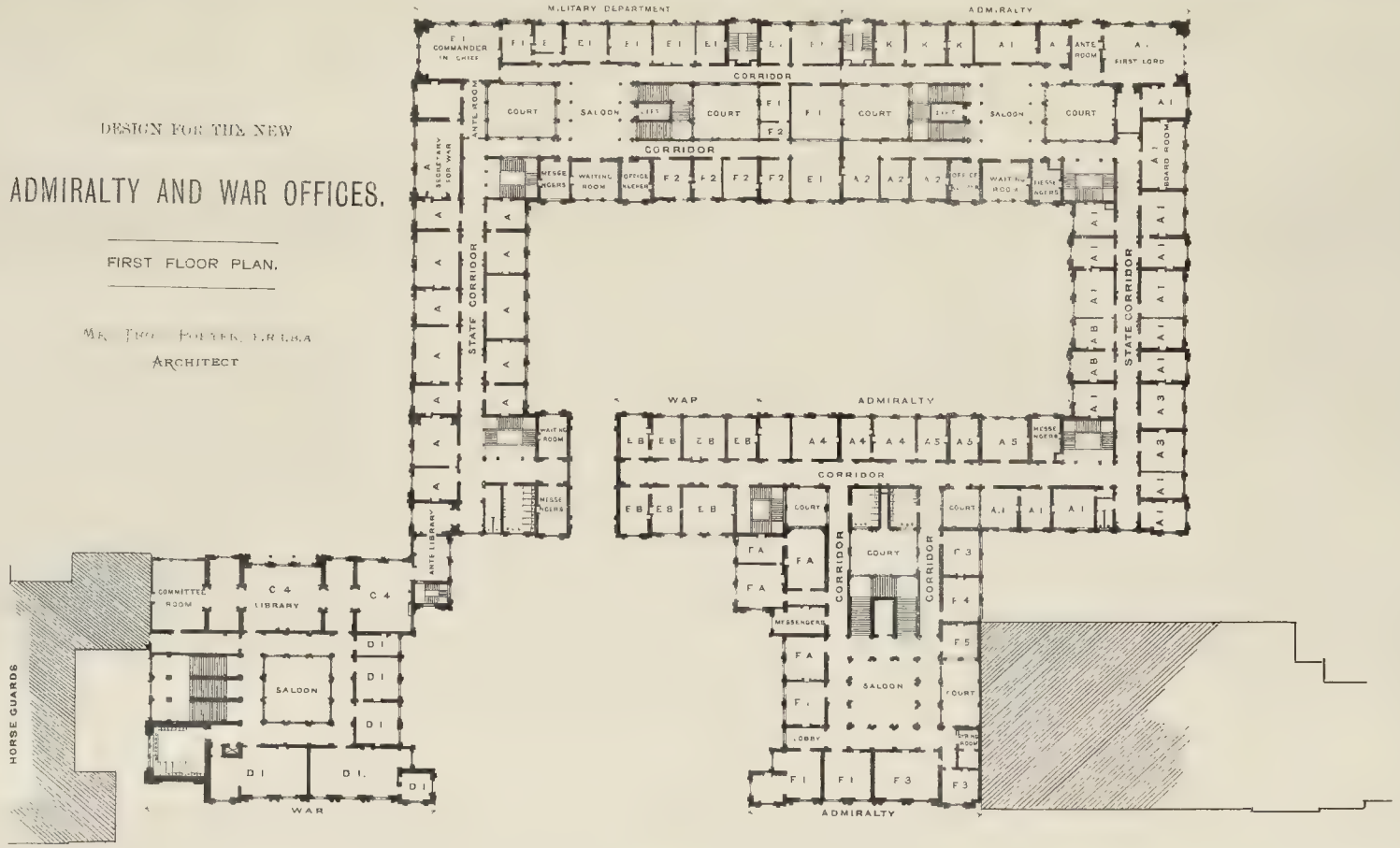
DESIGN FOR THE NEW

# ADMIRALTY AND WAR OFFICES.

FIRST FLOOR PLAN.

MR. THOS. POTTER, F.R.I.B.A.

ARCHITECT




Wyman & Sons Photo Lith.

...een St London, WC



SKETCHES BY A DISTRICT SURVEYOR. No 4.

THE MAISON ADAM, ANGERS.



*Photogravure, Waterlow & Sons Limited, London*

HOLMLEIGH COTTAGES, GRASSENDALE, LIVERPOOL

MESSRS. F. & G. HOLME, ARCHITECTS

with aisles the height and width of the choir itself. It cannot be said to be a beautiful building, but it is an excellent plain, common-sense church, very cheap, and very substantial. It serves as the cathedral for the Roman Catholic diocese of Roermond.

The Münster (Minster) at Roermond is, however, a far more interesting building; it is an excellent example of the Transition period and of Dutch First Pointed work. It bears a strong resemblance to the churches of St. Quirinus at Neuss, on the Rhine; St. Cunebert at Cologne, Braunweiller, and Gellenhausen, and is distinctly of a Rhenish type, with two sets of transepts. The lanthorn over the eastern crossing is crowned by a ridge-and-furrow dome, and it will astonish our English readers when we tell them that Mr. Cuypers, who restored this interesting building, has been blamed by some Dutch critics for retaining this feature, which they maintain ought to have been destroyed because it "only dates from the fifteenth century!" It is probably the only dome of that date north of the Alps!

There is, of course, very little ancient church plate existing in Holland, but one example of rare beauty is to be seen in this church: it is a monstrance, 3 ft. 4 in. high, composed entirely of silver, executed at the end of the fourteenth century. The elaborate nature of the work may be gathered from the fact that the details given in our drawing are the *actual* size.

Whether this beautiful vessel has always been a monstrance may perhaps be doubted, though Mr. Cuypers, the eminent Dutch architect, is strongly of opinion that it has always served that purpose, and certainly the half-moon recepticle for holding the consecrated host, and the little angels bearing it up, are of the same date as the vessel itself.

Nothing is known of the history of this monstrance. Another, rather more in accordance with the recognised form, and evidently half a century, at least, later than the Roermond example, is to be seen at the Catholic church at Breda. We should notice the fact that the Roermond monstrance takes in pieces, and is fastened together with little pegs attached by chains. H. W. Brewer.

## SKETCHES BY A DISTRICT SURVEYOR.

IV.

Angers, formerly the capital of Anjou, an ancient province and government in France, but now the chief town of the department of Maine-et-Loire, is situated on the Maine. Since the commencement of this century, no town in France has submitted to greater changes; many of her houses, so characteristic of another age, have disappeared, but a good specimen of half-timber construction remains at the Place Sainte Croix, behind the cathedral. This is La Maison Adam, which we illustrate. Right and left of the tree sculptured at the angle formerly stood a figure of Adam and another of Eve. The iconography of this house is a most interesting study. Beneath the flat oriel, on the left side of the sketch, is a sort of dragon, intended to typify the Evil Spirit departing from the premises; and on this side, but higher up, is a very obscene subject. Grotesques abound. The lady and gentleman about the centre, and facing the Place Sainte Croix, appear on very good terms. The figures supporting the door-head, on the right of the view, are a countryman and Scotchman. The Scotchman has stood the wearing effects of weather less successfully than his neighbour; but there are the kilt, bonnet, and bag-pipe distinct enough.

Louis XI. had, like his predecessors, a Scotch guard, and, as at this time our fortunes in France were on the wane, the Scotchman may have been set up at this town house to commemorate the assistance Scotchmen had given in establishing the integrity of the French crown, and in driving out her (auld) enemy, England.

The ground-floor is occupied by a draper, and the floors above are let in tenements.

Before the Revolution, Angers had both University and Academy of great celebrity. In its Military College, both Lord Chatham and the Duke of Wellington studied. Angers was also the birthplace of David the sculptor, and Bernier the traveller.

My drawing was large, and has been reduced for photo-lithography by Mr. A. Beresford Pite. T. E. Knightley.

## LLOYD SQUARE CHAPEL.

The chapel is divided into choir and north and south aisles; the choir for the sisters of the order, and the aisles for visitors. It is almost entirely surrounded by buildings, so that the light is introduced, as shown in the roof, by dormers and a lantern light; by this means the building is well and evenly lighted and also well ventilated. It is heated by Grundy's hot-air apparatus. The building was erected by Messrs. Bangs, of Bow, and the stalls (which are made of American birch) were very carefully executed by Mr. Knox, of Lambeth. Mr. Spooner has been the clerk of works for this and the greater portion of the adjoining buildings. The architect is Mr. Ernest Newton.

## HOLMLEIGH COTTAGES, GRASSENDALE, NEAR LIVERPOOL.

These cottages were erected some time ago for Mr. T. Sutton Timmis as residences for his coachman, grooms, gardeners, &c.

They are arranged in two groups, and have a considerable garden space allotted to each house, and a spacious drying green at the end furthest from the road. A large and cheerful sitting-room or living-room is provided, with a scullery and washhouse, larders, &c., at the back, and three bedrooms on the first floor.

The walls are of grey brick with red Ruabon jambs and string bricks; the roofs are tiled, and the porches and some of the gables are of timber framing with cement panels, some of which are enriched. Special attention has been given to the draining and ventilating of these cottages by the architects, Messrs. Francis & George Holme, of Liverpool, whose designs were carried out by Mr. Jones, contractor, of Garston-road.

This illustration, as well as another in the present number, is reproduced from a water-colour drawing by Messrs. Waterlow's "photo-print" process.

## BIRMINGHAM MASTER BUILDERS' ASSOCIATION.

The annual meeting of the members of this Association was held on Monday afternoon, Mr. W. Sapcote in the chair. Among those present were Messrs. T. Barnsley, C. H. Barnsley, R. Mann, H. Heal, J. Bowen, A. S. Smith, J. Dibble, C. W. Barker, W. J. Whitall, Folland, and E. J. Bigwood (secretary). The committee, in their report, express regret that they were unable to report any marked improvement in the building trade. In October last a notice was received from the stonemasons demanding an increase of wages and other alterations in the working rules. The committee met the representatives of the masons, with the result that their demand for increased wages was withdrawn, and some slight alterations were made in the working rules. A communication was received from the labourers (with whom no rules exist) requesting an advance of wages, but, having regard to the abundance of unskilled labour, the committee declined to accede to their request. The half-yearly meetings of the National Association of Master Builders at Bradford and London were attended by deputations from this Association, and matters of considerable importance to the trade were discussed. The form of contract had been under the consideration of the Council, and it was believed that the negotiation with the Institute of British Architects would settle the matter on a fair and equitable basis. A petition was presented to the House of Commons, on behalf of the Association, by Mr. P. H. Muntz, M.P., against the Employers' Liability Bill, 1884. A deputation from the Association had waited upon Messrs. Martin and Chamberlain with reference to the conditions of contract of the Birmingham School Board, and obtained some slight concessions. Six new members had joined the Association, and the committee hoped at the end of next year to be able to report a considerable increase in members. The committee also drew attention to the "Builders' Accident Insurance Company, Limited." The company was strictly mutual, and the directors had not only reduced the premiums 43 per cent., but also during the first year returned 20 per cent. rebate by way of bonus to insurers, and 12½ per cent. for the second year. During the past year the company had insured 3,600,000*l.* paid in wages, and had paid only 168*l.* commission on this amount, which was less than 2½ per cent. on the premium income.

The balance-sheet of the Association showed total receipts for the year 90*l.* 3s. 11d., which, added to last year's balance of 65*l.* 18s. 11d., made a total of 156*l.* 2s. 10d., and the various disbursements, including secretary's salary, amounted to 122*l.* 5s. 8d., leaving a sum of 33*l.* 17s. 2d. to the credit of the Association.

The Chairman, in proposing the adoption of the report, said that there had been no improvement in the state of trade during the year, though a few large buildings were in progress. Generally speaking, there was stagnation in trade, and many men were out of employment. He complimented the new secretary, Mr. Bigwood, upon the great interest he showed in the work of the Association, and went on to say that the depression in trade had increased competition to such a keen point that the work was taken at very small profits indeed, and contracts often resulted in a loss.

Mr. J. Bowen was elected President for the ensuing year, Mr. A. S. Smith vice-president, Mr. W. J. Whitall treasurer, and Mr. E. J. Bigwood was re-elected secretary.

## EDINBURGH ARCHITECTURAL ASSOCIATION.

The opening meeting of the current session of the Edinburgh Architectural Association was held on Monday evening last, Mr. David M'Gibbon, president, in the chair.

Mr. T. Fairbairn, the hon. secretary, read the report for the past year. The Council, it is stated, were much gratified in reporting that the past session not only was the most useful in the history of the Association, but also was one that held out abundant promise for its future development. The Council, during the session, felt it their duty to memorialise her Majesty's Government in regard to the present state of the hall in Edinburgh Castle; and attention has been promised on the part of the Government to the subject. The report referred with satisfaction to the work in progress of repairing Craigmillar Castle,—a work which would be of great value, tending to preserve what remained of a building rich in architectural features and historical associations. The Association was again placed under obligation to Professor Baldwin Brown, who had obtained an ordinance from the University Court, to the effect that members of the Edinburgh Architectural Association be permitted to attend the Fine Art Class next session on payment of a very modified fee. The membership of the Association continues to increase. It now numbers 270, which shows an increase of 35 during the year. The report by the treasurer, Mr. John Whitelaw, showed that the balances in bank and in hand amounted to 105*l.* 1s. 11d. The ordinary income during the year was 135*l.*, and the expenditure amounted to 101*l.* 6s. The reports by the conveners of the Sketch-book Committee and the Work-class Committee were also regarded as satisfactory. In moving the adoption of these reports, the Chairman very warmly congratulated the members on the growing prosperity and the growing usefulness of the Association. A considerable number of new members were proposed for election. Mr. George Washington Browne was appointed president for the current year; Mr. David M'Gibbon was elected vice-president; Mr. Hippolyte J. Blanc, and Professor G. Baldwin Brown were elected vice-presidents; Mr. T. Fairbairn was re-elected honorary secretary; and Mr. John Whitelaw was re-elected honorary treasurer. The retiring president then delivered an address.

**Finchley Main Drainage.**—This scheme, as prepared by Mr. G. W. Brumell, engineer and surveyor to the Finchley Local Board, has been sanctioned by the Local Government Board, and permission has been given to borrow money for the works, the estimated cost of which (including purchase of land for outfall site) is 60,000*l.* Owing to the peculiar features of the district it is necessary to construct a sewer in tunnel 120 ft. deep from its western side to the outfall site on the eastern side. The works are to be carried out forthwith. At a special meeting on the 30th ult. the Board marked their appreciation of Mr. Brumell's services in the preparation of the scheme by remunerating him with the sum of 175*l.*, and an addition to his salary of 50*l.* per annum.







## HEALTH EXHIBITION AWARDS.

We now give a list of that portion of the awards, in Groups 3, 4, and part of Group 5, which were made for work more or less directly connected with building and building trades; and also an engraving of the Health Exhibition Medal, forwarded to us by Messrs. Walter Barker & Son. The classification is as follows:—

*Group 3.—The Dwelling-house.*

Class 20, Dwellings, Models, and Designs for the same, and Specimens of Buildings erected in the Grounds. Fittings and Accessories for Dwelling-houses. Completely-fitted Apartments. Class 21, Water Supply and Purification: Meters, Filters, Water-Fittings, Cisterns, &c. Class 22, House Drains, their Construction and Ventilation: Sewer disconnexion; Sinks, Traps, Gullies; the Disposal and Utilisation of House Refuse. Class 23, Water and Earth Closets, Ash Closets, Commodes, Urinals, Disinfecting Powders and Fluids, Insect Destroyers. Class 24, Grates, Stoves, Kitcheners, Ranges, Boilers, &c., for Domestic Use. Apparatus for Heating and Warming, Smoke Abatement, &c. Class 25, Ventilators, Air Inlets and Outlets, Cubic Space of Rooms, Cowls, Air Straining and Cleansing. Class 26, Lighting Apparatus; (*a*) Electrical Apparatus for Illumination and Domestic Use, Secondary Batteries, Electroliers, Accumulators, &c.; (*b*) Apparatus for Lighting by Gas, Gas Producers, Gas Meters, Gasfittings, Chandeliers, &c.; (*c*) Oil and other Lamps, Mineral Oil, Wax and other Candles, Vegetable and Animal Oils. Class 27, Fire Prevention Apparatus: Extincteurs, Portable Engines, Domestic Fire Escapes, &c. Class 28, Materials for Sanitary House Construction: Roofs, Walls, Damp Courses, Solid Floors, Damp Proof Wall Coverings, Cements, &c. Class 29, Materials for Sanitary House Decoration, Non-poisonous Paints and Wall Papers, Floor Coverings, Washable Decoration, &c. Class 30, Objects for Internal Decoration and use in the Dwelling. Fittings and Furniture. Class 31, Baths, Bathing requisites, Public and Private Wash-houses, Washing Apparatus, Detergents, Appliances for Personal Cleanliness, &c. Class 32, Publications and Literature, Models, Pictures, Diagrams, &c., relating to Group 3. Class 33, Machinery and Appliances relating to Group 3.

*Group 4.—The School.*

Class 34, Designs and Models of Improved Buildings for Elementary Schools, Infant Schools, and Crèches. Class 35, Apparatus and Fittings for Warming, Ventilating, and Lighting Schools, School Latrines, Closets, &c. Class 36, Special School Fittings for Storing and Drying Clothing. Class 37, School Kitchens and Arrangements for School Canteens. Methods of Warming Children's Meals, &c. Class 38, Precaution in Schools for Preventing the Spread of Infectious Diseases, School Sanitoria, Infirmaries, &c. Class 39, Special Apparatus for Physical Training in Schools, Gymnasia, Apparatus for Exercise, Drill, &c. Class 40, Literature, Statistics, Diagrams, &c., relating to Group 4.

*Group 5.—The Workshop.*

Class 41, Designs and Models for Improvements in the Arrangements and Construction of Workshops, especially those in which dangerous or unwholesome processes are conducted. Class 42, Apparatus and Fittings for preventing or minimising the danger to health or life from carrying on certain trades; Guards, Screens, Fans, Air-jets, Preservative Solutions, Washes, &c.

*List of Awards in connexion with Building Trades, &c., and Sanitary Work.*

N.B.—"G." stands for *Gold Medal*; "S."—*Silver Medal*; "B."—*Bronze Medal*; "S.C.T."—*Special Certificate of Thanks*; "D.H."—*Diploma of Honour*.

| Class. | Name of Exhibitor. | Award. |
|---|---|---|
| 20 | Adams, Robert | G. |
| 42 | ,, ,, | B. |
| 52 | Adamson, William | B. |
| 30 | Ahrenda, F. & Co. (Denmark) | S. |
| 31 | Albert Laundry Blue Manufacturing Company | B. |
| 26 | Albion Lamp Company | S. |
| 26 | Albo-Carbon Light Company, Limited | B. |
| 31 | Allen, James, & Son | S. |
| 33 | Anderson & Hunting | S. |
| 21 | Anderson, R. | B. |
| 22 | Angel, A. T. | S. |
| 22 | ,, ,, | B. |
| 29 | Andreas, Theo. H. (India) | G. |
| (34-39) | Antwerp, City of (Belgium) | D.H. |
| 30 | Arup Bros. (Denmark) | S. |
| 33 | Ashworth Bros. | B. |
| 22 | Atmospheric Cowl Company | B. |
| 23 | Austin Antiseptic Company | B. |
| 39 | Bacon, George W. | S. |
| 25 | Bacon, J. L. & Co. | S. |
| 33 | ,, ,, | S. |
| 27 | Bailey, H. T. | B. |
| 21 | Bailey & Co. | B. |
| 22 | ,, ,, | B. |
| 23 | Baker, J. M. B. | B. |
| 20 | Baldwin, W. J. (U.S.A.) | S.C. |
| 22 | Banner Bros. & Co. | G. |
| 22 | ,, ,, | S. (2) |
| 25 | ,, ,, | S. |
| 22 | ,, ,, | B. |
| 33 | Barford & Perkins | B. |
| 30 | Barnard, Bishop, & Barnard | B. |
| 12 | Barnett & Foster | G. |
| 21 | ,, ,, | G. |
| 41 | ,, ,, | G. |
| 21 | ,, ,, | G. |
| 31 | Barrett, A., & Son | S. |
| 21 | Baskerville, R. | S. |
| 28 | Bateman, William H. | S. |
| 23 | ,, ,, | B. |
| 20 | Bath, Mayor and Corporation of | D.H. |
| 31 | ,, ,, ,, | D.H. |
| Literature | Batsford, B. T. | S.C.T. |
| 23 | Batten, William | B. |
| 26 | Bayle (France) | S. |
| 52 | Beaupré, C. | B. |
| 21 | Beck & Co. | G. |
| 21 | ,, | S. (2) |
| 23 | ,, | S. |
| 21 | ,, | B. (3) |
| 26 | Beggs & Co. | S. |
| 40 | Belgium, Ministry of the Interior | D.H. |
| 20 | Belgium, War Department | D.H. |
| 21 | Bell, John | B. |
| 20 | Benham & Sons | G. |
| 23 | ,, ,, | S. |
| 21 | ,, ,, | B. |
| 31 | ,, ,, | B. |
| 24 | Beynon & Cox | B. |
| 26 | Bickerdike, George | B. |
| 23 | Billing, H. J., M.D. | B. |
| 24 | Bingham, E. | B. |
| 20 | Birch, George H. | G. |
| 22 | Bird, Frederick, & Co. | B. |
| 28 | Birks, J. & T. | S. |
| 22 | Birmingham Sanitary Association | G. |
| 33 | Blackman Air Propeller Ventilating Company, Limited | S. |
| 29 | Blaine, Lieut.-General Sir Seymour, Bart., C.B. | S. |
| 21 | Blundell, G. T., & Co. | G. |
| 21 | ,, ,, | B. |
| 23 | ,, ,, | B. |
| 20 | Blyth, A. W. | S. |
| 23 | Boake, A. & Co. | S. |
| Literature | Bogue, David | S.C.T. |
| 21 | Bolding, John, & Sons | S. |
| 22 | ,, ,, | S. |
| 23 | ,, ,, | S. |
| 31 | ,, ,, | S. |
| 21 | ,, ,, | B. |
| 22 | ,, ,, | B. |
| 23 | ,, ,, | B. |
| 34 | Bordeaux, City of | D.H. |
| 21 | Boston Filter Company | B. |
| 29 | Botelberge, G., & Co. (Belgium) | S. |
| 20 | Bothams, John C., M.I.C.E. | B. |
| 22 | Botting, Francis | B. |
| 32 | Bourtreehill Coal Company | S. |
| 30 | Boussard (France) | S. |
| 34 | Bouvard, J. (France) | G. |
| 26 | Bower & Co. | B. |
| 20 | Bower Barff Rustless Iron Company | S. |
| 22 | Bowes, Scott, & Read | G. |
| 22 | ,, ,, ,, | S. |
| 24 | Boyd, A. | S. |
| 24 | Boyd, David O. | G. |
| 22 | Boyle, Robert | S. |
| 28 | Bracknell Pottery Brick and Tile Co. | S. |
| 31 | Bradford, T. & Co. | G. |
| 33 | ,, ,, | G. |
| 22 | ,, ,, | B. |
| 23 | ,, ,, | B. |
| 31 | Brenier (France) | B. |
| 28 | Bridgeman, H. H. | S. |
| 20 | Briggs, Warren R. (United States of America) | S.C.T. |
| 33 | Britannia Company | B. |
| 23 | British Patent Perforated Paper Co., Limited | B. |
| 22 | Broad & Co. | S. |
| 21 | Brooke, Edward, & Sons | B. |
| 24 | Brown & Green | G. |
| 20 | ,, ,, | S. |
| 24 | ,, ,, | B. |
| 26 | Browne & Co. | S. |
| 26 | Broxburn Oil Company | G. |
| 33 | Brunton & Trier | S. |
| 42 | ,, ,, | S. |
| 30 | Société Anonyme: La Construction Industrielle (Belgium) | G. |
| 22 | Buchan, William Paton | S. |
| 25 | ,, ,, | B. |
| 30 | Burke & Co. | G. |
| 20 | Cacheux (France) | G. |
| (34-39) | Calvados, Département du (France) | D.H. |
| 23 | Calvert, F. C., & Co. | G. |
| 31 | ,, ,, | S. |
| 30 | Campbell, Smith, & Co. | B. |
| 28 | Candy & Co. | G. |
| 22 | ,, ,, | B (2) |
| 22 | Capper, Son, & Co. | G. |
| 21 | ,, ,, ,, | B. |
| 30 | Cardinal & Harford | S. |
| 39 | Carne (France) | S. |
| 24 | Carron Company | S. |
| 32 | Cassell & Co., Limited | S.C.T. |
| 34 | Cernesson, L. Camille (France) | S. |
| 21 | Certes (France) | S. |
| 23 | Chabanelet et Brabant (France) | B. |
| 38 | Chaix, M. (France) | G. |
| 21 | Chamberland, Dr. (France) | G. |
| 24 | Chambers, Monnery, & Co. | B. |
| 28 | ,, ,, ,, | B. |
| 20 | Chappuis, P. E. | S. |
| 21 | Chedgey, Messrs., & Co. | S. |
| 26 | Cheseborough Manufacturing Co. | S. |
| 23 | ,, ,, | B. |
| 31 | ,, ,, | B. |
| 30 | China, Imperial Maritime Customs | G. (2) |
| 24 | ,, ,, ,, | S. |
| 31 | ,, ,, ,, | S. |
| 30 | ,, ,, ,, | S. |
| 30 | China, Shop from Canton | S. |
| 30 | ,, ,, Kinkiang | S. |
| 30 | ,, ,, Peking | S. |
| 30 | Choisy-le-Roi, Faïencerie de (France) | S. |
| 30 | Chorlton and Dugdale | S. |
| 26 | Christie, J. & Co. | S. |
| 20 | Christoph & Unmack (Denmark) | S. |
| 41 | ,, ,, | S. |
| 27 | Chubb & Sons' Lock and Safe Company, Limited | G. |
| 20 | ,, ,, ,, | S. |
| 32 | Churchill, J. & A. | S.C.T. |
| 20 | Clark, Bunnett & Co. | B. |
| 42 | Clark, William | B. |
| 20 | Clarke, Edward | B. |
| 26 | Clarke, Samuel | S. |
| 42 | Clayton & Shuttleworth | B. |
| 31 | Cleaver, F. S & Sons | G. |
| 31 | Clements, Jeakes, & Co. | G. |
| 33 | ,, ,, | B. |
| 20 | Cliff, Joseph, & Son | G. |
| 22 | ,, ,, ,, | S. (2) |
| 31 | ,, ,, ,, | S. |
| 23 | ,, ,, ,, | B. |
| 30 | ,, ,, ,, | B. |
| 20 | Closson, H. (Belgium) | S. |
| 21 | Clutterbuck, George | B. |
| 21 | Coalbrookdale Company, Limited | G. |
| 24 | ,, ,, ,, | S. |
| 30 | ,, ,, ,, | S. |
| 24 | ,, ,, ,, | B. |
| 24 | Colbran, J. B. & Co. | S. |
| 30 | Collinson & Lock | G. |
| 27 | Compressed Air Fire Engine Co. | S. |
| 23 | Condy & Mitchell, Limited | G. |
| 21 | Conolly, Henry | S. |
| 23 | ,, ,, | S. |
| 31 | ,, ,, | S. |
| 20 | ,, ,, | S. |
| 21 | ,, ,, | B. (2) |
| 22 | ,, ,, | B. |
| 20 | Constantine, T. J. | S. |
| 24 | ,, ,, | S. |
| 21 | Cooper, H. (Dudley) | S. |
| 25 | Cooper, H. W. | B. |
| 30 | Corticine Floor Covering Company | S. |
| 24 | Crabtree Brothers | G. |
| 22 | Craig, J. & M. | G. |
| 28 | ,, ,, | S. |
| 22 | ,, ,, | B. |
| 30 | Craven, Dunnill, & Co., Limited | B. |
| 31 | Cresswell, R. & Co. | S. |
| Literature | Crosby Lockwood & Co. | S.C.T. |
| 22 | Crosthwaite, R. W. | B. |
| 30 | Crystal Porcelain Pottery Co, Lim. | B. |
| 21 | Dale, R. F. & Co. | S. |
| 21 | ,, ,, ,, | B. |
| 38 | Dastot, Dr. A. (Belgium) | B. |
| 31 | Davey & Fabian | S. |
| 33 | Davey, Paxman, & Co. | G. |
| 21 | David, M. (Grosvenore par Nouvant, France) | B. |
| 21 | Davies | B. |
| 20 | Davis & Emmanuel | B. |
| 24 | Davis, Edward, & Son | B. |
| 24 | Davis, H. and C., & Co. | S. |
| 24 | ,, ,, ,, | B. |
| 28 | Dawbay, A. D. | S. |
| 41 | Deards, Samuel | S. |
| 24 | Dean & Son | S. |
| 22 | Dean, Henry | B. |
| 24 | Deane & Co. | G. |
| 35 | De Beaudot (France) | S. |
| 20 | Decauville (France) | G. |
| 24 | Deards, W. & S. | B. |
| 26 | Dee Oil Company | S. |
| 34 | De La Conserie (Belgium) | G. |

| Class. | Name of Exhibitor. | Award. |
|---|---|---|
| 22 | Dent & Hellyer | G. |
| 21 | ,, ,, | S. |
| 22 | ,, ,, | S.(2) |
| 23 | ,, ,, | S.(2) |
| 21 | ,, ,, | B.(2) |
| 21 | Deverill, John, junr. | B. |
| 26 | Devine & Co. | B. |
| 30 | Diespecker & Co. | B. |
| 22 | Domestic Engineering and Sanitary Appliances Company | S. |
| 27 | Douglas, William, & Co. | B. |
| 20 | Doulton & Co. | G. |
| 21 | ,, ,, | G. |
| 22 | ,, ,, | G.(3) |
| 23 | ,, ,, | G.(2) |
| 24 | ,, ,, | G. |
| 21 | ,, ,, | S.(8) |
| 22 | ,, ,, | S.(4) |
| 23 | ,, ,, | S.(2) |
| 30 | ,, ,, | S. |
| 21 | ,, ,, | B.(2) |
| 22 | ,, ,, | B.(2) |
| 24 | ,, ,, | B. |
| 13 | Dowie & Marshall | S. |
| 26 | Dowson Economic Gas Co. Limited | G. |
| 28 | Drake, Charles, & Co. | S. |
| 31 | ,, ,, | S. |
| 20 | Dreyfus, A. & Co. | S. |
| 26 | Drury, Robert F. | B. |
| 42 | Dubois et Francois (Belgium) | G. |
| 20 | Dujardin, A (Belgium) | B. |
| 40 | Du Moulin, N. (Belgium) | S.C.T. |
| Designs | Dunscombe, Clement, M.A., M.Inst. C.E. | G. |
| 23 | Durand-Claye (France) | G. |
| 22 | Dyer, Frederick | B. |
| 24 | Eagle Range and Foundry Company | G. |
| 30 | Ebner, Joseph F., & Co. (Austria-Hungary) | G. |
| 20 | Edwards, George | B. |
| 25 | Elesheieff, F. (Russia) | S. |
| 23 | Ellison, James Edward | B. |
| 26 | Ellis, Joseph J. | S. |
| 28 | ,, ,, | B. |
| 21 | Emmanuel, A., & Sons | S. |
| 21 | ,, ,, | B. |
| 23 | ,, ,, | B. |
| 20 | Ernst, Heinrich (Switzerland) | B. |
| 35 | Esperon-Morin (France) | B. |
| 31 | Ewart & Son | B. |
| 25 | Farcot, E. & D. (France) | S. |
| 21 | Farmiloe, Thomas & William | G. |
| 21 | ,, ,, ,, | S. (2) |
| 21 | ,, ,, ,, | B. |
| 21 | Farmiloe, George & Sons | B. (2) |
| 22 | Farnley Iron Company | B. |
| 28 | ,, ,, | B. |
| 21 | Farnworth, John K. | B. |
| 21 | Farquhar Oldham Filter Co., Limited | B. |
| 43 | Feigelstok, E. (Austria-Hungary) | B. |
| 40 | Festraerts, A. (Belgium) | S.C.T. |
| 26 | Field, J. C. & J. | G. |
| 31 | ,, ,, | G. |
| 22 | Finch, B. & Co. | S. |
| 31 | ,, ,, | B. |
| 33 | Fischer et Cie. (France) | B. |
| 24 | Flavel, Sidney, & Co. | S. |
| 34 | Flers, City of (France) | S.C.T. |
| 21 | Flicoteaux (France) | S. |
| 30 | Fox, T. & Co. | B. |
| 28 | Francis & Co. | S. |
| 39 | Frété et Cie. (France) | S. |
| 32 | Frith & Co. | S.C.T. |
| 22 | Frost, J. R. | B. |
| 20 | Fumière, Th. (Belgium) | B. |
| 23 | ,, ,, | B. |
| 31 | Gabriel, Z (Belgium) | B. |
| 33 | Galloway & Sons | G. |
| 42 | Gardner, E. V. | S. |
| 30 | Garrard, F. | B. |
| 29 | Gay, R. & Co. | B. |
| 31 | Gellé Frères (France) | S. |
| 24 | General Gas Heating and Lighting Apparatus Company, Limited ..... General Register Office, London. *See* London | G. |
| 23 | Geneste et Herrscher (France) | G. |
| 25 | ,, ,, | G. |
| 36 | ,, ,, | G. |
| 41 | ,, ,, | G. |
| 31 | Gibbs, D. & W. | S. |
| 23 | ,, ,, | B. |
| 38 | Gilbert, Dr. le Havre (France) | S. |
| 21 | Glenfield Co. | G. (2) |
| 22 | ,, | S. |
| 26 | Glover, George & Co. | G. |
| 24 | Godefroy, Dr. (France) | B. |
| 26 | Goodson, J. & W., & Co. | B. |
| 31 | Gosnell, John, & Co. | S. |
| 39 | Goy, H. | S. |
| 22 | Green, Henry, & Son | S. |
| 31 | Greenall, John | B. |
| 23 | Greenbank Alkali Works | B. |
| 21 | Gregory, Thomas | B. |
| 24 | Greven, Hendrik (Italy) | B. |
| 26 | Grey, Samuel | B. |
| 35 | Guérin (France) | S. |
| 22 | Guinier (France) | B. |

The remainder of the awards will be given in our next.

**Gwydyr House.**—Gwydyr House in Whitehall, at present occupied by the Charity Commissioners, and for some years previously by the Local Government Board, is at present undergoing an enlargement by the erection of an additional story, which will contain several new offices. The old roof and the attic floor within it have been removed, and the building will be covered in by a new roof. The enlargement (which will add to the height of the building by about 12 ft.) is being carried out under the superintendence of Mr. Taylor, architect to the Office of Works. Messrs. Mowlem & Co. are the contractors.

## COMPETITIONS.

*Stockport Baths.*—The Sanitary Committee held a meeting on the 29th ult., at the Pendlebury Memorial Hall, Stockport, to receive the report of Mr. Alfred M. Fowler, M. Inst. C.E. and architect, of Manchester, to whom the matter of selection was referred. On opening the envelopes containing the names and addresses of the authors of the plans bearing the respective mottoes of the designs selected, the following was found to be the result:—First premium, "Sanitas X.," Mr. J. C. Prestwich, Leigh, near Manchester; second premium, "Freshwater," Mr. G. B. Lewis, London; third premium, "Sink or Swim," Mr. James Hunt, Stockport. Ninety-one designs were received.

*Lincoln School of Art.*—In this competition (see *Builder*, pp. 473, 517, *ante*) we are informed that the second premium of 50*l.* has, on Mr. Barry's award, been given to Mr. Charles Bell, of New Broad-street, London, and the third premium of 25*l.* to Mr. Guy, of Lewisham.

*Llanelly (South Wales).*—At a meeting of the School Board, held on the 14th ult., Mr. E. H. Lingen Barker, of Hereford, was unanimously appointed architect, and his plans for the new school buildings in the Lakefield-road, for 750 children, were accepted. Mr. Lingen Barker's design was placed first in the recent competition by Mr. C. H. M. Mileham, of Essex-street, Strand, the professional assessor appointed by the Board. There were sixteen other competitors, from various parts of England and Wales.

## CASE UNDER THE METROPOLITAN BUILDING ACT.

HOT-WATER PIPES.

At Worship-street Police Court on the 30th ult., Mr. W. Shurmur, of Prospect House, Lower Clapton, the contractor engaged in the erection of the Hackney Union, appeared before Mr. Hannay to answer a summons issued at the instance of Mr. F. R. Meeson, the District Surveyor for East Hackney (North), for an alleged irregularity under the Building Act of 1855 in respect of certain hot-water pipes in connexion with the heating apparatus recently erected at the Union by Messrs. Z. D. Berry & Co., of Albion Works, Regency-street, Westminster, as sub-contractors under the defendant.

The District Surveyor by his notice had contended that the said pipes were erected in contravention of the twenty-first section of the Act of 1855 by reason of their being within the prescribed distance of certain combustible materials.

Upon the summons being called on, the District Surveyor applied for leave to withdraw.

The defendant's solicitor, Mr. D. W. Tough, applied for costs, on the ground that the notice of withdrawal had only been received that morning, and the defendant had engaged several engineers and others to give evidence, the contention of the defendant being that the pipes complained of were constructed upon the low-pressure system, and were, therefore, by the sixteenth section of the Amendment Act, 1882 (45 Vict., cap. 14), exempted from the provisions of the section of the Act of 1855, under which the summons was issued.

The Magistrate thought that the District Surveyor should have been certain as to the law upon the subject before issuing the summons, and he ordered the payment of two guineas costs to the defendant.

## LIGHT AND AIR.

COOPER *v.* FOSTER, PORTER, AND CO.

This important case, occupying nearly six days, before Vice-Chancellor Bacon, was decided on the 31st ult.

The counsel for the plaintiff were Mr. Martin, Q.C., and Mr. Powell; for the defendants, Mr. Hemming, Q.C., Mr. Finlay, Q.C., and Mr. W. B. Heath.

The application was for a mandatory injunction to compel the pulling down of the raised portion, about 11 ft., which had been added to a wall about 33 ft. high in Philip-lane, which is of narrow width.

There was also a cross-action, Foster, Porter, & Co., against Cooper.

The surveyors on the plaintiff's side were Messrs. Walter Greaves, J. P. Smith, Edmund Woodthorpe, Baker & Wilkinson, Christopher & White; for the defendants, Messrs. Gruning, Shingle (of Messrs. Farebrother, Ellis, & Co.), Chatfeild Clarke, and Banister Fletcher.

The Vice-Chancellor dismissed the second action with costs, and refused to grant the mandatory injunction.

**Catford Bridge.**—A stained-glass window from the studio of Messrs. Warrington & Co., Fitzroy-square, London, has recently been placed in Trinity Church. The subject represented is the parable of the Good Samaritan.

## WESTMINSTER HALL AND THE TOWER OF LONDON.

Sir,—The Institute fully appreciated the compliment paid to it by H.M. First Commissioner of Works in attending and addressing the opening meeting, and listened with interest to his remarks upon the recent Government competition.

If politeness prevented any open expressions of dissent from his announcements as to the restoration of ancient buildings at Westminster Hall and the Tower of London, it must not be assumed that assent was given to them by the whole meeting. Many of us think that restoration for its own sake is a fatal mistake.

The erection of any building is justified by its intended use; its preservation by our respect for its history and beauty.

Even without having seen the drawings, one may safely assert that the original uses of the destroyed buildings were different from the uses for which they are now required, and that to invent uses for them is merely to play at architecture.

No doubt, the ancient features of Westminster Hall should be protected from further decay and, as far as possible, be preserved for our study and admiration; but, if the Government have made up their minds clearly as to what kind of accommodation is *now* required, let them, in the name of common sense, erect buildings obviously suited to those uses, and as modern as possible in style, so long as they harmonise as well with the remaining old work as,—let us say,—the prebendal buildings of the sixteenth century harmonise with a cathedral of half a dozen earlier styles.

If it be asked what is modern architecture, it may be answered that it is that style which is left free to express itself honestly and beautifully without being hampered by the mere imitation of any *past* styles.

Edward J. Tarver,
Lecturer on the History of Architecture at the Architectural Association.

## PAYING FOR THE PRIVILEGE OF ESTIMATING.

Sir,—Last week the Isle of Thanet Gas Company advertised in a local paper for tenders for building a new retort-house, &c., at Margate,—plans, &c., to be seen at the engineer's office at Stepney, E.

On calling there I was informed that the charge to *look* at the plans was one guinea; for a copy of the specification, half a guinea; and that if tracings of the plans were required, they would be supplied at a further charge. I requested an interview with the engineer, as I thought these payments must be meant as deposits, as it is manifestly unfair that builders should be expected to pay for inspecting the plans as well as be at the expense of preparing their estimates. I was told by him that it was not a deposit, but a payment, that "nobody wanted us to estimate," and that "the Company would not pay for a hundred outsiders troubling about the plans," &c.

If "a hundred outsiders" do trouble about the job, getting in the tenders must be a very profitable concern for some one, as it would yield from 150*l.* to 200*l.* in fees, and I am much surprised if the builders of my native town submit to impositions of this kind, which we, in London, have long known how to treat as it deserves.

Is the term "outsiders" the key to the position?

K. G. Battley.

## THE PLUMBERS' CONGRESS.

Sir,—With great interest I have perused the report of the above Congress, contained in the *Builder* of the 25th ult.

As the statement of Mr. W. P. Buchan (Glasgow) therein reported will have a tendency, if allowed to pass without comment, to deteriorate to a greater or less extent, in the estimation of the architect to whom he is responsible, every efficient clerk of works, I take the liberty of informing your numerous readers that the average clerk of works of the present day is not altogether the cipher which Mr. Buchan would have people believe.

"When a journeyman, he had often to refuse to answer the questions of clerks of works, when under the master's order he had put on 5 lb. lead piping, instead of 6 lb. lead." Now, sir, to any one unacquainted with the qualifications essentially necessary for the efficient discharge of the duties appertaining to the office of clerk of works, the inevitable inference is that the clerk of works of the present day is altogether incapable of distinguishing the difference between 5 lb. and 6 lb. lead without the aid of the plumber. Let us hope that the clerks of works referred to by Mr. Buchan are an exception, and a very rare exception, to the rule. Every clerk of works who knows his duty is conversant with the tendency plumbers have to put in 5 lb.

lead instead of 6 lb., and 7 lb. in place of 9 lb., &c., and therefore takes the necessary measures at his command in order to satisfy himself, without being under the necessity of interrogating the journeyman plumber or any one else regarding the weight.

ROBERT GIBSON, Clerk of Works.

## DISTRICT SURVEYORS' FEES.

SIR,—In February, 1883, I professionally superintended the erection of four houses within ten miles of London; the works were completed in August of the same year. The district or local surveyor in October, 1884 (fourteen months after the contract was completed), coolly sends to my client his charges for what he terms "surveying," which amount to 10*l.*, with a request for a cheque to be sent on at once. The usual clause, "The builder to pay all fees legally demandable," was duly inserted in the conditions and signed. I may add that within the last few months the builder has been adjudicated a bankrupt.

Will any of your correspondents kindly inform me if the "surveyor" is acting within his rights in sending in his accounts to the architect's client, and whether he can legally recover his fees so long after the buildings have been completed?

SYDNEY B. GROSVENOR.

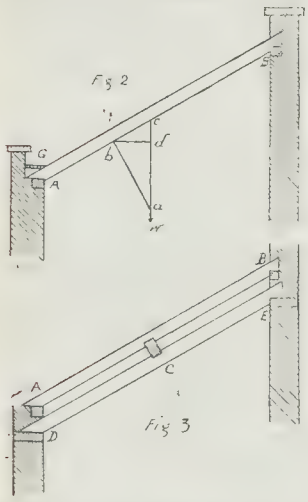
*** Pressure on our space compels us to defer several important letters.

# The Student's Column.

## ON THE CONSTRUCTION OF ROOFS.

II.

*Shed Roofs.*—Roofs that are to be covered with slates or tiles require to have a slope or *pitch* of at least 27°, or a rise of one in two. Where one wall is higher than the other the *rafters* may be laid across from wall to wall as shown in fig. 2, their ends being notched down







on a timber *wall-plate*, A, B, laid horizontally on each wall, the rafters being spiked to the wall-plates. This is called a *shed* or *lean-to* roof. If W is the load supposed to act at the centre, C, of the rafters, and we represent it on scale by the vertical line C *a*; by drawing *a b* perpendicular to C A we get the transverse strain (on the same scale) at right angles to the beam, and can then find the necessary scantling as in the case of floor joists. It will be seen from the figure that as we increase the angle of pitch we diminish the amount of the transverse strain, since the length *a b* decreases; therefore a smaller scantling can be used for a high pitch than for a low one, when the length of the rafter is the same; the length, however, increases with the pitch if the span is the same. Thus when the angle of pitch is 30°, *a b* is W multiplied by ·866, but when the angle is 60°, *a b* is one-half of W.

Supposing the load per foot of roofing to be 56 lb., then the scantling of the rafters placed 12 in. from centre to centre can be found by the following rules:—When the angle of pitch is 30°, dividing the length (in feet) by the cube-root of three times the breadth (in inches) gives the depth in inches; but when the angle is 60° the transverse strain is less in the proportion of 4 to 7; and the rule is, divide the length by the cube-root of 5¼ times the breadth, and the quotient is the depth in inches.

For example, let the length be 6 ft. and the breadth 2 in., then the cube-root of 3 times the breadth, or 6, is 1·82; and 6 divided by 1·82 is 3⅓ in., the depth required when the pitch is 30°. If the pitch is 60°, the cube-root of 5¼ times the breadth is 2·2, and 6 divided by 2·2 gives 2⅔ in. for the depth.

Suppose the length to be 10 ft. and the breadth 2½ in., then the cube-root of 3 times 2½ is 1·96, and 10 divided by 1·96 is 5·1 in. for the depth, when the angle is 30°. When the angle is 60°, the cube-root of 5¼ times 2½ is 2·35, and 10 divided by 2·35 gives 4¼ in. for the depth.

Let the length be 15 ft. and the breadth 3 in., then the cube-root of 3 times 3 is 2·08, and 15 divided by 2·08 gives 7¼ in. as the depth for 30° pitch. When the angle is 60°, the cube-root of 3 times 5¼ is 2½, and 15 divided by 2½ is 6 in., which is the required depth.

When there is a parapet at the feet of the rafters, as shown in fig. 2, a gutter G is formed by fixing light pieces of wood, called *bearers*, across from the rafters to the parapet wall, and nailing planks thereon longitudinally, with a slope of about 1 in 60 towards a *cesspool* at the lower end, which communicates with the rain-water stack-pipe. *Drips*, or steps, are formed in the gutter every 10 ft. length, and the planking is covered with sheet-lead turned up and down at the drips, the lead is laid about 9 in. under the *eaves* of the slates, and turned up 6 in. against the parapet wall.

The *shed* roof is often used over the aisles of churches and where the span is a moderate one. But when the span exceeds 10 ft. it is advisable, instead of increasing the scantling of the rafters, to support them on stronger rafters, called *principals*, at D E (fig. 3), resting on stone templates bedded in the walls at D and E, and following the same incline, but placed a few inches below them, at intervals of about 10 ft., on which horizontal beams, called *purlins* (shown in section at C), are fixed, about 5 ft or 6 ft. apart, and the *common rafters* notched and spiked thereto. Each *principal* will in this case have to support ten times the load that one of the common rafters has to carry, and as the load is not uniformly distributed, but placed at one or two points, we must find its scantling by a rule similar to that used for girders in the former articles on "Floors." The rule for the scantling of a principal is,—divide five-thirds of the length in feet by the cube-root of the breadth in inches, and the quotient is the depth in inches, when the pitch is 30°; and when the pitch is 60°, dividing one-and-a-half time the length by the cube-root of the breadth gives the depth.

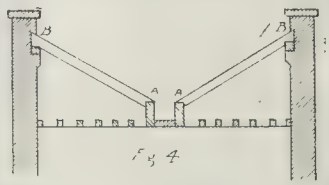
For example, let the length be 15 ft. and the breadth 8 in., the cube-root of which is 2; five-thirds of 15 is 25, which divided by 2 gives 12½ for the depth when the angle is 30°; and when the angle is 60°, one-and-a-half time 15 is 22½, which divided by 2 is 11¼ for the depth. The common rafters in this case need only be 4½ by 2, and 3½ by 2, respectively.

Shed roofs require to have a strong wall to support the feet of the rafters or *eaves*, as the outward thrust will be considerable in a roof of long span, and its amount can be calculated in the following manner:—

The line *c b* (fig. 2) will represent the thrust down the rafter, and the horizontal line *b d* the horizontal thrust upon the wall at the foot of the rafter, which in roofs of 30° or 60° pitch will be W multiplied by ·433. When the length of the rafter is 6 ft., the horizontal thrust on every foot length of wall will be 171½ lb.; with a length of 10 ft., the thrust will be 286 lb.; and with a length of 15 ft., it will be 428 lb. per foot. When principals are used, as shown by fig. 3, and placed 10 ft. apart, the thrust on the walls will be all concentrated at the points where the feet of the principals rest, and will be ten times as great as the above weights, which shows the necessity of building buttresses at those points.

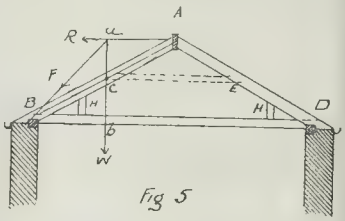
The *purlins* will have to carry the same load as the principals, but it will be uniformly distributed; consequently the strain upon them will be much less, and will depend on their distance apart and length of bearing. The purlin being fixed at right angles to the rafters (as in fig. 3), the cross strain will vary with the angle of pitch, as in the rafters. The scantling can be found by the following rule:—Divide the distance apart (in feet) by 3 times the breadth (in inches), when the pitch is 30°, or by 5¼ times the breadth when the angle is 60°, the cube root of the quotient multiplied by the distance apart of the principals (in feet) gives the depth of the purlin in inches. For example, let the distance apart of the purlins be 6 ft., and that of the principals 10 ft.; then, if the breadth is assumed to be 4 in., 6 divided by 3 times 4 is ½, the cube root of which is very nearly $\frac{8}{10}$, and this multiplied by 10 gives 8 in. as the depth of the purlin for a pitch of 30°. When the pitch is 60°, we have 6 divided by 5¼ times 4, equals $\frac{2}{7}$, the cube root of which is nearly $\frac{2}{3}$, and this multiplied by 10 gives 6⅔ in. for the depth of the purlin.

A common form of roof used for covering rows of town houses is that called the M-roof, which is a double shed-roof, as shown by fig. 4.




The upper end, B, of the rafters, A B, are supported on the party-walls, while the lower ends rest at A upon two purlins, which run from front to rear, resting on the front and back walls of the house, and on any intermediate partition; the purlins are placed about 1 ft. apart, and form a gutter to carry off the water. If the purlins are 3 in. thick, and the rafters 10 ft. long, the depth of the purlins can be found by multiplying their length of bearing (in feet) by ·884, or by ·8 if the breadth is 4 in. The gutter is formed by fixing *bearers* between the bottom edges of the purlins, and laying boards thereon laid to a slope of 1 in 60, with drips every 10 ft. of length; this is called a *trough* gutter, and is lined with lead or zinc in the manner above described.

*Ridge Roofs.*—The most common form of roof is that in which the rafters are fixed in pairs, as AB, AD, fig. 5, and meet at a *ridge*, A, in the centre of the roof. In order that the




heads of the rafters may be kept in one straight horizontal line, they are made to abut against a plank at A, which is called the *ridge-piece*, and rises horizontally the whole length of the roof, the heads of the rafters being spiked thereto, while their feet rest upon *wall-plates*, as before described. The action of the forces in this kind of roof is different from that in the case of the *shed-roof*, where the heads of the rafters rested on a wall-plate. Here we have a horizontal re-action, R, of the two rafters at A, a vertical force, W, at C, and an inclined force, F, at B, which is the thrust on the foot of the rafter. Now as the directions of three forces in equilibrium must meet in one point, these three forces must meet at *a*, so that *a* B is the direction of the thrust at B. If *a b* is taken to represent the load, W, on the rafter acting at C, then B*b* will be the horizontal thrust at B to the same scale as *ab* represents W. The cross strain on the middle of the rafter and its scantling can be found by the rules already given for shed-roofs.

When there is a floor or ceiling at B D, the joists are spiked to the feet of the rafters and counteract all horizontal thrust that they might produce on the walls. Sometimes a horizontal piece of wood, called a *collar*, is fixed across from rafter to rafter as shown by the dotted lines C E, the ends being spiked to the sides of the rafters. The collar serves the double purpose of a tie to the rafters and a joist for fixing a ceiling to, where there are rooms in the roof; in this case the useless angles formed between the feet of the rafters and the floor joists may

cut off by upright pieces, H, called *quarters*, which plastering can be fixed. These arters also help to stiffen the rafters. The tom edges of the roof, where the rafter feet t on the walls, are called the *eaves* of the f, and an *eaves-gutter* of wood or iron is fixed the feet of the rafters or on brackets driven o the wall, where there is no parapet. When re is a parapet the gutter is formed as pre-usly described for shed-roofs.

When the angle of pitch is 30°, the length will be to the length *ab* (fig. 5) as ·866 to 1, the horizontal thrust is W multiplied by ·866; AB is 15 ft., W will be 990 lb., and the hori-ntal thrust 857 lb. per foot length of wall. his will also represent the tensile strain in the ist BD, if securely fixed to the feet of the fters. When the pitch is 60°, the horizontal rust will be W multiplied by ·29; if AB is 5 ft., the horizontal thrust will be 287 lb. per ot of walling.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

441, Improvements in Connecting Door Knobs to Spindles. E. V. Bailey, Birmingham.

This improved form of connexion is suitable for most kinds of door-handles, but particularly the movable knobs of look spindles and cupboard turn-locks. A knob is fixed at one end of the spindle, at the other end of the spindle the knob is movable. The hole in the neck of the movable knob is screwed at the back with a screw-thread for taking upon the screwed end of the spindle. The front of this hole is square or angular. For determining the position in which the movable knob can be passed on to the screwed end of the spindle a sliding collar is used, which has a square or angular bush, to match or fit the square or angular hole in the neck of the movable knob. To fix the handle the rose is first secured at the end of the fixed knob and the screwed end of the spindle inserted through the door. On the protruding screwed end of the spindle the sliding collar is passed until it reaches the door. The movable knob is screwed up, and a peculiar pattern of rose-plate screwed on to the spindle to prevent the knob being withdrawn from the spindle.

1,738, Terra cotta. Stanley and Sharratt, Nuneaton.

The improvement is in taking marls or clays of various colours and qualities, either in a raw, prepared, or burned state, and after pulverising or grinding the same to dust submit the dust to the action of fire in kilns or ovens. This burned clay or marl dust is then used for dusting the moulds in which clay goods are prepared, or a liquid of a similar nature is used for coating the clay goods to be treated by the improved process.

512, Improved Open Fire Ranges. John Dean, Oxford.

This invention obviates the dependency of the working of the range upon the manner in which it is set in brickwork. It substitutes a metal casing for the usual brickwork hot-air chamber, and fastens the same to the range. Thus, the range is complete in itself, and is to a great extent self-fixing.

1,558, Preventing Smoke in Open Fireplaces. R. Wright, Richmond, Yorks.

A fine powder is sprinkled on the fire by an improved form of dredger. The powder consists of burned limestone and sea-coal compounded. The layer of lime and sea-coal with which the fuel is thus covered causes combustion to take place, without the evolution of smoke, and at the same time effects a great economy of fuel.

1,878, Improvements in Steam-boiler Furnaces. Leopold Bregha, Dresden.

Here the improved furnace consists of an inclined grate, formed in steps, on which the fuel is first charged and heated by the heat from the main body of the furnace before being burned on a second or main grate, placed horizontally at the end of the inclined grate, and in such condition that the fuel shall remain at rest thereon. Between the two grates is situated in an iron frame a door, with access to the horizontal grate in order to replace the grate bars when necessary. These parts are enclosed in front by means of an iron frame, in which are arranged blinds made with adjustable louvres intended to regulate and distribute the air entering the furnace. Above the blinds a door is provided through which the progress of the combustion can be observed. The space above the inclined grate is surrounded by an inclined vault of brickwork forming an inclined passage or chamber for charging the fuel, and for giving, at the same time, a downward course to the air entering the furnace, and this allows the gas to be produced and consumed at the horizontal grate. A box turning on its axis carries the fuel, and it discharges the fuel or contents on the first step of the inclined grate. When brought back to its place the mouth of the furnace is closed by a sliding door. A handle attached to a cross-bar distributes the burning fuel on the lowest bar of the grate, and clinkers are removed by a rake affixed under the bars of the grate.

### APPLICATIONS FOR LETTERS PATENT.

*Oct.* 24.—14,074, G. W. Webb, Reading, Improvements in Exhaust Ventilators.—14,087, J. Farthing and J. H. Lorrimer, London, Manufacture of Artificial Asphalte.—14,094, W. H. Perry, Exmouth, Improved Stop to Mortising Machine.

*Oct.* 25.—14,115, A. E. Carey and E. Latham, Liverpool, Manufacture of Concrete and Mortar.—14,124, W. P. Thompson, Liverpool, Improvements in Girders and Beams.—14,125, G. C. Davies, Peckham, Ventilating Traps for House Sinks, &c.—14,134, J. A. Jacobs, London, Water Taps for Recording the Number of Times the Water has been turned on.—14,139, W. Jarvis, London, Movable Street Kiosks.—14,141, R. E. Hayward, London, Fixing Door Handles to their Spindles.—14,150, J. Martin and J. C. Mineard, London, Handle Fittings for Drawers, Flaps, and Doors.—14,157, A. M. Clark, London, Apparatus for Brick and other Presses.

*Oct.* 27.—14,166, J. Parker, Hull, Excavating Machines.—14,109, G. H. Lane, London, Improved Stop for Dowelling Bits for Cabinet-makers.—14,196, F. W. Rees, London, Ball Roller Castors.—14,210, A. W. L. Reddie, London, Rock Drills and Supports.

*Oct.* 28.—14,218, J. Davison, Newcastle-on-Tyne, Mechanism for Rock Drills, Screw Jacks, &c.—14,239, H. J. Allison, London, Rendering Buildings Fireproof.—14,241, A. M. Clark, London, An Improved Composition Mastic.—14,243, F. Herbert and H. Osborne, London, Ventilators.—14,271, J. Harrington, London, Improvements in Spring Seats or Chairs.

*Oct.* 29.—14,275, F. F. Smart, Birmingham, Reflector for Lobby and Door-lamps.—14,288, H. Swete, Worcester, a Safety Anti-vacuum Valve for Preventing the Suction of Sewer Gases into Drinking-water Pipes and Mains.—14,290, G. E. Chapman, London, Appliance for Preventing Noise and Concussion in Closing Doors and Windows.—14,304, E. Pearson, London, Improvements in Water-closets.—14,308, C. Leech, T. Neal, O. M. Lilly, and H. J. Staples, London, Manufacture of Indian Red, Venetian Red, and other Oxide of Iron Pigments.—14,310, F. Candy, London, Manufacture of Bricks, Architectural Blocks, and Enamelled Ornament for External and Internal Building Construction.—14,313, J. J. Barton, London, Window-sashes.—14,316, R. Willis, London, Preparation of Wood before Varnishing, Polishing, or Painting same.—14,317, E. W. Lay and C. Cescinsky, London, Apparatus to Facilitate the Sweeping of Chimneys.—14,319, E. G. Banner, London, Improvements in Ventilating Apparatus.—14,324, P. M. Justice, London, Furnaces for Burning Cement, &c.

*Oct.* 30.—14,329, J. Glaister, Ryton-on-Tyne, Automatic Safety Door.—14,337, J. Frick, London, Connecting Branch-pipes to Mains.—14,346, G. Kinniard, sen., G. Kinniard, jun., and J. Kinniard, Glasgow, Converting Close Fire-ranges into Open and Close Fire ditto.—14,362, G. F. Redfern, London, Manufacture of Parquet Flooring.—14,365, W. Dawson, London, Mills for Reducing Cement or other hard substances.—14,368, J. Holroyd and J. Lang, London, Automatic Flushing Syphons.—14,371, G. Hughes, London, Pintles for Hinges and other analogous purposes.—14,385, D. Radclyffe, London, Window-sashes.—14,387, H. Doulton and J. Slater, London, Manufacture of Ornamental Articles in China, Earthenware, and other Pottery.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

11,885, G. Hibberd and H. O. Hibberd, Wheeling, U.S.A., Combination Tools.—12,783, P. Mooney, Hulme, Wash-out Water-closets.—12,936, T. Christy, London, Pipes or Piping for Heating or Drying Purposes.—13,270, R. Entwistle, London, Improved Water-tap.—13,284, F. George, London, Connexions for Lead and other like Pipes.—13,329, R. M. Justice, London, Improvements in Elevators or Lifts.—13,394, S. Rideal, Manchester, Wheel Tyres, and Method of attaching same.—13,397, R. A. Goodman, Halifax, an Improved Ventilator.—13,416, J. Hamblet, London, Manufacture of Ridge and other Roofing Tiles.—13,492, A. French and J. Ballantyne Hannay, Glasgow, Manufacture of White and other Lead Pigments.—13,551, W. England, jun., London, Improved Handle for Tools.—13,554, R. C. Jones and J. W. Cunningham, London, Improvements in Lock Furniture.—13,556, A. C. Carver, London, Window-sash Furniture.—8,338, G. M. Rutty, Bow, Scarifying Macadam and other Roads.—11,616, E. Edwards, London, Manufacture of Wheels.—12,470, G. E. Smart, London, Improvements in Nails.—12,770, H. A. Stuart, Fenny Stratford, Ratchet Drills or Braces.—12,888, W. B. Smith, London, Improvements in Bricks, Tiles, Stones, or other Building Materials.—12,937, V. De Michele, London, Cement-testing Machine.—13,024, W. Hassall, London, Joints for Water, Gas, and other Pipes.—13,026, T. Briggs, London, Apparatus for Use in Soldering.—13,314, W. Lester and W. R. Lester, Glasgow, Glazing Bars or Astragals for Roof Lights and Windows.—13,380, J. J. Barclay, R. Allison, and J. Barclay, London, Improvements in Kilns, and Apparatus for Drying and Burning Bricks.—13,472, H. Thompson, London, Construction of Stoves and Grates.—13,474, H. H. Lake, London, Bakers' Ovens.—13,477, J. R. Jex Long, London, Apparatus for Dividing Timber.—13,490, W. H. Tooth, London, Heating Rooms and Buildings.—13,500, J. T. Pearson, London, Improvements in Bakers' Ovens.—13,867, A. J. Boult, London, Manufacture of Paint.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

173, W. H. Barraclough, Edgbaston, Flushing Apparatus and Water-waste Preventer for Water-closets.—784, C. H. Murray, Highgate, Shaping or Moulding Clay for the Manufacture of Bricks and Tiles.—902, J. G. Stadler, Switzerland, a new Roofing Tile.—943, J. Hemmings, Brighton, Ball Valves for Cisterns.—989, C. Schlickeysen, Berlin, Machinery for the Manufacture of Bricks and Tiles.—1,258, E. Hill, Sheffield, Construction of Roads and Pavements.—1,311, J. Warne, London, Open Stove or Fireplaces.—1,493, J. Roper and W. Roper, Birmingham, Combined Knob, Bell-push, and Fittings, for Hall or Street Doors.—1,498, W. P. Thompson, Liverpool, an Improved Vice.—1,504, F. W. Gerhard, Wolverhampton, Manufacture of Cements.—1,540, J. C. Mewburn, London, Improved Pipe-joint for High Pressures.—7,350, G. Potter and G. W. Potter, Hampstead, Securing Rain-water and other Pipes in Position.—8,270, R. W. Gardner, Paddington, Self-closing Window Fasteners.—288, J. Bruce, Birmingham, Apparatus for Opening and Closing Casements and Ventilators.—351, H. Knowles, Woodville, Kilns for Burning Brick, Pottery Ware, or Lime.—517, E. Verity and J. M. Verity, Leeds, Cramps for Fixing Boards upon Walls and Ceilings.—714, T. W. Helliwell, Brighouse, Glazing Roofs, Railway Stations, Greenhouses, &c.—1,088, J. Beckett, Crosshill, N.B., Ventilating Devices for House-drains.—1,202, J. Jakens, Bury, Apparatus for Joining Lead Pipes.—1,407, S. P. Wilding, London, Corrugated Metal Rolling Shutters.—2,194, W. B. Carne, Kingsand, Sliding Sash-frames.—4,903, J. Monro, New Barnet, Glazed Shelter Wall.—9,150, A. Miller, London, Ventilating Railway-carriages.—9,164, G. Birkitt, Derby, Cooking-ranges.—12,347, F. Grinnell, Rhode Island, U.S.A., Machines for Boring and Tapping Pipe-fittings.—13,006, T. Thorley and A. J. Thorley, London, Ventilating Apparatus, applicable also for preventing Down-draughts in Chimneys.

## RECENT SALES OF PROPERTY.

OCTOBER 31.

By NORTON, TRIST, WATNEY, & Co.

| | |
|---|---|
| Putney—The freehold residence, Winchester House | £1,335 |
| Maida Vale—7, Clifton-gardens, 64 years, ground-rent 12*l.* | 820 |

By ROBERT REID.

| | |
|---|---|
| Edgeware-road—18, Hathpool-street, 54 years, ground-rent 7*l.* 7*s.* | 365 |
| Tottenham—3, Mason-terrace, 93 years, ground-rent 5*l.* 5*s.* | 245 |

By REYNOLDS & EASON.

| | |
|---|---|
| South Hackney—Ground-rents of 270*l.* a year, reversion in 90 years | 6,720 |
| Canning Town—A plot of freehold land, 5a. 3r. 39p. | 3,600 |
| Bethnal-green—21 and 22, Half Nichol-street, freehold | 560 |
| 11 and 17, Sherwood-place, freehold | 835 |
| Haggerston—10 and 11, James-street, freehold | 560 |
| Hoxton—33, Holt's-place, 30 years, ground-rent 4*l.* | 125 |

NOVEMBER 3.

By JAMES GEARNS.

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|---|---|
| Tottenham—Woodville-grove, two plots of freehold land | 1,100 |

By BATTAM & Co.

| | |
|---|---|
| St. Luke's—95, Central-street, 55 years, ground-rent 10*l.* 10*s.* | 425 |

NOVEMBER 4.

By ROGERS, CHAPMAN, & THOMAS.

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|---|---|
| Kensington—32, Lexham-gardens, 87 years, ground-rent 12*l.* | 3,200 |

JONES, LANG, & Co.

| | |
|---|---|
| Streatham—Freehold Ground-rent of 12*l.* a year | 275 |

NOVEMBER 5.

By WALTER PARISH.

| | |
|---|---|
| Shepherd's-bush—55 & 59, Coningham-road, 88 years, ground-rent 14*l.* | 560 |
| 7, 86, & 92, Cathnor-road, 88 years, ground-rent 18*l.* | 800 |

DRIVER & PERFECT.

| | |
|---|---|
| Holloway—20 & 21, Devonshire-road, 68 years, ground-rent 12*l.* 12*s.* | 730 |

By WEATHERALL & GREEN.

| | |
|---|---|
| Port Victoria, Kent—Red House Farm, 112a. 3r. 3p. freehold | 4,100 |
| Freehold farm, containing 76a. 2r. 6p. | 2,350 |

NOVEMBER 6.

By INMAN, SHARP, & HABRINGTON.

| | |
|---|---|
| Clerkenwell—10, 14, Benjamin-street, 20 years, ground-rent 12*l.* | 750 |

By J. A. MUMFORD.

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|---|---|
| Battersea Park-road—36, 92 years, ground-rent 10*l.* | 560 |
| Holloway—14, Junction-road, 75 years, ground-rent 7*l.* 3*s.* | 705 |

By THURGOOD & MARTIN.

| | |
|---|---|
| Ipswich—Bell Vue House, cottages, mill, and 9½a. freehold | 5,500 |
| Borough—19, Falcon-court, freehold | 310 |
| Norwood—Effingham Lodge, Central Hill Cottage and Oak Cottage, freehold | 2,175 |

By Newbon & Harding.

Clerkenwell—192, St. John Street-road, freehold ... £2,100
Camden Town—1-4, Prebend-street, 37 years, no ground-rent ..... 1,335
59 60, Park-street—23 years, ground-rent 26l. 5s. 675
Haverstock-hill—45, Queen's-crescent, 65 years, ground-rent 7l. ..... 700
19, Prevost-road, 83 years, no ground-rent ..... 800
Kilburn—8, Pembroke-houses, 96 years, ground-rent 8l. 8s. ..... 200

## MEETINGS.

Saturday, November 8.

*Association of Municipal and Sanitary Engineers and Surveyors.*—Yorkshire District Meeting at Leeds. (1) Mr. Thomas Hewson, Borough Engineer, Leeds, "On Sewering Towns on the Separate System." (2) Inspection of various works. 10.30 a.m.

Monday, November 10.

*Surveyors' Institution.*—Opening Meeting of the Session. Address by the President. 8 p.m.

*Inventors' Institute.*—8 p.m.

Tuesday, November 11.

*Anthropological Institute.*—(1) Mr. Francis Galton, F.R.S., "On the Anthropometric Laboratory at the late Health Exhibition." (2) Mr. H. O. Forbes, F.Z.S., will read some "Ethnological Notes on the People of the Island of Buru." 8 p.m.

*Institution of Civil Engineers.*—First Ordinary Meeting of Session 1884-85. Mr. A. Jamieson "On Electric Lighting for Steamships." 8 p.m.

Wednesday, November 12.

*London and Middlesex Archæological Society.*—*Conversazione* at Skinners' Hall, Dowgate-hill. Notes from the following papers will be read:—(1) "Reminiscences of the Church and Parish of St John the Baptist upon Walbrook," by Mr. J. D Mathews. (2) "On the Early Municipal History of London," by Mr. G. Laurence Gomme, F.S.A. (3) "On the Recent Discoveries made on the Line of the Inner Circle Railway and at Bevis Marks," by Mr. John E. Price, F.S.A. 8 p.m.

Thursday, November 13.

*Society of Telegraph-Engineers and Electricians.*—(1) Mr. J. Hopkinson, F.R.S., "On the Theory of Alternating Currents." (2) Professor W. Grylls Adams, F.R.S. (President), "On Experiments with Alternate Current Machines." 8 p.m.

*Parkes Museum* (74a, Margaret-street, W.).—Mr. G. J. Symons, F.R.S., "On Meteorology and Hygiene." 8 p.m.

## Miscellanea.

**The Cooper "Coal-Liming" Process in Gas Manufacture.**—At a meeting of the Society of Engineers held on Monday evening last, at the Westminster Town Hall, Mr. Perry F. Nursey, vice-president, in the chair, a paper was read by Professor Wanklyn on "The Cooper Coal-Liming Process." The author commenced by citing a number of analyses of coal, and after entering upon several details he arrived at the conclusion that the coal used in gasworks contained about one per cent. of sulphur. He then went on to state that when gas was made, part of this sulphur entered into the gas. To rid the gas of the sulphur cost 8d. or 10d. in labour and material, and 8d. or 10d. in interest on plant per ton of coal carbonised, and entailed upon the gas-works the creation of one of the worst nuisances in the whole range of manufacturing industry. Cooper's coal-liming process remedied this state of things, and enabled gasworks to produce pure gas without creating a nuisance, and with considerable advantage. The process consists in the addition of about half a hundredweight of quicklime to every ton of coal carbonised. The lime is slaked with its own weight of water, and is mixed with the coal when being charged into the retort. The exact *modus operandi* of the oxide purifier was described, and an indirect result of coal-liming mentioned. When the coal-liming process is in full operation, as at the Tunbridge Wells Gasworks, the oxide purifier is transformed into a dry scrubber, the function of which is to bring about a combination between traces of oxygen and traces of sulphuretted hydrogen existing in the gas on its entrance into the oxide purifier. Coal-liming, Professor Wanklyn stated, was singularly free from drawbacks of any kind. The cost of the lime was more than repaid by the extra ammonia. The coke was increased and improved, and the furnace was not injured.

**Northern Hospital, Winchmore Hill.**—The Managers of the Metropolitan Asylums Board having accepted the tender of Messrs. Wall Bros., of Carlton Works, Kentish Town, for the erection of the New Convalescent Hospital, Winchmore Hill, from plans prepared by Messrs. Pennington & Bridgen, architects, the committee met at the site on Friday, October 31st, when the first sod was turned by Dr. Latham, chairman of the committee for this hospital, preparatory to commencing the building operations.

**Building Improvements in Eastcheap and Tower-street.**—The construction of the Inner Circle Completion Railway, and the widening of Eastcheap and Tower-street is being followed by several architectural improvements in those thoroughfares. Conspicuous amongst the new buildings is that which has just been erected for Sir H. W. Peek, and which is now on the point of completion. The building has a frontage of about 60 ft. in length to Eastcheap, and is upwards of 50 ft. in height, containing four floors. It is faced with Portland stone, and has a carved frieze and cornice. At the corner of Eastcheap and Love-lane there is an angular frontage, which is surmounted by a dome. The circular stone work immediately under the dome is ornamented with pilasters, containing carved festoons and devices. The building has a return frontage in Love-lane. Mr. Alex. Peebles is the architect, and Messrs. Chappell & Co. are the contractors. Its cost will be about 20,000*l*. The old Ship Tavern, on the north side of Tower-street, a portion of which came within the railway line, is also being rebuilt, and on the same side of the street, between Mincing-lane and Mark-lane, a block of office and warehouse premises has been erected on a portion of the site which was cleared for the making of the railway and the widening of the street. These buildings have a frontage of more than 100 ft. The ground-floor portion of the buildings consists of shops, divided by polished grey granite piers, and the upper portion of the elevation, consisting of three lofty floors surmounted by dormers, is faced with red Mansfield stone. At the Mincing-lane end there is an octagonal tower upwards of 90 ft. in height, whilst at intervals along the frontage the elevation is surmounted by gables. Mr. Edwin Crockett, of Mark-lane, is the architect, Messrs. E. Lawrence & Sons being the contractors, and Mr. Chandler the foreman. The Commissioners of Sewers have decided to purchase the freehold of three houses in Padding-lane for 17,175*l*., and the freehold of two houses in Botolph-lane for 10,000*l*.

**Architecture in Relation to Landscape Gardening.**—Mr. G. Richards Julian delivered the fifth of his course of lectures on the above subject at the Crystal Palace School of Art on Wednesday last. In the fourth lecture the birth and development of Renaissance architecture in Italy were dealt with; the astylar form of the early Florentine palaces; the further step of the application of the orders,—one to each story,—as seen especially in Venice; and the final one, the Palladian,—when the order ran through two or more stories, regardless of internal arrangements, were successively sketched. Mr. Julian commenced the fifth lecture with a description of the characteristics of the French style, the "François Premier." Turning to our own country, the well-known forms and details of the Elizabethan style were described, and the subsequent course of Renaissance architecture among us, was traced. Passing to the subject of the architectural decorations of parks and gardens in connexion with buildings of the Renaissance style, the lecturer proceeded to defend such decorations on artistic grounds. Premising that contrast was, of course, one of the elements of beauty, he called attention to the fact that *violent* contrasts, in any of the fine arts, produce almost invariably an effect of crudeness. On this ground he approved of the use of terraces and the formal garden as tending to soften the contrast between the necessarily somewhat hard lines and regular arrangement of architectural forms, and the irregular and flowing outlines of the natural objects in the midst of which they are planted.

**New Buildings at Charing-cross.**—A block of buildings is at present in course of erection in Charing-cross, for the Hygienic and Sanitary Engineering Company. Although the frontage is limited to about 18 ft., the building has a height of upwards of 60 ft., and contains five lofty floors. The building is faced with Portland stone. The first floor has an oriel window on each side of which are panels filled in with carved foliage. The second floor has similar projecting windows, flanked with octagonal columns (carried up to the cornice). At the foot of the second floor there is a bold projecting balcony. The third and fourth floors have each three-light mullion windows. Messrs. Ford & Hesketh, of Aldermanbury, are the architects, and the work is being carried out by the Company's *employés*.

**Stoves at the Health Exhibition.**—Messrs. Geo. Wright & Co., of Rotherham and Queen Victoria-street, write to say that we were in error in giving (in our article on this subject in the *Builder* for the 25th ult., p. 553) their names as exhibitors at Stand No. 670, for although in some instances their manufactures were shown by other exhibitors, they had no stand of their own, and were not exhibitors. While on this subject, we may add that Mr. William Stobbs, of 16, Duke-street, Grosvenor-square, exhibited his patent "Smoke-Preventer," as fitted to a hob register-grate. The invention consists of (*a*) an inner and loose fire-basket; (*b*) a hood reaching nearly to the top of the fire and excluding all cold air from the chimney; (*c*) a swinging diaphragm within the hood. It is applicable to any existing grate or open fire range. The loose fire-basket allows of the provision of a channel for the passage of air under and at the back of the fire, thus creating a strong draught. It is claimed on behalf of this arrangement that the hot air and the increased draught ensure nearly perfect combustion of the fuel, so that very little smoke is formed. The smoke and products of combustion from the fire pass through and over the back of the loose fire-basket and within the hood, and, mixing with the hot air whilst at a high temperature, are oxidised. There is no doubt that, to give due and early effect to the important movement for the abatement of smoke, means must be found of readily adapting existing grates and fireplaces so as to secure more perfect combustion than at present obtains in the generality of them, and Mr. Stobbs claims that by means of his adaptation the formation of smoke, even in the combustion of the most smoky "Wallsend," is to a very material extent prevented, while it is asserted that by the use of this invention a pleasant and agreeable fire may be had by burning coke, Welsh steam, or anthracite smokeless fuels.

**The Sunderland Misery.**—The distress in Sunderland is lamentable, and needs much more than the off-hand subscription of a 5*l*. note by true friends of the poor. It is real and widespread, and must be relieved. But it will be a further misfortune if some light is not thrown on its cause. Sunderland up to a very recent period was one of the most thriving and prosperous towns in England. The disastrous inflation of the steamship-building business, which has brought such bad times to sailors and shipowners, brought high wages and plenty of work to Sunderland workmen. Yet, on the very morrow of a reverse, the well-to-do and prosperous workmen appear before the country *in formâ pauperis*, without savings, and even without food. It is really time that this oft-repeated phenomenon should be thoroughly investigated and explained. We commend the subject to the Lord Mayor's attention. If he will deal faithfully with it, he will not only do good to the men of Sunderland, but to the country at large. These violent oscillations of the social pendulum are truly discreditable, not only to workmen, but to those who give a false impetus to industry, only eventually to leave all affected impoverished or ruined. The blame ought to be fairly distributed. Drink and improvidence will need to be fearlessly and faithfully exposed, if they are the real or chief factors in this Sunderland misery. But commercial gambling and mad haste to be rich ought not to escape. It will be well for the country when it wakes from the dreams of political excitement and learns the value of steady work, thrift, temperance, and commercial sobriety and integrity. Statesmen are not without their very special responsibilities for these crises of misfortune.—*Lancet*.

**Obituary.**—The deaths of two well-known West Country builders are announced this week. Mr. N. Kent Verren, of Plymouth, died on the 30th ult., aged 62, at his residence, 5, Kirkby-place, in that town; and on the 2nd inst., at Southlands, Exmouth, Mr. James Stephens (late senior member of the firm of Stephens & Son, builders, Exeter), passed away at the age of 75. He was brother to the late Mr. E. B. Stephens, A.R.A., who was a native of Exeter.

**The City of London Court.**—The Corporation have resolved to rebuild the City of London Court, Guildhall-yard, in consequence of the existing court being no longer adequate for the legal business transacted there. The present structure is to be taken down, and the new building erected on the same site.

**Buildings for the Industrial Classes at the East End.**—The Metropolitan Railway Company are about to become the owners of an extensive block of dwellings for the industrial classes. For this purpose they are utilising their surplus land on the east side of the Minories, near Aldgate. The site has a frontage of 240 ft. in length to the Minories, with an average depth of about 70 ft. On this land they are about to erect buildings which will have accommodation for a population of upwards of 1,000 persons. Mr. Walter Graves is the architect, and Messrs. Chappell are the contractors for the buildings, which will cost 43,000*l.* A short distance eastward, in Cartwright-street, Royal Mint-street, the East End Dwellings Company are erecting a similar but smaller block of buildings on a site covering an area of 32,000 ft., which was some time ago purchased from the Metropolitan Board of Works for 4,600*l.* The buildings will have a frontage to Cartwright - street 370 ft. in length. Messrs. Davis & Emanuel, of Finsbury-circus, are the architects, and Mr. S. J. Jerrard is the contractor. The estimated cost of the buildings is 13,790*l.* Another block of buildings for workmen is about to be erected in Stoke Newington. They are designated Gibson's Buildings. Messrs. Davis & Emmanuel are the architects, and Mr. J. Grover the contractor, the contract being 10,843*l.* The Commissioners of Sewers are erecting five blocks of industrial buildings in Petticoat-square, which are fast approaching completion, one of the blocks being nearly ready for occupation. Mr. W. Haywood, Engineer to the Commission, is the architect, and Mr. Mark Gentry, of the Langthorn Works, Stratford, is the contractor. The cost of the buildings will be about 64,000*l.* It will thus be seen that in the erection of these several blocks of dwellings for the working-classes in the east and north-east of the metropolis upwards of 130,000*l.* are being expended.

**A Penny Water Cleaner.**—Take a flower-pot and a brick. You can get three flower-pots for 1d., also three bricks for 1d. However, let us say a flower-pot and a brick for 1d. Break the bottom out of the flower-pot in such a way as to leave edge enough to hold up half a brickbat. Let one corner of the half brickbat stand out through the bottom hole. Break up the rest of the brick into bits about as big as a quarter of a walnut. Throw them into the pot. Soak the whole over night in a pail of water, and let it drain. Let the water you want to clean drop upon the middle of the chips of brick. After a few hours the water which drops from the bottom will be wholesome and fair water. Most filters pretend to purify water mechanically. They clarify rather than purify. Others depend upon some curious property of the medium, like animal charcoal. Such cunning matters have to be frequently renewed. The purifier I suggest combines a rather coarse filtration with an effective aëration and something of a specific chemical action as well. But its beauty is its cheapness. Only one penny, and as good as any other.—Fredk. Guthrie, in *Gardening Illustrated.*

**New Corporation Offices, Dublin.**—The new municipal offices, which are being fitted up in the building formerly known as La Touche's Bank, on Cork Hill, are being brought to completion by the contractor, Mr. J. J. Leggett. When finished, several of the new offices will greatly facilitate the duties of the most important departments of the Corporation, the accommodation provided for them in the City-hall having been for some years past found very inadequate. The offices proposed to be removed to the new building are those of the Public Health Department, Finance and Leases Committee, City Treasurer and Accountants' and the City Architect and Building Surveyor's offices. The additional space gained in the City-hall by the transference of these offices will be utilised by increasing the accommodation for other municipal departments, the space at the disposal of which is at present much restricted.

**Builders' Benevolent Institution.**—The thirty-seventh anniversary dinner of this Institution took place on Thursday evening last at the Freemasons' Tavern, Mr. Stanley G. Bird, President, in the chair, supported by Mr. Ewan Christian (President of the Royal Institute of British Architects), Mr. George Plucknett, J.P., and other friends of the Institution. Subscriptions and donations to the amount of 665*l.* 14s. were announced during the evening. A report of the proceedings will appear in our next.

**School of Art Wood-Carving.**—We are requested to state that the School of Art Wood-Carving at the Royal Albert Hall, Kensington, in connexion with the City and Guilds of London Institute for the Advancement of Technical Education, has been re-opened for the winter session with improved accommodation for pupils. Full particulars of the classes and the lessons by correspondence, also as to work executed in the school, can be had from the manager. We may add that the school has been awarded a silver medal in the Educational Section of the International Health Exhibition, and the following students have also obtained honours:—Miss M. E. Reeks, Silver Medal; Miss H. E. Wahab, Bronze Medal; Mr. D. Chisholm, Bronze Medal. The school also gained the highest award for wood-carving, a silver medal, at the Art Exhibition held in September last at Eastbourne. The main purpose of the school is to teach the art of wood-carving to students of the industrial class who cannot afford to pay for instruction, and although the school is to some extent aided by grants from the City and Guilds Institute and fees received from more wealthy pupils, its financial resources are not commensurate with the work which it has undertaken.

**Temple Chambers.**—Amongst other new buildings which are about to be erected on the vacant land facing the Thames Embankment, belonging to the Corporation, is an extensive block of offices and residential apartments, designated Temple Chambers. The site of the intended buildings is at the west end of the vacant land, immediately adjoining the eastern block of buildings within the Temple grounds, overlooking the Gardens. The site stretches southwards from Tudor-street to the Embankment, and the buildings, when completed, will have a frontage of about 400 ft. to one of the new streets which intersect the ground, having also a handsome frontage to the Embankment. Mr. J. Whichcord, of Palace-chambers, Westminster, is the architect.

## CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Sewering, Kerbing, Channelling, &c., New Southgate | Southgate Local Board | C. G. Lawson | Nov. 11th | xviii. |
| Carriage Timber, &c. | Great Western Ry. Co. | *Official* | do. | ii. |
| Road Making and Paving | Fulham Board of Wrks | do. | Nov. 12th | ii. |
| Erection of Retort House | Isle of Thanet Gas Co. | H. E. Jones, C.E. | Nov. 13th | xviii. |
| R ad Making, New Windsor | | T. V. H. Davison, C.E. | Nov. 15th | ii. |
| Street Watering Posts, &c. | Southend Local Board | A. Clayton | Nov. 17th | xviii. |
| Enlargement of Sorting Office, Stoke Newingtn | Commissnrs. of Works | *Official* | do. | ii. |
| Government Offices, Newcastle-on-Tyne | do. | do. | Nov. 22nd | i. |
| Fittings for Sorting Office, Liverpl. Post-Office | do. | do. | Nov. 24th | ii. |
| Works and Repairs (Hampton Court, Kew, and Richmond District) | do. | do. | do. | i. |
| Pipe Sewer | Bexley Local Board | do. | Nov. 26th | ii. |
| New Museum, Chester | | Thos. M. Lockwood | Nov. 29th | ii. |
| Repairs and Alterations to Station Buildings | Gt. Eastern Railway Co. | J. Wilson | Dec. 1st | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Surveyor | Chiswick Local Board | 200*l.* per annum | Nov. 17th | xvi. |
| Assistant Surveyor | Finchley Local Board | 100*l.* do. | Nov. 22nd | xvi. |
| Surveyor | Dartford Highway Brd. | 200*l.* do. | Nov. 28th | xvi. |

## TENDERS.

For alterations and additions to the London Rowing Club-house, Putney. Mr. George A. Dunnage, architect. No. 5, John-street, Adelphi. Quantities by Mr. C. L. Cadney, 57, Moorgate-street:—

| | |
|---|---|
| Thos. Knight & Sons | £2,364 0 0 |
| Chamberlain Bros. | 1,958 0 0 |
| Langdale & Hallett | 1,923 0 0 |
| W. H. Smith | 1,990 0 0 |
| J. & P. Hermon | 1,792 0 0 |
| Robert Aviss & Co. | 1,767 0 0 |
| T. H. Adamson & Sons, Putney* | 1,730 0 0 |

* Accepted subject to certain reductions to be arranged.

For the erection of a residence in the Arkwright-road, Hampstead, for Mr. H. Gosschalk. Mr. R. A. Briggs, architect —

| | |
|---|---|
| Barrett | £5,260 0 0 |
| Conder | 4,844 0 0 |
| Whittay | 4,813 0 0 |
| Boyce | 4,373 0 0 |
| Foster & Dicksee | 4,255 0 0 |
| Kirk & Randall | 4,028 0 0 |
| Killby & Gayford | 4,010 0 0 |

For alterations and repairs at the Northumberland Arms, Brompton-road, for Mr. G. Frei. Mr. H. W. Budd, architect, 76, Vincent-square:—

| | |
|---|---|
| Fish, Prestige, & Co. | £588 0 0 |
| Stimpson & Co. | 542 0 0 |
| Hoare & Son | 528 0 0 |
| Pemberton | 514 0 0 |
| Lamble (accepted) | 487 0 0 |
| *New Counters, Pewtering, &c.* | |
| Warne | £249 0 0 |
| Helling | 242 15 0 |
| Sanders & Sons (accepted) | 215 2 0 |

For alterations at 396 and 398, York-road, Camden Town, for Mr. J. Collingwood. Mr. G. McDonell, architect, 2, Arundel-square, N.:—

| | |
|---|---|
| Austin | £520 0 0 |
| Osborn | 425 0 0 |
| Goodman | 407 0 0 |
| Chant (accepted) | 391 0 0 |

For the erection of new schools, on Windmill-hill, Bristol, for the Bristol School Board, on alternative plans:—

| | A. | B. |
|---|---|---|
| Eastabrook & Sons | £8,123 | £8,204 |
| T. N. Lewis | 8,075 | 8,350 |
| H. A. Forse | 8,050 | 8,700 |
| Cowlin & Son | 7,654 | 7,608 |
| A. Krauss | 7,458 | 7,438 |
| Enos Gray | 7,373 | 7,780 |
| R. J. Crocker | 7,234 | 7,439 |
| William Church | 7,149 | 7,200 |
| H. J. Rossiter | 6,843 | 6,855 |
| A. J. Beavan | 6,700 | 6,950 |
| E. Hatherley (accepted) | 6,467 | 6,467 |

For the erection of two pairs of cottages, for the Colchester Co-operative Society, on Lord's Land Estate. Mr. J. W. Start, architect, Colchester. Quantities by the architect:—

| | |
|---|---|
| G. Lee | £940 0 0 |
| C. Shepherd | 920 0 0 |
| G. Farran | 840 0 0 |
| C. Eade | 830 0 0 |
| C. Oldridge | 795 0 0 |
| A. Gladwell | 765 0 0 |
| A. Chambers | 750 0 0 |
| F. Dupont | 648 0 0 |
| H. Ambrose (accepted) | 620 0 0 |
| A. Diss (withdrawn) | 550 0 0 |

Accepted for external and internal repairs, fitting-up baths, closets, and general decorations to mansion, at Belsize Park-gardens, for Mr. J. Wright:—

| | |
|---|---|
| Hobbs & Son, Enfield | £361 0 0 |

[No competition.]

For new Catholic Church and Presbytery, in the Blenheim-road, Deal. Mr. Frederick A. Walters, architect, 4, Great Queen-street, Westminster. Quantities by Mr. J. F. Carew, 22, Surrey-street, Strand.—

| | A.* | B.† | C.‡ | D.§ |
|---|---|---|---|---|
| Adcock, Dover | £2,997 | £986 0 | £377 | £500 |
| Trollope, Lower Walmer | 2,861 | 921 0 | 386 | 454 |
| Martin, Ramsgate | 2,746 | 946 0 | 387 | 450 |
| Brooks, Folkestone | 2,736 | 939 10 | 382 | 460 |
| Wise, Deal | 2,571 | 908 0 | 376 | 412 |
| Denne, Deal | 2,445 | 900 0 | 369 | 433 |

* The Church and Sacristy. † The Presbytery.
‡ The Tower. § Omission of Transepts.

For alterations, repairs, and other works, to be done at the Horse and Dolphin public-house, Soho, for Mr. Cooper. Mr. N. Clark, architect:—

| | |
|---|---|
| Johnson & Manners | £725 0 0 |
| Hale | 695 0 0 |
| Bolding | 597 0 0 |
| Feltham Bros. | 530 0 0 |
| Mower | 525 0 0 |
| T. L. Green | 497 0 0 |

For alterations at the Alfred's Head public-house, Newington-causeway, for Mr. H. R. Cope. Messrs. Barnard & Medland, architects:—

| | |
|---|---|
| Shurmur | £585 0 0 |
| Gill | 575 0 0 |
| Hemmings & Mullins | 560 0 0 |
| Mower | 555 0 0 |
| Beale | 539 0 0 |
| Croaker | 485 0 0 |
| *Pewterers' Work, including Cabinet.* | |
| Saunders & Co. | 617 0 0 |
| Warne | 477 0 0 |
| Heath | 456 0 0 |

For erecting detached villa, at Manor-road, Stoke Newington. Messrs. Bray, Webb, & Co., architects:—

| | |
|---|---|
| Harriss (accepted) | £430 0 0 |

For the erection of superintendent's new house, lodge, and other works at the Western Hospital, for the Managers of the Metropolitan Asylums District. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities supplied. -

| | | | |
|---|---|---|---|
| W. Hammond | £4,800 | 0 | 0 |
| Hill Bros. | 4,258 | 0 | 0 |
| Gould & Brand | 3,985 | 0 | 0 |
| Smith & Son, Kensington | 3,978 | 0 | 0 |
| W. Johnson | 3,898 | 0 | 0 |
| R. & E. Evans | 3,885 | 0 | 0 |
| H. T. Sanders | 3,789 | 0 | 0 |
| Balsam Bros. | 3,591 | 0 | 0 |
| Howell & Son | 3,570 | 0 | 0 |
| J. B. Potter | 3,533 | 0 | 0 |
| Feltham Bros. | 3,500 | 0 | 0 |
| J. Dickeson | 3,496 | 0 | 0 |
| Magee & Co., 182, Brompton-road* | 3,359 | 0 | 0 |

* Accepted.

For sewerage works at Barking, for the Local Board:—

| | | | |
|---|---|---|---|
| Argent | £3,447 | 0 | 0 |
| Cornish | 2,003 | 0 | 0 |
| Jackson | 1,884 | 0 | 0 |
| Stewart | 1,818 | 3 | 8 |
| Cardus | 1,818 | 0 | 0 |
| Bottoms | 1,763 | 0 | 0 |
| Simpson | 1,738 | 11 | 7 |
| Wood | 1,723 | 0 | 0 |
| Headle Bros. | 1,718 | 0 | 0 |
| Hawkins | 1,689 | 0 | 0 |
| Mascroft | 1,665 | 0 | 0 |
| Smith | 1,585 | 0 | 0 |
| Catley | 1,544 | 0 | 0 |
| Peell & Son | 1,435 | 0 | 0 |
| B. Cooke & Co., Battersea (accepted) | 1,425 | 0 | 0 |
| Nicholson | 1,384 | 0 | 0 |
| Saunders | 1,248 | 0 | 0 |
| Neave | 1,116 | 0 | 0 |

For a dwelling-house, at Beckenham, for Mr. R. R. Gibbs. Mr. Geo. Waymouth, architect:—

| | | | |
|---|---|---|---|
| Richardson Bros. | £1,093 | 0 | 0 |
| Henry Brown | 1,095 | 0 | 0 |
| Shurmur | 1,044 | 0 | 0 |
| Jones | 937 | 0 | 0 |
| Taylor & Grist | 925 | 0 | 0 |
| Howe & White (accepted) | 890 | 0 | 0 |

For new tower at the Church of Chesham Bois, Bucks. Mr. Geo. Waymouth, architect:—

| | | | |
|---|---|---|---|
| Taylor & Grist | £190 | 0 | 0 |

For foundations for assembly-rooms and offices for the New and Latter House of Israel, Gillingham, Kent. Messrs. William Margetts, Son, & Co., architects. Quantities by the architects:—

| | | | |
|---|---|---|---|
| E. B. Brass, London | £2,453 | 0 | 0 |
| Geo. Shaw, London | 1,780 | 0 | 0 |
| J. Heaven, Strood | 1,764 | 0 | 0 |
| J. H. Trueman, London | 1,653 | 0 | 0 |
| S. Ames, Strood | 1,513 | 0 | 0 |
| J. C. Trueman, Luton | 1,467 | 0 | 0 |
| W. Hocking, Strood | 1,460 | 0 | 0 |
| Honey & Rye, Gillingham | 1,360 | 0 | 0 |

For building the superstructure of the Jones Memorial Block, at the Royal National Hospital for Consumption, Ventnor, Isle of Wight. Mr. T. Hellyer, architect, Ryde, Isle of Wight. Quantities supplied by Mr. H. P. Foster, No. 5, John-street, Adelphi:—

| | | | |
|---|---|---|---|
| Ingram & Sons (accpted) | £9,984 | 0 | 0 |

For the erection of small bazaar, for Messrs. Pierce & Hutchings, Bournemouth. Messrs. Kemp, Welch, & Finder, architects:—

| | | | |
|---|---|---|---|
| W. Stanley | £1,518 | 10 | 9 |
| J. Huxtable | 1,441 | 0 | 0 |
| Jenkins & Son | 1,414 | 0 | 0 |
| A. H. Stroud | 1,389 | 0 | 0 |
| C. A. D. George | 1,350 | 0 | 0 |
| Saunders | 1,335 | 0 | 0 |

[Architects' estimate, 1,435 l. 7s. 4d.]

For pulling down and rebuilding 20 and 21, Little Windmill-street. Mr. D. C. Nicholls, architect. Quantities by Mr. H. P. Foster:—

| | | | |
|---|---|---|---|
| Green & Sons | £3,463 | 0 | 0 |
| Bangs | 3,159 | 0 | 0 |
| Colls & Sons | 3,010 | 0 | 0 |
| Mowlem & Co. | 2,948 | 0 | 0 |
| Conder | 2,848 | 0 | 0 |
| Scrivener & Co. | 2,883 | 0 | 0 |
| Lawrence | 2,8[illegible] | 0 | 0 |
| J. R. Hunt | 2,789 | 0 | 0 |

Accepted for alterations and additions to Nos. 3 and 4, Brunswick-street, Hackney, for Mr. Freeman. Mr. H. F. Simmonds, architect, Cambridge heath —

| | | | |
|---|---|---|---|
| G. G. Hardy, Pritchard's-road, Hackney-road | £140 | 0 | 0 |

Accepted for alterations and repairs to Broke House, Ford-street, Old Ford, for Mr. Macklin. Mr. H. F. Simmonds, architect:—

| | | | |
|---|---|---|---|
| Bentley, Walthamstow | £100 | 0 | 0 |

Accepted for alterations and additions to No. 166, Green-street, Bethnal Green, for Mr. R. Preston. Mr. H. F. Simmonds, architect:—

| | | | |
|---|---|---|---|
| Delaforce, Bonner-lane, Green-street, Bethnal-green | £130 | 0 | 0 |

For constructing new road sewers, &c., on the Wimbledon Estate, for the Directors of the Birkbeck Freehold Land Society. Mr. Sydney B. Gravenor, surveyor, 23, Southampton-buildings:—

| | | | |
|---|---|---|---|
| P. Pound (accepted) | £943 | 0 | 0 |

For engineer's work in constructing and heating picture gallery, at Fonthill, Wilts, for Mr. Alfred Morrison. Messrs. Gordon & Lowther, architects:—

Marshall & Hatch, Bingfield Iron Works, London.

[Accepted at schedule of prices.]

For iron stable fittings at above:—

Marshall & Hatch.

[Accepted at schedule of prices.]

For the erection of business premises, in Bermondsey-street, Southwark, for Messrs. F. M. Hudson & Sons. Mr. William Eve, architect, 10, Union-court, Old Broad-street:—

| | | | |
|---|---|---|---|
| Boyce | £2,450 | 0 | 0 |
| Downs | 2,264 | 0 | 0 |
| Shepherd | 2,225 | 0 | 0 |
| Shurmur | 2,079 | 0 | 0 |
| Harris & Wardrop | 2,074 | 0 | 0 |
| Salt | 2,065 | 0 | 0 |
| Aldridge & Jenvey, Camberwell* | 1,900 | 0 | 0 |

* Accepted.

*Stables, Brompton.*—In the list of tenders for this job printed last week, it should have been stated that the only reason of Mr. Holland's (which was the lowest) not being accepted, was because Mr. Craske offered to complete in ten days' less time.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

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# The Builder.

Vol. XLVII. No. 2180. Saturday, November 15, 1884.


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### *Recent Criticisms on the Olympian Discoveries.*

IT is not surprising that in the collection of essays forming the birthday volume* offered to Prof. Curtius on his seventieth birthday there should be found no less than five, — and these, perhaps, the most important and interesting,—which relate to the Olympian excavations. Other matters are not neglected. We have an article on the topography of the bay of Salamis, on the history of Attic finance, on the recently excavated Temple of Vesta, on Etruscan ash chests, and many more which we cannot even enumerate. The volume was, indeed, intended to be as widely representative as possible of all the branches of classical learning,—a tribute and testimony to the wide sympathies of the veteran scholar and archæologist. But it was impossible to forget that to all archæological Europe the name of Curtius suggests Olympia, that these Olympian excavations had been to Prof. Curtius the inspiration of his early youth, the hope deferred of his middle life, and the crown and glory of his old age. He was only twenty-three when he first went to Athens, when he travelled through the Peloponnese in company with Ottfried Müller, the father of modern scientific archæology; from the time when he first trod the plain of Olympia in the hope,—nay almost the determination,—to unearth her treasures. But the waiting was long and weary. In 1844 he had the good fortune to be appointed tutor to the Crown Prince, a connexion invaluable for the fortunes of archæology. In 1852 he made his memorable oration in the Berlin "Sing-Akademie," and pleaded with passionate fervour the cause of Olympia. His enthusiasm was contagious, the Emperor and the Crown Prince caught fire, and for a while it seemed that his hope was near fulfilment. But, alas! the war intervened, and the prospect seemed further than ever. Archæologists, whatever their political convictions, have to be thankful for the issue of that war. Once peace established, the German Government, enriched and elate, lost no more time in undertaking a work that was sure to redound to the national glory. In 1874 Professor Curtius went as delegate to Athens. A convention was arranged, and at last, in 1875, on his birthday, September 2nd, he left Berlin for Olympia as director of the excavations. This is now just nine years ago; since then Prussia has enriched her national museum by the great find of the Pergamene marbles; and by the sensational splendour of these the far more valuable discoveries at Olympia are cast, for the popular mind, just a little in the shade. But the work of reconstructing and elucidating the Olympian remains goes steadily on, and some valuable results of this steady continuous labour are embodied in the five papers which fitly form part of the memorial volume before us. Interest in such elucidations has never failed among professional archæologists, but now that casts of the principal sculptures are to be seen at the South Kensington Museum this professional interest is sure to develope into a wider popularity.

As a specimen of new opinion ingeniously supported, we may select the paper by Dr. Gurlitt, on "Pæonios and the East Pediment of the Zeus Temple," as a welcome contribution to the literature of a most puzzling question.

The puzzle is this. Every one knew before a sod was upturned at Olympia that we might expect to find there the work of a certain artist, Pæonios of Mende. This Pæonios, literary tradition said, executed the pediment which contained sculptures representing the contest of Pelops and Oinomaos. Further, we knew that Pæonios was, roughly speaking, a contemporary of Pheidias, and as he was intrusted with the execution of work so conspicuous and all-important we naturally concluded that he was a very illustrious contemporary. Bit by bit, the sculptures by the hand of Pæonios were unearthed, and in eager expectation the archæologists of Europe rushed to see them. Then came, at first bitter disappointment, later complete bewilderment. Instead of sculptures of ideal beauty, great in conception, noble in execution, we have—well, what every one may now see for himself in the South Kensington Museum,—sculptures profoundly interesting, but to the untrained eye scarcely beautiful at all. Lamentation was followed by criticism and by attempted explanation. The best judges agreed happily on one point; the sculptures of both pediments and of the surviving metopes left on every highly-trained eye one impression,—that of confusion, bewilderment; of a style, that is, perhaps, best characterised as style-less; there was nothing about the sculptures of the high commanding *manner* of a great master. There was a good deal of liveliness, abundant realism, a certain aptitude for filling space, but nothing that amounted to style. Ingenious conjectures were hazarded to account for work so unsatisfactory,—so, as it seemed, inadequate,—coming, as we were bound to suppose it did, from the hands of masters like Pæonios and (for the west pediment) Alkamenes. One critic suggested that the work had been designed indeed by the great men, but carried out inefficiently by local workmen; another has invented for us a whole school of "Northern Greece" artists dominated by pictorial influence. Dr. Gurlitt rightly points out that the unsatisfactory character of the Olympian sculptures is due not merely to defective execution,—that rather the designs sin through want of largeness and fineness of conception,—that there are certain inherent defects in the treatment of the human body and in the schemes of drapery, that undoubtedly point to a certain poverty in the original model. With Professor Brunn's theory of the Northern Greece school and its pictorial tendencies Dr. Gurlitt has no quarrel; in fact, his own view is, in some respects, a further development of this very theory. He confines his discussion to the question of the style of Pæonios and his relation to the east pediment. Now about the style of Pæonios the excavations have added a very important piece of circumstantial evidence, the existence of which was unknown from literary testimony,—we mean the famous statue of Nike with the inscribed basis. This Nike has served to complicate the Pæonios question. Its style, superficially considered, is markedly superior to that of the east pediment; is it possible that the Nike and the pediment can have sprung from one and the same brain? The inscription compels us to acknowledge the Nike as the work of Pæonios; must we reject the pediment? Dr. Gurlitt thinks not; and first he turns to the inscription on the basis. This tells us that "the Messenians and Naupaktians dedicated the statue to the Olympian Zeus as a tenth of the spoil from their enemies, that Pæonios of Mende made it, the same who conquered in making the akroteria on the temple (*τὰκρωτήρια ἐπὶ τοῦ ναου*)." It has been thought by many that the "akroteria on the temple" might mean the pediment sculptures. This idea is now given up, and the akroteria are understood much more naturally to mean not the space contained within the pediment triangle, but the angles of that pediment, and hence the ornaments which adorned those angles. Pæonios then, according to the inscription, made the ornaments which adorned the pediment angles, the apex, and the two angles at the base. Why, we naturally ask, does the inscription call attention to this fact? And why, if it must mention other works of Pæonios and those connected with the temple of Zeus, does it make no mention of the fact that the pediment sculptures in the east end of the temple,—sculptures at least as important as the akroteria,—were by this same master Pæonios? The reason is obvious enough if we

* Historische und Philologische Aufsätze Ernst Curtius zu seinem siebenstigsten Gebuststage genidmet. Berlin: Asher & Co. 1884.

consider the nature of these akroteria; the centre one will suffice. On the apex of the Zeus temple floated a bronze-gilt Nike. The conclusion seems irresistible that the Nike, with the basis,—the sculptural Nike made for the Naupaktians,—was a replica, a second rendering of the original Nike made by Pæonios to decorate the temple. The reason of the mention of the akroteria is obvious. Pæonios did not wish to be regarded as the copyist of another's work when he was, in fact, merely a translator of his own.

Granting this (which few will be prepared to deny), Dr. Gurlitt goes on to say, here we have a remarkable juxtaposition; we possess two out of the three recorded works of the master Pæonios, and one of them is a translation into purely plastic form of what was originally a decorative design. Surely we have enough actual monumental evidence before us by which to judge of the sculptor's style, without troubling ourselves unduly with questions as to whether he worked under the influence of Pheidias or not. Further, have we not in this translation of the decorative into the purely plastic Nike a significant clue to the chief characteristic of Pæonios? This characteristic Dr. Gurlitt believes to be externalism; purely decorative, as opposed to imaginative excellence. No one denies the Nike is pictorial in conception. The conception of the floating goddess in swift motion is about as *un*sculptural as any conception could be. We have Nikes enough in the Athenian balustrade, but not one is thus daringly suspended, dependent for her support on that very atmosphere which is the essential of pictorial design, and which is for sculpture non-existent. But we might say this Nike is pictorial because she is a mere replica of the akroterian Nike, which necessarily, as a mere decorative adjunct, has a certain pictorial externalism. Dr. Gurlitt concedes this, but he goes on to point out how this decorative externalism is the key-note, not only of the Nike, but of the other work of Pæonios, the east pediment of the Zeus Temple. It is this decorative externalism which distinguishes it alike from the ruder Ægina pediments which preceded as from the finished excellence of the Parthenon. To Pheidias only was it given to combine a perfect decorative fitness with an absolutely plastic idealism. Pæonios was but a bold successful craftsman, probably self-taught, belonging to no particular school, who had seen great works and succeeded in catching something of the outward semblance of things, but who never penetrated beyond appearances, who never mastered that inwardness, that monumental security which was the characteristic of both Attic and Arqui schools, otherwise so widely apart.

Dr. Gurlitt supports this interesting, and, we think, substantially true theory by a careful analysis of the pediment figures one by one, and a comparison of them with the Nike; he also makes the suggestive remark that as the east pediment is to the Nike, so may the Parthenon pediments be to the unknown term,—the great masterpieces in the round by Pheidias But upon this matter we cannot dwell. We must turn from this original expression of new *opinion* to a paper by Dr. Furtwaengler, which contains more valuable material still,—the statement of new fact. Dr. Furtwaengler is the one of all Dr. Curtius's able disciples on whom the mantle of his inspiration seems to have fallen, and we are glad that he has drawn the lot of a brilliant and interesting discovery. Every one who has examined the Olympian find of archaic bronzes will remember a fragment of the thinnest possible metal which contains part of a design evidently mythological. The fragment is, from the point of view of the history of art, of the highest importance, but perhaps its special fascination was the difficulty of interpreting it in its mutilated condition. A nude male figure, beardless, stands to the left; a portion of a draped figure, sex quite uncertain, advances with extended arms and seems to be handing some object; between are visible the bent knees of a prostrate figure. The explanation current among archæologists was that the scene represented Ariadne coming to greet and crown Theseus; between them the dead body of the prostrate Minotaur. There is absolutely nothing in the Olympian fragment to make this interpretation unfeasible, but it failed to satisfy some instinct of Dr. Furtwaengler's mind. Fortunately he openly expressed his dissent, and suggested another interpretation. The draped figure might be the aged Priam, the youth Achilles, between them the dead body of Hector. Probably Dr. Furtwaengler had little hope that his conjecture would ever be substantiated. Business took him to Rome to attend the great Castellani sale. There turning over some neglected objects heaped together, forgotten, in a drawer, he came by chance on an ancient Greek mirror, formed in a somewhat unusual way; a small square plate forming the handle and the circular disk. A glance showed him that on this small square was a replica of the Olympian bronze. The missing half was there, and the missing half showed that the design was beyond a doubt not the triumph of Theseus, but the ransom of Hector. The full figure of old Priam came into view leaning on his staff, the rest of the prostrate figure was the human shape of Hector with the bull-headed Minotaur, and to complete the design appeared the god Hermes with his herald staff, who, to do honour to King Priam, guided him through the Grecian tents. No demonstration could be more complete, no certainty more delightful to the fortunate discoverer.

The discovery is interesting as interpreting securely a very ancient bronze, and as such it will perhaps be most widely appreciated; it would perhaps be out of place here to enlarge on the delight that it will give to the specialist in "Vase Types." To have established the earliest type of the "Εκτορος λύτρα" is not to have lived in vain, and none knows that better than the discoverer himself, who has made such rich contributions to the history of black-figured vase paintings.

Dr. Furtwaengler made the discovery in the spring, but he wisely kept it *in petto* as a fitting tribute for the autumn festival of his master.

## WORKMEN'S HOMES AND THEIR ADJUNCTS.

The third part of M. Cacheux's voluminous treatise* discusses the material and moral welfare of the labouring classes, and opens with pointing out that in every civilised nation there are periodical financial crises which seriously affect the condition of those classes. M. Cacheux believes that if the State would give greater publicity to the commercial information which it possesses, those crises might be prevented; but that is very doubtful,—in this country at all events. However that may be, he is of opinion that a remedy may be supplied by a private Society undertaking such functions as were exercised by certain good men who, in 1848, formed themselves into a central committee for the encouragement of industries in the mountainous tracts in Bohemia. In France, though several similar societies already exist, there is yet much more to be accomplished, especially in the direction of agriculture, which is an industry of great moment. It is well known that France imports very largely foreign produce, and that it must continue to do so unless it can continue to raise the raw material from its own soil. For a long time beetroot and the vine have contributed to the prosperity of many of her departments, but now both those industries are languishing, and it behoves her to seek for fresh productions and to stem the tendency to emigration from the country to the towns. M. Cacheux advocates an extended system of canalisation as one description of useful work which might find ample employment for the workmen who have been thrown out by the stagnation of trade, and instances particularly a project for relieving the Seine from thos inundations which have of late years been s disastrous. The estimated cost of that cana is eight millions sterling, all of which has bee subscribed, but the necessary authority has no yet been given for its commencement.

With reference to the amelioration of th condition of the labouring classes, there are tw ways by which it may be effected, either b raising their wages or else by supplying the with the necessaries of life at reduced price M. Cacheux truly observes that a rise in wage as has, indeed, been proved in our own cas is attended with questionable benefit. F France it seems to have operated undoubtedl for evil,—for it has so tended to increase th price of production as to oblige contractor to resort to foreign countries in which th articles they require are produced mor cheaply, and consequently the demand f home labour has proportionately diminished The case of Mulhouse furnishes an apt illu tration of which is the better method o improving the workmen's condition. Ther in order to enable them to compete with the rivals, it has been necessary to keep wages a as low a figure as possible; but then care ha been taken to make it up in other ways b furnishing them with cheap lodgings, chea food, and providing for them benefit societi and working men's clubs. It is just because like interest has not been taken in his work men by the Parisian employer that th labourers in Paris have fallen into the present unfortunate condition,—a conditio from which it is impossible for them emerge, unless by the intervention of c operative or other benefit institutions they a enabled to procure the bare necessaries of li more cheaply than is at present practicable.

M. Cacheux follows up his subject by di cussing next the description and scale of di most suitable for the working classes. Doub less it is a point deserving consideration, b it must evidently vary according to the descri tion of work on which they happen to engaged. Again referring to Mulhouse, states that the workmen there used to consum too large a proportion of farinaceous a liquid food; and when restaurants were fir started by their employers they grumbled the comparative smallness of the rations, b that they soon began to perceive they we equally well up to work notwithstanding th they were consuming a far smaller bulk food. After discussing the alimentary qualiti of various articles of nourishment, the auth proceeds to explain the best modes for the preparation, and this leads to an investigatio of the different apparatus which have been i vented for cooking purposes. Where lar numbers have to be provided for, as in Work men's Restaurants, the general arrangemen and the best appliances for the kitchen becom matters of great importance, both on the sco of efficiency and economy. The relative meri of the different kinds of stoves, whether worked directly over the fire or by steam, a likewise discussed, but it does not appear th gas-stoves have as yet been tried in Franc at least no allusion is made to them by M Cacheux. In all the principal establishmen in London and the provinces the gas-stove pla an important part, and its superior economy as well as cleanliness, appear to be general admitted. The interesting collection of hea ing and cooking apparatus at the Health Exh bition, lately described in the *Builder*, has n doubt already attracted the attention of o intelligent neighbours, but possibly the hig cost of the fuel is one reason why gas-stoves ha not as yet been employed in France. The co of a meal varies apparently at different place ranging from 6½d. to 9d. according to th quality or quantity of the viands, but a sub stantial meal of wholesome food can be and supplied for less at many workmen's dining rooms in London.

The next subject treated is that of bath the use of which is daily becoming mo popular amongst the working classes. France more elaborate provisions appear to h made than is customary in England. At th ordinary swimming-baths the price charge varies from 1d. to 2d. per head, and is abo

* L'Économiste Pratique: Construction et Organisation des Crèches, Salles d'Asiles, Écoles, &c. Par Émile Cacheux, Ingénieur des Arts. Paris: Librairie Polytechnique; Baudry & Co., 15, Rue des Saints-Pères. (See p. 614, *ante*.)

the same in both countries. The transition from baths to laundries naturally follows, the latter of which constitutes a very thriving industry, and hence our author devotes a considerable space to describing the various operations connected with it. Without following him through his descriptions it will suffice to direct attention to the ingenious apparatus in which the linen is thoroughly scalded and cleaned by steam, and also to the drying machine shown in Plates 59 and 60. At the laundries in the Health Exhibition similar processes, though not applied in exactly the same manner, have been seen in daily operation. It is, however, generally admitted that France excels all other countries in this particular industry; but, at the same time, as English people well know, the little bill of a French laundress is a veritable *article de luxe*.

Societies and associations for the special object of rendering pecuniary aid to operatives come next under review, but the general principles on which they are founded, and the conditions on which they are worked, are much the same as in our own country. In this branch of political economy, however, England is at present the most advanced nation, for in no other country do there exist so many mutual aid and benefit societies. The savings-banks, especially that connected with the Post Office, are amongst the most valuable of our many admirable institutions, and have taken deeper root in Great Britain than on the Continent, notwithstanding that as a nation Frenchmen are undoubtedly much more thrifty than Englishmen.

M. Cacheux concludes his treatise with an examination of several methods of dealing with that class of the community which for one cause or another is unable or unwilling to support itself. "If any work not, neither should he eat" is an Apostolic decree, and were it more rigidly enforced, probably the large number of mendicants who now loiter along our own thoroughfares would soon be diminished; but where there is a large surplus population there must always exist a number of persons who, however willing to work, are unable to procure employment, and it is for such that succour must be provided. There are also many who, owing to physical or mental infirmity, are unavoidably thrown on the care of the public. Asylums for the latter, as well as hospitals for the sick, are to be found in almost every country, but perhaps nowhere do they abound so much as in Great Britain, and yet the efforts made to alleviate the wants of suffering humanity are unable to overtake the numbers who stand in need of help.

M. Cacheux ably discusses the merits and arrangements of the different institutions which have been or ought to be created for the purpose, but it is beyond his power to indicate how or whence the requisite funds for their creation can be obtained. Nevertheless he has done good service by publishing the vast amount of information which he has collected on the subject, and we can only hope that his efforts to ameliorate the condition of the humbler classes of his fellow-men may meet with the appreciation which they deserve, and we would commend his treatise to the attention of the Royal Commission which is now engaged in considering the subject of Housing the Poor.

## NOTES.

THE loss to the nation by the death of such a man as Henry Fawcett is one which none who are concerned, however imperfectly, in the endeavour to forward the healthful practical work of the world in this generation can pass over in silence, even though his special influence was apart from the province with which they are professionally concerned. The manly resolution with which, in early life, he set himself to contend against a terrible calamity and to rise above what might have seemed its inevitable consequence in circumscribing his career, and the energy and business-like ability which he brought to bear on the working of the important public institution which he directed under the present Government, are qualities which men in all ranks and professions may admire and aspire to emulate. The universal and almost personal regret which the news of his death evoked from men of all shades of political feeling is a refreshing testimony to the fact that, amidst all the acerbities of party politics, —now, unfortunately, more pronounced than ever,—true nobility of character and honesty of aim will command a respect and sympathy apart from the minor and passing considerations of party tactics. It is, in fact, neither to the politician nor to the Postmaster-General that the homage of universal regret has been especially paid during the past week, but to the personal character of one concerning whom it might be said,—

"That Nature might stand up
And say to all the world, 'This was a man!'"

TWO statements appear on the same page of the London morning journals of the 11th current, which may advantageously be read together. One, dated from Paris, is to the effect that "the slow but steady increase of cholera, especially in the eastern quarters of the city, causes considerable anxiety. . . . . There have been 55 cases of cholera, and 22 deaths, in the city and the hospitals from midnight till noon to-day." The other announcement runs, "The Royal Commission on Metropolitan Sewage Discharge met yesterday at 32, Abingdon-street, Westminster." Bearing in mind the semi-official, if not wholly official, expression of the opinion of the noble and learned Chairman of this Commission, addressed to the Home Secretary, to which we recently called the attention of our readers, it is perhaps permissible to express the hope that London may not have much longer to wait for the report of this body of experts. That degree of safety which is due to a thermometric heat below 70 deg. Fahr. is relied on, as we have seen, by the Metropolitan Board of Works. Shall we not observe, until too late, that as this condition has not proved a safeguard in the case of the Seine, it is running an altogether unwarrantable risk to rely on it in the case of the Thames?

MR. WATERHOUSE'S design for the new Liberal Club has been the occasion of a little paper warfare in the columns of the *Pall Mall Gazette*, in which the doctors differ not a little. A capital letter, signed "F.R.I.B.A.," published on the 6th, commented on the disappointment felt by some in regard to the design of the building, also stating that Government authority had interfered to compel the adoption of a design in harmony with certain other buildings to be erected on the contiguous site of "Whitehall-court," and that Mr. Waterhouse's first and superior design had thus been shelved, against his will. If this be true, it adds one more to the list of the mischiefs worked in this country whenever official authorities meddle with architecture. "F.R.I.B.A." justly describes the general harmony of the district as "a general harmony of dull mediocrity," and refers to Mr. Waterhouse's tower at the angle of the club as the one striking feature left in the design. Mr. Fergusson, in a letter published two days later, fastens on the tower as a specially objectionable object, which "will dwarf everything in its neighbourhood." Well, as far as that goes, we sincerely hope it will. Mr. Fergusson's argument that the most effective point of the interior plan is sacrificed by relegating it to the provision of staircases and an inclined plane we can quite understand, but Mr. Waterhouse says the plan could not well be arranged otherwise; and he is a master of planning. But as to the architectural question, we should be perfectly thankful to see something different from the respectable commonplace of most of the buildings in the neighbourhood, even if it does "dwarf" them. The most important point brought out in the correspondence, however, is the statement that Mr. Waterhouse had designed something much better and after his own heart, and was prevented from carrying it out by the intervention of bumbledom.

WITH a good deal of Mr. Sedding's diatribe against the modern architectural system, printed elsewhere, we are very much in sympathy; but his criticism is of a very negative description (the very easiest kind of criticism), and too much pervaded by the temper which finds it piquant to say sharp things of other people. "Some people," said Sydney Smith, "think themselves pious when they are only bilious"; and the weakness occurs in regard to architectural as well as moral righteousness. That Mr. Sedding himself has overlooked some branches of knowledge which society imperatively demands from the modern architect, and is in want of the hated "specialist" to help him, is evident from his innocent reference to the "D-trap," as if that were the typical representative of sanitary machinery. He urges that the modern architect should set about training himself more thoroughly. Having regard to the deadly effects of putting unwholesome and inefficient traps into houses, we may reply to the "art-architects" who are guilty thereof, "Que messieurs les assassins commencent." The extraordinary reference to a certain eminent lawyer as the only real architect of the day seems to have been prompted by the reason which Johnson assigned for a certain couplet in Pope. "Why did Pope write that?" "Sir, he hoped it would vex somebody."

A SCHEME, called the Wandle Valley Main Drainage, has recently been completed for the Croydon Rural Sanitary Authority. The district served embraces five villages, with a population of 17,000, and covers an area of 10,106 acres. The watershed contains sixty square miles of chalk, from which the Wandle is fed, and whence it runs over beds of alluvium overlying the London clay. The scheme is on "the separate system," the storm-water being provided for in the old sewers and water-courses, which have been improved for the purpose, while the new sewers as completed measure 55 miles, of which 20 miles have been laid with 9-in. Doulton pipes. The system was designed to allow as much of the sewage as possible to be carried to the land by gravitation, and where this was not possible a low-level sewer was laid, from which the sewage, after its arrival at the pumping-station, is pumped up into the gravitation outfall an average height of 20 ft., and then flows into the depositing-tanks. The sewage, after it has been deprived of floating matter, and when the solids have subsided in the tanks, is filtered through a 4-ft. bed of coke, and then passes on to the land set apart for filtration and its final purification. The sludge is first treated with milk of lime, and then pressed into cakes 2 ft. in diameter and 1½ in. thick; and a farmer in the neighbourhood has contracted for the cake produced for twelve months, paying a sum of 42*l.*, and undertaking to keep the works free from sludge cake. Owing to the area, some 29 acres, set apart for filtration purposes being very swampy and liable to be flooded, it was necessary to construct a clay-puddle dam entirely round it, and to 1 ft. below the surface of the London clay. In the upper portion of this area an artificial filter was made of alternate 3-in. layers of burned ballast and porous soil through which the sewage passed first into the natural filter. The land irrigated by the sewage in its passage is devoted to the cultivation of rye grass, for which there is a good demand, the crops realising 30*l.* per annum.

THE case of "Ex parte Cooper *in re* Morris," reported in the *Law Reports* of October, though it was decided some time ago, is of a good deal of interest to employers and workmen. A large firm were in the habit of deducting from the wages of their workmen sums in respect of a "doctor's fund" and a "reading-room fund." The sums so deducted were from time to time handed over to the doctor and to the treasurer of the room, and the workmen got their medical attendance and literature without further payment out of pocket. The firm became bankrupt, and at the time there was a sum in respect of each fund in the employer's hands, not yet paid either to the doctor or to the treasurer. In the liquidation the workmen claimed to have a right to be paid back, so to speak, the sums yet unpaid

to the doctor and treasurer, whilst the employer's trustee urged his claim. The Court of Appeal, over which the Lord Chancellor presided, was of opinion that the workmen's claim was a valid one, for, by the Truck Act, the wages were to be paid in current coin, and the wages which these sums represented not having been paid, but remaining, as it were, in the hands of the employers, they fell within the meaning of the Bankruptcy Act, which gave a preferent claim for wages. The Court, however, very carefully guarded itself from allowing the decision to extend to sums which had been actually applied to the purpose for which they were set aside. For, as Lord Justice Cotton said, that "might possibly amount to a payment in cash, not to them, but to their agent or person appointed on their behalf to receive it." There can be little doubt that the workmen could not have a legal claim to any such sum, nor is there any moral reason why they should.

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IN the professional papers on Indian Engineering for the month of September there is an interesting article on "Irrigation from Wells in the N.W. Provinces," where three million acres of various crops are watered by their means. When so large a tract is dependent for its water from this single source, it becomes a matter of great importance to ascertain how the surface level is to be maintained; for, as wells come to be multiplied, it is obvious that the water stratum must necessarily become more depleted, and therefore the wells, especially the older ones, will in time run dry. To ascertain the relative level and the rate of inclination of the underground supply, a series of cross sections at five miles apart were run across from the Ganges to the Jumna, and intermediate observations taken at every mile of the surface level in existing wells. The levels were then laid down in the Ordnance Survey Map, and the cross-sections show with more or less exactness the slope of the subsoil water, and point to the conclusion that the supply cannot be derived from the great rivers, or by percolation from the hills, but that it is drawn directly from the local rains, which are collected in adjacent depressions. The author of the paper, Major Clibborn, deduces from this that drainage operations must be carried out with circumspection, or else the subsoil will be so deprived of water as to render existing irrigation from wells very precarious. In the absence of canal irrigation the point in question deserves consideration.

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A CORRESPONDENT writes:—"The proposal to hold an American Exhibition by Americans in the heart of the British metropolis during 1886" (to which we have before referred) "is undoubtedly a new departure in Exhibition politics, and if it succeeds in coming to the birth, will undoubtedly produce an exhibition 'boom' for that year in conjunction with the Colonial Exhibition; but some of those who are more deeply interested in them than the general public, viz., the exhibitors, do not hesitate to condemn them pretty roundly, as causing themselves, directly, an enormous amount of inconvenience and expense, and, indirectly, a loss of trade, by throwing open to all the world their particular modes of manufacture, without obtaining for them any reciprocal advantages. Unfortunately, the Exhibition system is not likely to decrease, but rather to increase, seeing that it has hit the taste of the English *flaneur*, who likes to be amused, while fancying that he is being instructed, and the speculation is usually too paying a one to be influenced by such trifling considerations as injury to national trade and invention." Apart, however, from these melancholy considerations, an American Exhibition in London will undoubtedly be very novel and very attractive; for, to our shame be it spoken, our American cousins know us, and are anxious to know us, much better than we know them; and as the whole Exhibition is intended to be arranged in a sequence or consecutive order, the visitor will obtain a kind of panoramic idea of the country from east to west.

IT is stated in a recent number of the *Lumber World* that the ordinary life of unprotected timber structures is not more than twelve or fifteen years. If they are exposed to moisture in the presence of air, especially in a warm situation, or to alternate wetting or drying, they will decay more rapidly. Sap and moisture retained in timber by painting or closing in the sticks before they are seasoned, will cause decay of a very insidious kind, as it works in the interior, leaving an apparently sound exterior, which, of course, has the first opportunity of seasoning. It follows, therefore, that paint on unseasoned timber is more hurtful than serviceable. Large pieces of timber dry so slowly, that decay may set in before they are seasoned throughout, and for this reason pieces of small scantling are preferable to large ones. The best-seasoned timber will not stand exposure to the weather more than twenty-five years or so.

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WE called attention last week to the manner in which the splendid modern Indian gateway sent from Gwalior was left to lie in the grounds of the South Kensington Museum. Since then a paragraph has appeared in the daily papers to the effect that the gate will be lent to the Commissioners for the Indian and Colonial Exhibition to be held in 1886. Till then, we suppose, it is to lie where it is,—not a very graceful recognition of a remarkable gift.

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THE *Melbourne Argus* states that surveying operations have been undertaken by a French man-of-war for the purpose of ascertaining the feasibility of laying a submarine cable between New Caledonia and Queensland. It is to extend from Gowen, in the north-west of New Caledonia, to Sandy Cape, a distance, as surveyed, of about 500 miles. As the results of the survey have been pronounced very satisfactory, there seems very little doubt but that the cable will ere long be constructed.

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VOL. VII. of the *Magazine of Art*, which has been forwarded to us, is in the main a delightful specimen of an artistic journal; varied in its literary matter, much of which is very good, and signed by good names; and admirable in the execution of its illustrations. We could wish, however, that the examples of architectural writing and criticism were better. Here, for instance, is a certain Mr. Aaron Watson, who indites reflections on "the Lower Thames" and its structures, and while he speaks of Somerset House as a "Philistian structure," refers to Blackfriars Bridge as "beautiful enough in itself," only spoiled by the proximity of the railway-viaduct. Now, worthy scribbler, thou art thyself the Philistine, who canst not discriminate between the merits of really refined Classic detail, such as that of Somerset House, and crude, coarse, would be Gothic, like that of Blackfriars Bridge, which is, besides, a complete sham in its outward and apparent structure.

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THE following Committee has been appointed, on the nomination of Mr. Shaw-Lefevre, to consider the subject of the "restoration" or other treatment of the exterior of Westminster Hall:—Mr. W. H. Smith, Mr. Rylands, Mr. Beresford-Hope, Sir John Lubbock, Sir R. Wallace, Sir E. Reed, Sir H. Holland, Mr. Peddie, Lord R. Churchill, Mr. Walter, Mr. J. Huntly McCarthy, and Mr. Shaw-Lefevre. Considering the subject to be discussed, some of these names are truly astounding, and seem to leave one no resource but silent prayer.

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**Bristol School Board.**—The architects for the new schools to be erected at Windmill-hill, Bedminster, for which the amounts of the tenders were published in our last number, are Messrs. J. W. Trew & Sons, of Bristol, whose plans were chosen in an open competition. The quantities were prepared by Mr. Wm. L. Bernard, of Bristol. Mr. J. Fletcher Trew, M.S.I., of Gloucester, arranged the sanitary work and supplied the quantities for that section. The architects' estimate for the school, as arranged in scheme A, was 6,500*l*.

## THE MODERN ARCHITECT AND HIS ART.

WE give the main points of Mr. Sedding's very piquant but *very* long paper read at the last meeting of the Architectural Association:—

It is idle to shirk disagreeable questions, and so I begin with a simple proposition which covers much of the ground we shall traverse to-night. Is architecture, as practised by the modern architect, worth living for? To my mind the question is most suitable to the present time. This is a time of felt uncertainty, of stranded purposes, of searchings of heart,—a time when the issues of things connected with the arts of design are hanging in the balances. This is a time, too, of disillusionising alike for architects and for people, when we ourselves are not quite so confident about our method of pushing architectural design forward by means of impulses of an essentially fleeting nature, and when people are beginning to realise that every branch of architecture is well represented by outsiders, and when they are beginning to question the *raison d'être* of the architect at all.

This question is, then, a practical one, and one which it is desirable to face and to answer. It at once puts the modern architect and his art in their right place. If you take up architecture as your vocation, to be followed with the ardour of a religion, I am not sure that you will succeed in gaining riches or fame; you may have to be happy with small opportunities and small gains, and have to live a life of quiet, unnoticed worth. But you will be happy and contented and grateful all the same. If, on the other hand, you go in for architecture as a profession which only needs the efficient handling of a T-square and ruling-pen, you may, if you are a good, steady fellow, rise to be an eminent practitioner. And if you are a successful practitioner your rewards are great: you may have access to the best society and to the best columns of the *Times* newspaper; you may be a lion at evening crushes, and wear brown velveteen; you may pose as the patron of the very Fine arts, and be a judge of *bric-à-brac*, and a connoisseur of Queen Anne teapots, Chippendale chairs, and such like; you may even hope to be the F.S.A. and the F.R.I.B.A., and even the P.R.I.B.A., if you have paid your subscription and are alive when your turn comes. But as for art, and the mastery of the crafts, and the power of colour and form, and all that sort of thing, you may neither have any, nor need your friends ever suspect that such things come within the make-up of the modern British architect.

To proceed. I said just now that this question touching the worth of modern architecture as a serious life's pursuit puts our art in its true place. Instinctively one feels that while it is applicable to the modern architect and his art, none but a fool would have put it to William of Sens, Jocelyn of Wells, Alan of Walsingham, William of Wykeham, Thomas Chard of Glastonbury, or of Bramante, Michelangelo, Christopher Wren, Inigo Jones, or Adams or Chambers, and there must be a reason for this.

Again, none but a fool would ask the modern musician, or the sculptor, or the painter or poet, if his art were worth living for. Indeed, here are living arts, each with its ideal conception to symbolise, each with its mission to stimulate, delight, and console mankind, and to raise men's minds out of money-grubbing grooves into a less selfish, less sordid, less common-place atmosphere. It is significant that in each of these cases the artist is his own craftsman; he thinks his own thought, clothes it himself, and spares no pains in the elaboration of the clothing. He keeps no "ghost," and if he does he is not thought to be respectable. But the architect's "ghosts" are legion,—on his premises and off them,—and he is not one whit ashamed.

Again, we must confess that the other contemporary arts I have enumerated have been affected for the better and not for the worse by the influences of the day. Each has won new triumphs, each has found out new chances of appeal, new domains for display. But not so architecture, for while it has gained nothing it has lost nearly all. In respect of the use of iron for constructive purposes and of patent sanitary appliances, which builders and sanitary engineers have devised for us, we score something. Yet, however blessed the iron joists and D-traps [?!] are, and however lucky we are to be able to use them, the architects of

ld, who knew them not, were infinitely more ccomplished all-round men than ourselves; nd I do not know that, after all, our houses re either more stable or more sweet and whole-ome for body and soul to inhabit than the old omes of old England.*

But further. The practice of these arts of olour, sound, form, and word directly conduce o the development of artistic genius; nor ould you be a successful composer if you had o musical genius, nor an eminent literary man ithout literary genius. Yet you can be ccounted an eminent architect, and reap all he honours of the profession, without possess-ng or feeling the want of artistic genius.

In putting the case thus strongly, do not uppose that I am blind to the noble gifts and enius of certain architects working with us, nd shedding their helpful influence amongst us t the present time; and, but for my resolve to eep this paper impersonal, I would name them nd speak of them with all the genuine admira-ion and respect I feel for them. Do not mis-ake me on this point; I speak of the rank and ile, and not of these. And I ask whether rchitecture as now practised ought not rather o be accounted as a "useful" than as an 'ornamental,"—or, as some would call it, a 'fine,"—art? I ask whether architecture can any longer be termed the "Queen of Arts," when all that remains of her is the skull and the feet and the palms of her hands?

I ask if it be not true that architecture has ignominiously resigned her throne, lost her honours, and bartered the sceptre of pre-eminence with which she has held sway from time immemorial, and only reserved for herself the sovereign right of levying a tax of 5 per cent. on other men's labours? I ask whether it is not true that the engineer has (whether civilly or uncivilly it matters not, as the thing is done) robbed the architect of one-third of his domain on the one side, and whether the deco-rator and manufacturer have not between them robbed him of another one-third on the other side? I ask, whether the architect of to-day is, or need be, anything more than a paper-draughtsman, to sit on a stool and invent new sorts of doors and windows? I ask, whether his business in life is not that of a designer of shells of houses for decorators and manufac-turers to finish and furnish, and who varies this jackal occupation by occasional jobs for an engineer, who hires him to do the "pretty" upon a bridge or railway station? Yes; and such of us who like to see iron skeletons clothed in shoddy ornament may, after refreshing our bodies, refresh our souls at the York or Bristol railway station, and realise at the same time the mission and scope of the modern architect and his art.

But in order to clear the way for some few practical observations, I must arrange the sub-ject under three heads:—(1) What is architec-ture, and what were the functions of the archi-tect in old days? (2) When, and from what cause, did the change from the old to the new system take place? (3) Is it possible for archi-tecture under its present conditions to be carried out upon the old lines, and, if so, by what means? Here are three points, each of which would serve as a theme for a long lecture, so that my treatment of each must needs be brief and simply relative to the matter in hand.

As to the first point, although addressing a professional audience, I cannot define architec-ture as building erected after an architect's design. I would define architecture as imagina-tive building; in other words, building which expresses the invention or imagination of the builder, and which appeals by this means to the imagination of the spectator. If it is to answer to the description of architecture, the building must have a soul as well as a body. The body is the structure answering to the primary pur-pose of its erection, and this body should be stable and convenient. The soul is that super-imposed something extra to the body,—that something which is provided beyond the demands of mere utility, and which is really the expression of the builder's thought and his mode of appeal to the sympathy and imagina-tion of the spectator. In this definition you get the three cardinal virtues of architecture represented, namely, stability, which relates to science; convenience, which relates to good sense; and beauty, which relates to taste.

Naturally, the primary purpose of a struc-ture, combined with other like conditions, settles its character and the fit extent of its decoration; and yet, while it is quite fair to define the word architecture as the art of building nobly and ornamentally, you cannot gauge the value of a structure by the amount of its ornamentation. Dance, who built old Newgate, was an architect, and, although his structure has dead black walls of rough-hewn granite, relieved only here and there with niches and statuary, and a savage repellant air, it is imaginative building, and speaks directly to the imagination of the spectator of violence and doom in the true grim Norman manner. A mere builder would have put plain brick walls. And architecture, all the world over, has the same characteristic qualities,—however diffe-rent the types and the styles of the art repre-sented, however different the scale of the structure, however different the culture and aims and methods of the builders,—the archi-tecture carries the impress of thought or inven-tion, or imagination befitting an ornamental art. Architecture is truly a human art, a volume, and a record of human thought.

The architecture of the modern world answers, in all essentials, to the architecture of the ancient world, however different its aime, and character, and mode of appeal. With regard to the latter point, the Classic is a more intel-lectual art, and demands a more intellectual appreciation. The Greek architect is a man of complete culture, learned in philosophy and geometry, and he addresses his peers. This ex-plains why it is that some of us find the heights of Classic art cold, and the atmosphere that sur-rounds it bleak and grey. The modern archi-tect, like the ancient, is the right man in the right place; and, whether he be cultured or uncultured, prince or ploughman's brother, he is the most skilled man in the building crafts upon the job.

Luckily for me, it is immaterial to our pur-pose to inquire as to the social status of the architect as a person, or whether he had soft hands or hard. One thing is certain about him, —cultured or not cultured, hodsman's cousin or not,—he contributed the requisite amount of knowledge and theoretical science, and did not retain experts; he was in direct contact with the work as it grew up; he saw how things were done, and was not the mere figurer of details at an office; he was the familiar spirit of the building, and not the distant dictator of its details. And besides having a general knowledge of handicrafts, he was master of at least one. Some architects were modellers, some carvers, some workers in marble or in gold or in ivory, and, plainly enough, we can infer that they worked in workshops, and not in offices or studios. "In Greece," Winckel-mann says, "the best workman in the most humble craft might succeed in rendering his name immortal."

Let us turn for a few moments to Italian Mediæval art, for we know so much more about the architects of Italy than of those of any other country, and they afford us a ready type of men whose functions covered every matter pertaining to construction and ornament. The Italian architect was engineer, builder, painter, decorator, sculptor, modeller, metal-worker, goldsmith, and the rest; or at least you might expect that the same man could paint a picture, carve a subject, draw and model a bit of orna-ment, make a gold casket or an urn, design a dress or a fabric, build a church, or a palace, or a bridge. Think of Da Vinci, with his superb power of colour and form, of his magni-ficent designs and projects in art and mechanics, and set this man with his marvellous range, his almost superhuman grasp of mind and boundless ideal, against our puny selves poring over our D-traps, and ventilation, and quantity-taking, Metropolitan Building Acts, &c.; and if, after instituting the comparison, you are satisfied with the scope and issues of the modern architect and his art, then I think you are eligible to be a Fellow of the Institute without further ado, and I will give myself the honour of proposing you on the first convenient occasion.

Now you cannot properly account for the high condition of Italian art in the Middle Ages by saying that the Italian people are a phenomenal people with art in the blood. If so, art would be flourishing in Italy at this time, and it is not. The fact is, that whatever art you examine of any period, or of any country, you will invariably find that the excel-lence of the work is only commensurate with the ideal. There is no luck, no chance about it, it is a simple matter of cause and effect; and if the members of the Institute had as high an idea of architecture, and of the various arts and sciences connected therewith, as they have of the privileges of the profession and of their professional status, English architecture would be very different to what it is. It needs no prophet to foretel that so long as the modern architect contents himself with grovelling views and consumes his soul in small things, so long will he grovel and do small things. In Italy in the Middle Ages there was a grand ideal to animate the artist and to sustain his art. Of course many things conspired to favour art there and then, beyond the consanguinity with artistic races which doubtless had its effect. Italy was then what England is now,—the world's emporium, the seat and centre of the world's commerce. There was wealth, and the desire to spend it upon beautiful things. There was the ambition of cultured nobles. There was the inheritance of fine traditions. There was a lovely climate and a flowery land. There was the innate passion for beauty of a passionate and beautiful people. But what raised Italy to her high-water mark of art was the measureless value set upon execution. "Design" then meant something more than it at present does in an architect's office, or in our classes of design. It meant the power to *do* as well as to *draw*. It meant executive power and technical skill. It meant that what the brain of the man could conceive, that the hand of the man that conceived it could execute.

Coming to our second point. We have to inquire when and from what cause the change from the old to the new system of architectural practice took place. Ever since English archi-tecture was English architecture, it had been born and bred and fostered and propagated in English workshops. The Gothic revival meant not only confusion to architecture, but death to the art of the workshop. I do not mean for a moment that the art of the workshop, or the craft carried on there, were of a high order before the inauguration of the new condi-tion of things, but I speak of one system of design as opposed to the other. People, when they are uncomfortable about the results of the Gothic revival, are fond of pointing to Gower-street as a justification for the annihila-tion of traditional art. But you may depend upon it, had there been the demand for higher things, there would have been the supply. However homely, or, if you like, however ignoble, the art done just before the new stimulus came, the traditions of the better times still lingered on in the workshops, and the brick-layer, the carpenter, and the plasterer who hung on were men with some notion of style, and some love of detail. The Early Queen Anne had leanings towards the picturesque Elizabethan, and the houses of the period are singularly well adapted to English minds and English scenery, and their fittings are in nowise unworthy of the best traditions of the English workshop.

But I have yet to account for the decay of architecture before the Gothic revival, and also for the change from the old to the new system of architectural practice; and the explanation I offer for the one applies to the other. I cannot see that you could expect that art should engage men's attention when you remember the vast number of social, political, and religious problems that were then agitating England. Professor Seeley's valuable book on the "Ex-pansion of England" has helped me to see why the faculty for design died out with us in the eighteenth century, for he shows how entirely English interests were then centred in America and her other colonies. Think of the war-ships that had to be built, the armies to be equipped, the colonies to be fought for and occupied, and, later on, think of the machine-looms and steam-engines to be invented and perfected, and the railways to be made! How naturally does the engineer spring into existence amid the demand for the useful arts! How naturally does the eye of the historian pass on to the record of that noble set of engineers and mechanists, and mathematicians,—Davy, Watt, Cavendish, Arkwright, Herschell, Stephenson, and Brunel! And how natural that the men of genius should gravitate,—not to the ornamental arts as in earlier days, but to the useful arts!

And now, having considered the origin of the engineer, who is one of the cuckoo intruders in the architect's nest, let us turn to the origin of that still bigger bird,—the ornamentalist or expert in the decorative arts. I said just now

* They certainly will not be if Mr. Sedding puts D-traps in them.—Ed.

that the Gothic revival had inaugurated the change from the old system of architectural practice to the new. Before this revolution of taste took place the architect was the leading spirit of the building he designed, but he did not stand alone. His designs or models for stone, brick, iron, wood, and plaster work were backed by the traditional skill, and types, and methods of craftsmen, each of whom was more or less of an artist. The architect was only the prime minister: the workmen represented the departments. He was only the president for the time being of a little republic of art. From what we know of Wren, Inigo Jones, Chambers, and Adams, the architect was conversant with every branch of the work included in the structure. He supplied the plans and sketch-elevations, and the leading details (as in John Thorpe's case), but the hundred and one odd details required for after-thoughts and emergencies might fall to the conduct of the workman, who, at all events, would be quite competent to deal with them if so required.

The Gothic revival upsets all this harmony of procedure, for the whole of the traditions of the past must be sacrificed, and new types, mouldings, traceries, carvings, groinings, decorations, and the rest of it, are introduced, about which the workman knows nothing, and cares less.

Now my explanation of the origin of the specialist decorative artist is this,—Having destroyed the old system of art, the Gothic revivalist found himself unable to construct a new system that would work; he had accepted a task which he was unable to cope with. He had a strong love of art, a true sense of the intimate relations of the lesser arts with architecture; but he found things too much for him, and, instead of raising an army of fellow-labourers in the workshops, he called into existence certain specialist assistants to aid him in the conduct of his practice, where he lacked time or ability to carry out the work himself. The mischief of the whole business has been that he was only a learner himself all the time he was carrying out works in various styles.

I come now to my third point. Is it possible for architecture under its present conditions to be carried out upon the old lines, and if so, by what means? To the first division of this point my short answer is,—No and Yes. No, if the present conditions are to remain unchanged. Yes, if things change for the better. In dealing with the whole matter before us, I do not want to arraign modern art for difficulties inherent to it, nor do I want to multiply the responsibilities of the architect. That some of the higher branches of an architect's work have been abandoned is undeniable; and I plead for the recovery of these at any cost. In claiming this I do not desire to extend the radius of the architect's proper work. I am even arguing for the lessening of his labours by bringing the handicraftsman into a more active participation in the work he has to do. This was the old system, and it is the only practical solution of the case.

I grant you that, according to the present state of things, specialists must exist to do such things as these,—to superintend the imitation of old work; to carry out decoration in a given style, Pompeian, Egyptian, Classic, or Gothic; to restore or build Gothic or Classic churches; Elizabethan, Jacobean, or Georgian houses, and the like. The question, however, arises here,—Are we to go on imitating the styles of the past? Specialists are necessary if we do go on in our present courses; but if we are to get out of the mists and on to the hill-tops again, we must train ourselves for our future liberty. If we want to perpetuate chaos and will-o'-the-wisp art, I do not know that we can devise a better means to that end than the establishment of representatives of the rival styles and rival trickeries of the day. But surely we do not want practitioners of one accomplishment or one idea! Let us take courage and look forward to the time when the jumble of styles will be cleared away or reduced to a system. Depend upon it that it will not be the one-eyed, or one-legged, or one-armed, or one-idead specialist practitioner that will then be sought for, but it will be the architect with the most individuality, the most culture, the most skill, the most efficient training, that will be sought for, and found most useful to the architect of the future.

May I divert your interest for one moment from that all-important matter, the modern architect and his art, and ask you to look at the British workman. What is his condition? What are the issues of his life's work? What have you done for him? We left him in the eighteenth century, a magnate according to his personal qualifications in his little parliament of art, the workshop, evolving architectural types, and putting his whole soul into his work. In those days he was an intelligent being, following his craft joyfully because he excelled in it, and knew what he was about, and had a felt place in the world. You have scattered those workmen, you have dissolved these little republics of art that in old days held sway in every town and village in the land, and what have you put in their place? You have drowned the English handicrafts, by opening up the sluices of a ceaseless tide of archaic types, and how has your eclecticism affected the British workman?

Just think of all the sad, bad, and mad architecture that has passed under the British workman's hand, say in these last thirty-five years. In 1850 he was rearing a Norman apse upon the ruins of an old chancel that had been destroyed in the interests of morality and purism. In 1855 he was building a thirteenth-century hotel, with details cribbed from Salisbury Cathedral, and a bank adjoining it in the Ducal Palace style. This took him some time. In 1870 we find him titivating an old Queen Anne house in a Gothic manner; and in 1880 he was titivating an old Gothic house in the Anglo-Foreign "Early English" Queen Anne manner; and now, in this year of the architect's salvation, he is satisfactorily completing the memorial of the nineteenth century at the west end of St. Alban's Abbey, under the reputed direction of our all-accomplished, soft-handed, "emancipated," and only truly British architect, Sir Edmund Beckett, Q.C.

Now I want to know if we cannot do something to regenerate the art of the builder's yard and to raise the workman's position; and, if no higher motive affects you, think how it is for the interests of the modern architect and his art that you look steadily into this matter and do your best in it. I am firmly persuaded that there will be no good architectural design, and no good execution, until the craftsman can be brought to participate with the architect in the working out of architectural ornamentation. It is just one of those things about art which marks its divine origin and inherent dignity. You can get faultless mechanical work out of machines, and you can get good mechanical work out of human machines, but noble handlabour is only found where the workman uses his intelligence, and where he is able to express the individuality of the individual. I would say, then, begin the work of regeneration by throwing away all your petty professionalism. Give the workman his rightful participation in your aims. Let him see into your great mind. Make him something more than the transcriber of your hesitating lines. Lift him nearer to your own level of knowledge so that he may know something of the essential qualities of the style he is working in, and may at least interpret your thought sympathetically, render in his own idiom the things you put before him, and find some way of escape for the soul within him. Thus, and thus only, will you get good architecture and good sympathetic workmanship.

I conclude this paper with two propositions which aim at the amelioration of some of the evils I have here enlarged upon. The first is as to the selection and classification of the architectural types now in vogue. The second relates to the provision of technical education for architects and craftsmen. With regard to the first point, it is clear that no scheme of architectural design has ever been practised without a basis of workshop traditions. Shall we then,—is it worth while to try and formulate our tentative styles and to systematise our distracted types, with a view to rendering things permanent and to assist the workmen? If so, you must have a grammar and an alphabet before you can form words and sentences. Now it so happens that never since the world began has so much architectural knowledge been accumulated as is now stored up in the brains and on the shelves of the English architect. Why, then, should not these experts be set to work to formulate and render into serviceable shape the leading mouldings and forms and features of the styles in vogue? Why should not the destroyers of old English traditions do penance and make reparation for their naughty deeds, and build up new traditions? Why should we not have a well-arranged series of details of arches, capitals, bases, plinths, friezes, cornices, staircases, doors, windows, &c., for workshop use?

The second proposition is to have a technical college for the instruction of architectural design, to be for the use of architects and craftsmen. If modern architecture showed itself in as attractive a form to the public as English music does, the scheme would receive the attention which we who know our pitiful state think that it deserves.

What we want is not so much men who can design in many styles of more or less remote antiquity, or men who can sketch well, but men of aim who can lead the aimless, men who by their personal acquaintance with the handicrafts and personal participation in the production of ornamental art can build up new traditions for the workshop, restore the credit of English workmanship, and recover the lost ideal of the English architect.

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Of the discussion which followed, we give a report on p. 653.

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## PROTECTION OF LIFE FROM FIRE IN THEATRES, &c.

After the catastrophe at the Ring Theatre, Vienna, the public became a little nervous as to the state of the theatres in the metropolis, and questions were repeatedly asked in Parliament as to what steps were being taken to secure the safety of the public in case of fire or panic occurring while performances were going on, and ultimately pressure was brought to bear upon the Metropolitan Board of Works to put in force an Act which was passed in 1878, but had been lying dormant as far as theatres or other places of public entertainment were concerned until the scare occurred.

In 1882 the Board caused surveys of the whole of the theatres to be made, also including therein some of the principal music-halls, and proceeded actively to put in force the above Act, viz., 41 & 42 Vic., c. 32, s. 11. Section 11, applying only to houses, rooms, or other places of public resort licensed at the time of the passing of the Act, enacts that whenever it appears to the Board that any of the above places which are kept open under letters patent, or of a license granted by the Lord Chamberlain or Justices of the Peace, are so defective in their structure that special danger from fire might result to the public frequenting the same, the Board may, with the consent of the Lord Chamberlain, as to theatres under his jurisdiction, or of the Home Secretary, in other cases, if in the opinion of the Board such structural defects can be remedied at a moderate expenditure, by notice in writing require the owner of such house, &c., to remedy such defects within a reasonable time to be fixed by the Board, and if such owner fails to comply therewith, a penalty of 50*l.*, and 5*l.* a day while such default continues, is entailed. An appeal to an arbitrator to be appointed by her Majesty's First Commissioner of Works could be had upon notice being given to the Board fourteen days from the service of the requisitions.

Sections 12 and 13 of the same Act empowers the Board to make regulations as to new theatres, &c., and states that no future new licence is to be granted unless the certificate of the Board is first obtained, and also empowering the Board to grant a conditional licence to any premises about to be constructed when applied for.

Now as to the working operation of the Act under section 11 of the same, applying only to places licensed at the time of the passing of the Act. The first place to try the effect of arbitration was the Royal Music Hall, and, upon the arbitration, it was found for the first time that the Board had no power to make requisitions which would impose the acquisition of land not in the possession of the owners; and, by the arbitration, the owners succeeded in evading an important requisition and the consequent expense by its fulfilment. The next was the Lyceum, and afterwards Drury Lane. In all, six theatres and three music-halls have tried arbitration, the Board's requisitions being mostly confirmed with slight modifications, and for a new Act the same seems to have worked very smoothly.

The requisitions of the Board were confined mainly to the providing of efficient proscenium

walls (many of the theatres being without, and others being provided with, walls which in modern days were not thought sufficient to resist a large volume of fire), additional staircases, strengthening existing supports for the public coming in and out, and making all doors, &c., to open outwards. Upon inspection of the theatres many of the dressing-rooms were found to be very objectionable, and that a large amount of rubbish existed; defects which, by the action of the Board, although not coming strictly within the provisions of the Act, have been remedied.

The Board having now dealt with the whole of the theatres in the metropolis, do not propose to proceed further unless a fee is paid. This seems a very objectionable course. Are we to go back in a few years to the old state of things which existed before the Act of 1878 was put into operation?

Owners of theatres will speedily efface what has been done by the Board. Doors which should be kept closed will be left open, and *vice versâ*. Exits will be blocked up, gangways will be utilised, and other necessary works will be left undone. Whereas, if the Board still kept the question of further requisitions open where owners had infringed the former ones, their alterations would work permanent good. There is yet one other point, the most important one of all, viz., the acquisition of adjoining property; the Board having been much cramped in their operations through not having the power to compel the owner to acquire property for the purpose of securing a safe exit for the public. This should be done, and can be easily dealt with by the Board under the Lands Clauses Act, directly the necessary Parliamentary powers have been obtained.

## ART LOAN EXHIBITION AT BRIGHTON.

Visitors to Brighton during the next few weeks may pass an hour or two very pleasantly in inspecting the contents of the Art Loan Exhibition which was opened the other day. The Exhibition is being held in aid of the funds of the Brighton and Hove School of Science and Art. The pictures are, almost without exception, by eminent masters. The Picture Gallery adjoining the Free Library has its walls covered with 130 works, all of them lent by their owners. Sir Frederick Leighton, P.R.A., is represented by three works,—"Summer Moon" (his finest production, to our thinking), "The Sisters," and "Lieder ohne Wörte." Mr. Millais's "Dropped from the Nest," a little girl (apparently a portrait) holding a bird in her hands, has been lent by Mr. W. Cuthbert Quilter, who, with Mr. James L. Ashbury, Mr. J. J. Brown, Sir Julian Goldsmid, Mr. J. H. Trist, Mr. J. Staats Forbes, Mr. Louis Huth, Mr. J. P. Heseltine, Mr. Martin Colnaghi, Mr. A. Morrison, and Mrs. Hill, are amongst the most copious contributors. Space fails us to mention all the notable pictures (of which there are many). Though most of them have been seen in exhibitions within the last few years, there are others which are not likely to be seen for some time to come after the closing of the present exhibition except in the possession of their owners. The collection includes good specimens of the works of John Phillip, R.A., J. D. Watson, John Brett, R.A., H. W. B. Davis, R.A., Mark Fisher, Edwin Long, R.A., B. W. Leader, A.R.A., J. C. Hook, R.A., G. A. Storey, R.A., J. Linnell, Frank Holl, R.A., G. H. Boughton, A.R.A., W. P. Frith, R.A., P. R. Morris, A.R.A., G. Romney, R.A., W. Etty, R.A., R. F. Poole, R.A., W. Q. Orchardson, R.A., H. Stacy Marks, R.A., G. Mason, A.R.A., Keeley Halswelle, A.R.S.A., R. W. Macbeth, A.R.A., Briton Riviere, R.A., John Pettie, R.A., W. Holman Hunt, Thomas Faed, R.A., R. Ansdell, R.A., Luke Fildes, R.A., E. W. Cooke, R.A., Sir David Wilkie, F. Goodall, R.A., David Cox, Clarkson Stanfield, R.A., Sir Edwin Landseer, R.A., J. Constable, R.A., T. S. Cooper, R.A., George Morland, J. M. W. Turner, R.A., David Roberts, R.A., J. C. Horsley, R.A., Erskine Nicol, Val Prinsep, R.A., F. R. Pickersgill, R.A., and Hubert Herkomer,—to mention only some of the names. Most of these masters are represented by two or more works in the picture-gallery alone, while some of them are represented by additional works on the screens in the Corn Exchange. Rossetti is exemplified by a female head and bust, "Queen of Hearts," lent by Mr. J. H. Trist. A case of miniatures, by Cosway, is lent by Mr. Josephs. So far we have spoken only of English painters, but amongst the foreign painters of works exhibited are Millet, Israels, Van Haanen, Diaz, Munkacsy, Corot, Koekkoek, De Nittis, Rousseau, Fortuny, and Boldini.

In the Corn Exchange is arranged not the least interesting part of the Exhibition, including works by Sir Joshua Reynolds, Andrea del Sarto, Raffaelle, Sassoferrato, Canaletti, Rembrandt, Van Ostade, Jan Steen, Wouvermans, Sir Godfrey Kneller, Romney, Sir Peter Lely, Gainsborough, R. P. Bonnington, John Hoppner, R.A., Hogarth, Zoffany, Turner, Gerhard Terburg, Lucas Kranach, Vandyke, Murillo, and Holbein. On the screens in the galleries are Turner's plates from the "Liber Studiorum"; etchings by Cruikshank, Seymour Haden, Whistler, Méryon, Rajon, and others. Another exhibit worth looking at is a small frame containing a well-executed coloured drawing by Charles Mathews, the actor, who, as will be known to some of our readers, was educated as an architect. The drawing in question was made by him in 1824, and represents the Loggia of the Palazzo Belvedere at Naples. It is mentioned in the "Memoirs" of Lady Blessington.

On the ground floor of the Corn Exchange is arranged a series of cases containing selections of porcelain, metal-work, &c., from the South Kensington Museum; while of *bric-à-brac* generally there is a large and interesting display. There are also several good specimens of Chippendale and other furniture. There is a series of rooms intended to illustrate seventeenth and eighteenth-century interiors, and these contain some quaint furniture and utensils. On the occasion of the visit of H.R.H. the Princess Christian to the Exhibition, last week, these rooms were rendered more complete and attractive by the presence of a number of ladies in costumes of the periods represented by the rooms. We may add that Mr. Charles E. Clayton, architect, Brighton, was entrusted by the executive committee with the arrangement of the exhibits in the Corn Exchange.

The exhibition (which will remain open until the end of December) is well lighted at night by the Swan-Edison incandescent electric lights.

## THE ARCHITECTURAL ASSOCIATION.

The ordinary meeting of the members took place on the 7th instant, Mr. Cole A. Adams, president, in the chair.

Mr. J. D. Sedding read a paper on "The Modern Architect and his Art," a portion of which we print on another page.

The Chairman, in opening the discussion, congratulated Mr. Sedding on his extremely interesting and amusing paper. An onslaught had been made in it upon the doings of the Institute, and Mr. Sedding also appeared to have a somewhat low opinion of the work of the Architectural Association. According to him, the Gothic revival had been an absolute failure, and yet men like Pugin, Scott, Street, and a host of others, had done beautiful work, and erected buildings which were the admiration and study of all,—buildings which would hold their own with what had been done in times past. In a profession such as theirs it was impossible to prevent men crowding into it, and turning out abominally bad work; but the same thing must have occurred in former times. They must all, however, agree with Mr. Sedding in the lesson he deduced from the divorce which had taken place between the architect and the workman. He had referred to the many styles in which the man had to work until he was made like a machine; but there were architects, like Mr. Sedding, who instilled into the workman a love for his art. A workman who understood his work was a man before whom the architect might stand, hat in hand, and learn what he could from him. They saw much that was bad, but how was it to be met? Mr. Sedding, of course, was one of those free lances who charged in all directions with perfectly alarming viciousness; but when he had knocked all these things down, what was he going to set up in their place? What he (the Chairman) had gathered as Mr. Sedding's conclusion was, that the workman should be instructed in ornament; no one would dispute the desirability of this. A fair and honest attempt had been made of late years to afford that instruction, and the work produced, often by manufacturers and specialists, had shown great results, considering the time that had elapsed. It would hardly be practicable to have a committee which should give forth to the world what cornices and details should be used; such a task would bristle with difficulties. The look-out was not, however, so dismal as it had been pictured by Mr. Sedding. An immense stride had been made, and he believed that the solution of the question would be found in the establishment of a thorough and systematic course of study. If, in the future, they had a school with some more definite aim than hitherto, which the best men in the profession would help, some practical remedy might be found for the evils set forth by Mr. Sedding.

Mr. J. A. Gotch considered that Mr. Sedding's idea of educating the workman was an excellent one, if it could be carried out. At the same time this would pre-suppose an intimate connexion with the workman, which did not exist, and therefore it was the tendency of modern work and procedure which was at fault. They would require to have several rich clients and *carte-blanche*, so that when one job was completed they could go on to another one. The system of contract was to a large extent the bane of modern architecture. Everything had to be settled before commencing, and it was only by the most dexterous manipulation that anything different could be introduced. In old times plans were drawn to a certain extent, but not particularly adhered to, and the architect had a free field. The specialist was not the product of modern days, and he did not suppose that in the Gothic times architects were acquainted with every detail of the buildings. They had only one style, of course, while the number of variations of mouldings was within one or two hundred, and used throughout the length and breadth of the land. What they had now to do was to grasp the present conditions, and do the best they could. If the public cared anything for good architecture, they would have it. But the public did not care; and until there was a change in this respect they would not have the ordinary houses and buildings of that vernacular architecture, the specimens of which, that had come down from old times, pleased them so much. He proposed a vote of thanks to Mr. Sedding.

Mr. Hilton Nash, in seconding the vote, remarked that Mr. Sedding had not dwelt upon the fact that the workman had of old as great a love of his art as the architect had. Mr. Sedding had made out the modern architect to be of chameleon-like inconstancy; but it was one of the signs of the times that everything was changing, and one must make the best of it. There were a great many noble modern buildings in the metropolis.

Mr. Woods said that Pugin had a regular school for the instruction of workmen in carving and handicraft. Mr. Butterfield, also, had exercised a considerable influence, especially in ironwork. Mr. Sedding seemed to speak with some contempt of sanitary knowledge, but it was the want of this which tended to bring architects into disrepute, and brought in the specialist.

Mr. J. M. MacLaren believed that the evil was caused by the architect standing, so to speak, at the top of the stairs, while the workman was at the bottom. Such a college as Mr. Sedding had advocated would do a good deal to redeem the profession from the slur cast upon it. Schools of art should not be confined to drawing and modelling, but might be developed into colleges in which architects and artists could work together with the workmen.

Mr. H. D. Appleton (hon. secretary) inquired whether Mr. Sedding would recommend the admission of workmen into the classes of the Association?

The vote of thanks was put and carried by acclamation.

Mr. Sedding, in replying, remarked that what had been left out of his paper had been said for him. He would only revert to the question he had asked at the commencement, "Is modern architecture, as now practised, worth living for?" He did not think he had drawn too gloomy a picture of the present condition of things. He believed in sticking to one builder, and for the last twenty years he had pursued such a course. The builder he had employed was a Cornishman, who had restored at least a score of churches, and done work for him in many counties of England and Wales. It was a great pleasure to him to shake hands with Tom, Dick, and Harry at different places, as he knew they understood their work, and would be able to carry it out well. It was impossible for the architect to supply by post details of every period and phase from the thirteenth to

the eighteenth century: hence they should revert to the good old system, as far as it could be carried out under the altered conditions,—the system in which the workman supplied certain details himself, and was able to meet any emergency which might arise. In reply to Mr. Appleton's question he would most emphatically say "Yes." He did not know much of the working of the Association, but he hoped to redeem that loss as time went on.

## HEALTH EXHIBITION AWARDS.*

We this week give the remainder of the list of awards to exhibitors connected with building and sanitary matters† :—

N.B.—"G." stands for *Gold Medal*; "S."—*Silver Medal*; "B."—*Bronze Medal*; "S.C.T."—*Special Certificate of Thanks*; "D.H."—*Diploma of Honour*.

| Class. | Name of Exhibitor. | Award. |
|---|---|---|
| 30 | Haibara, N. (Japan) | G. |
| 25 | Hale, R. W., & Co. | S. |
| 27 | Hale, E. H. | S. |
| 31 | Hall, John, & Co. | B. |
| 29 | Hall, Thomas | B. |
| 21 | Halliday, J. | B. |
| 30 | Hanke, Reinhold (Germany) | B. |
| 29 | Hare, John, & Co. | B. |
| 31 | Hargreaves Brothers & Co. | B. |
| 23 | Hartin's Crimson Salt Company | S. |
| | Haslam Foundry and Engineering Company, Limited | S. |
| 34-39 | Havre, City of (France) | D.H. |
| Literature | " Bureau d'Hygiène (France) | S.C.T. |
| 22 | Hawksley, Charles | S.C.T. |
| 22 | Hayward Bros. & Eckstein | B. |
| 25 | " " | B. |
| 26 | " " | B. |
| 21 | Hayward, Tyler, & Co. | S. |
| 23 | " " | S. |
| 21 | " " | B. (4) |
| 24 | Hazard, H. H. | S. |
| 30 | Heal & Son | B. |
| 31 | Hendrie, Robert, & Co. | S. |
| 34 | Henman & Harrison | S. |
| 42 | Henrard (Belgium) | B. |
| 24 | Hepburn, R. H. | S. |
| 26 | Heron, Thomas | B. |
| 35 | Herring & Son | G. |
| 24 | " | S. |
| 21 | " | B. |
| 33 | " | B. |
| 31 | Highbury Machine Company | B. |
| 30 | Hindley & Sons | S. |
| 28 | Hitchins' Fireproof Plastering Co. | G. |
| 20 | Hobbs, Hart, & Co. | S. |
| 39 | Holm, John | B. |
| 20 | Hooker & Hemings | B. |
| 39 | Horn, T. S. | B. |
| 20 | Horne, Andrew | B. |
| 29 | Horne, W. C. | S. |
| 22 | Houghton & Co. | S. |
| 22 | " | B. |
| 22 | Howie, J. & R. | B. |
| 34 | Hubert, J. (Belgium) | G. |
| 32 | Hughes & Lancaster | S. |
| 20 | Humphreys, J. C. | B. |
| 24 | Hunt, Harry | S. |
| 21 | Hygienic and Sanitary Engineering Company | B. |
| 22 | Imperial Stone Company | S. |
| 22 | " " | B. |
| 20 | Improved Industrial Dwellings Co. | G. |
| 29 | Indestructible Paint Co., Limited | G. |
| 22 | Ingham, W., & Sons | S. (2) |
| 28 | " " | S. |
| 22 | " " | B. |
| 28 | Irish, Symons, & Co. | B. |
| 21 | Isler, C., & Co. | B. |
| 30 | Jackson & Graham | G. |
| 28 | Jackson, G., & Sons | S. |
| 24 | Jaffrey's Patent Grate Company | B. |
| 24 | Jameson's Patent Cooking Company | G. |
| 26 | " " | S. |
| | Japan, Department of Education | D.H. |
| 39 | " Department of Gymnastics | D.H. |
| | " Department of Music | D.H. |
| | " Department for Imperial Household | D.H. |
| | " Navy Department | D.H. |
| | " Printing Bureau, Finance Department | D.H. |
| | " Sanitary Bureau, Home Department | D.H. |
| | " Senju Government, Woollen Factory | D.H. |
| | " War Department | D.H. |
| 29 | Jeffrey & Co. | G. |
| 30 | " | G. |
| 21 | Jennings, George | G. |
| 23 | " " | G. (2) |
| 31 | " " | G. |
| 21 | " " | S. (2) |
| 23 | " " | S. (3) |
| 22 | " " | S. |
| 31 | Jennings, Thomas | B. |
| 26 | " | B. |
| 26 | Johnson, Charles | B. |
| 21 | Johnson, S. H., & Co. | S. |
| 28 | " " | B. |
| 29 | Jones, Frederick, & Co. | G. |
| 20 | Joubert et Fils (France) | S.C.T. |
| 21 | Jowett, William M., & Co. | B. |
| 30 | Judson, Daniel, & Son | S. |
| 30 | Kashiwabara, M. (Japan) | S. |
| 20 | Kaye, Joseph, & Sons | S. |
| 33 | Keenan, Matthew | S. |
| 24 | Keith, James | G. |
| 26 | " | S. |
| 21 | Kent, George | G. |
| 20 | " | S. |
| 21 | " | B. |
| 26 | " | B. |

* See p. 640, *ante*.

† For description of classes see last week's number.

| Class. | Name of Exhibitor. | Award. |
|---|---|---|
| 31 | Kenworthy, E. N., & Co. | S. |
| 22 | Kershaw, A. W. | B. |
| 38 | Keyser, A. (Belgium) | B. |
| 22 | King, H. | B. |
| 32 | King, P. S., & Son | S.C.T. |
| 25 | Kite, C. & Co. | G. |
| 22 | " | S. |
| 32 | Knight, Henry, & Co. | S.C.T. |
| 31 | Knight, John, & Sons | G. |
| 39 | Knofe, Oscar | G. |
| 30 | Kutsutani, T. (Japan) | G. |
| 29 | Kwaikoshai School (Japan) | S. |
| 40 | Lainé, N. (France) | S.C.T. |
| 42 | Lakeman, James B. | G. |
| 22 | Lamb, J. M., & Co. | B. |
| 42 | " | B. |
| 28 | Langstaff, Charles, M.D. | S. |
| 23 | " " | B. |
| 21 | Latham (Member of Jury) and Way | S.C.T. |
| 21 | Lawrence & Co., Limited | G. |
| Literature | Layet, Dr. (France) | S.C.T. |
| 35 | Lecœur, (France) | S. |
| 34 | Lecoq (France) | S. |
| 29 | Lefevre, J. (Belgium) | G. |
| 20 | Leggett, W. & R. | B. |
| 21 | Le Grand & Sutcliffe | G. |
| 21 | " " | B. |
| Literature | Lewis, H. K. | S.C.T. |
| 42 | Libotte, N. (Belgium) | B. |
| 32 | Liège, Conseil de Salubrité publique de la Province de Liège (Belgium) | S.C.T. |
| 42 | Lindley, C. & Co. | B. |
| 30 | Linoleum Manufacturing Company, Limited | S. |
| 29 | " " " | B. |
| 20 | Liverpool, Corporation of, | D.H. |
| 22 | " " | D.H. |
| 24 | Lloyd, F. | S. |
| 20 | Lombart, Jules (France) | S. |
| 41 | " " | S. |
| 21 | London, Metropolitan Water Companies | D.H. |
| 20 | London, Society for Improving the Condition of the Labouring Classes | S. |
| | London, Society of Arts | D.H. |
| 20 | London, South London Dwellings Company | S. |
| 22 | London Sanitary Protection Association | B. |
| 22 | Lord, William, & Co. | S. |
| 34 | Lot-et-Garonne, Département du (France) | D.H. |
| 23 | Lyon, F. | B. |
| 23 | Lyon, Washington | G. |
| 33 | " " | S. |
| 21 | Machinery and Hardware Company, Limited | B. |
| 21 | McCallum, J. B. | S. |
| 36 | McCarthy, Rev. E. F. M. | S. |
| 23 | McDougall Brothers | G. |
| 31 | " " | B. |
| 22 | McKee, Robert Robertson | S. |
| 29 | McLennan & Owen | B. |
| 23 | Mackey, Mackey, & Co. | G. |
| 21 | Maignen, P. A. | G. |
| 42 | " " | S. |
| 31 | " " | B. |
| 28 | Major, H. J. & Co. | B. |
| 23 | Manchester, Corporation of | D.H. |
| 22 | Manufacturers' and Millowners' Mutual Aid Association | G. |
| 24 | Mappin & Webb | B. |
| 42 | Marihaye, Société Anonyme des Charbonnages de (Belgium) | S. |
| 31 | Marks, Henry, & Sons | S. |
| 21 | Martineau & Smith | S. |
| 21 | " | S. |
| 45 | Marten, Edward B. | B. |
| 30 | Martin & Co. | B. |
| 22 | Masson (France) | S. |
| 34 | " | S. |
| 22 | Masters, Henry | B. |
| | Mayed, Marquis (Japan) | S.C.T. |
| 23 | Meihs, I. R. | B. |
| 27 | Merryweather & Sons | S.C.T. |
| 20 | Metropolitan Association for Improving the Dwellings of the Industrial Classes | S. |
| 28 | Midland Rustless Iron Company | S. |
| 22 | " " | B. |
| 41 | Mignon & Rouart (France) | S. |
| 41 | Mignot, F. (Belgium) | B. |
| 23 | Möller, L. M. (Denmark) | S. |
| 20 | Moerath, John N. | B. |
| 35 | Monthiers (France) | S. |
| 30 | Moon, Mrs. Washington | B. |
| 25 | Moore, Josiah, & Sons | B. |
| 23 | Moule's Patent Earth Closet Co. | G. |
| 30 | Müller, H. (Austria-Hungary) | S. |
| 26 | Muller, H. L. | S. |
| 21 | Muller, J. A., C.E. | S. |
| 24 | Musgrave & Co. | G. |
| 30 | Nairn, M., & Co. | B. |
| 30 | Namikawa, S. (Japan) | B. |
| 32 | National Association for the Promotion of Social Science | D.H. |
| 23 | National Chemical Company | S. |
| 20 | National Model Dwellings Company | B. |
| 22 | Native Guano Company Limited | G. |
| 24 | Neilson, W., & Co. | S. |
| 23 | New Carbolic Sanitary Company | S. |
| 23 | Neuilly, Société de Construction des Ateliers de (France) | S. |
| 20 | " " " | B. |
| 20 | Neujean, A., & Delaite (Belgium) | S. |
| 30 | Newman, Alfred | B. |
| Designs | New York State Board of Health | D.H. |
| 26 | Nobel Brothers | G. |
| 30 | Norchi & Co. (Italy) | B. |
| 39 | Nordenfelt, T. | G. |
| 28 | Norman, R. & N. | B. |
| 21 | Normandy's Patent Marine Aerated Fresh Water Company, Limited | G. |
| 22 | North British Plumbing Company | B. |
| 31 | " " | B. |
| 30 | Ogura, M. (Japan) | B. |
| 26 | Omega Gas Light Company | B. |
| 21 | Oswald, W. R. | B. |
| 30 | Ota, M. (Japan) | G. |
| 23 | Owen, Henry, & Co. | G. |
| 23 | " " | S. |
| 22 | " " | B. |

| Class. | Name of Exhibitor. | Award. |
|---|---|---|
| 21 | Owen, Samuel | S. |
| 21 | " " | B. |
| 31 | " " | B. |
| 22 | Ough, Henry | S. |
| 23 | Overbury, Henry | S. |
| 22 | Page, Edmund | B. |
| 38 | Paget, Charles E. | S. |
| 25 | Papier | B. |
| 39 | Paris, Cercle Parisien de la Ligue de l'Enseignement (France) | D.H. |
| 32 | Paris, Société de Médecine Publique et d'Hygiène Professionnelle (France) | D.H. |
| 34 | Paris, Société des Crèches (France) | D.H. |
| 34 | Paris, Société des Écoles Enfantines (France) | D.H. |
| 40 | Paris, "Société Protectrice de l'Enfance (France) | D.H. |
| 39 | Paris, Union Française de la Jeunesse (France) | S.C.T. |
| 21 | Paris, Ville de (France) | D.H. |
| 27 | " " | D.H. |
| 34 | " " | D.H. |
| 33 | Paris, "Ville de," Prefecture of the Seine (France) | D.H. |
| 23 | Parker, John | S. |
| 30 | Parker, Smith, & Parker | B. |
| 26 | Parkinson, W., & Co. | G. |
| 21 | " " | S. |
| 28 | Patent Durable Roofing Felt Co. | B. |
| 31 | Patent Steam Washer and Laundry Company, Limited | B. |
| 28 | Patent Victoria Stone Company | S. |
| 22 | " " | B |
| 31 | Paton & Charles | B. |
| 20 | Pearse, Robert, & Co. | S |
| 31 | Pearson & Co. | B. |
| 26 | Peignict-Changeur et Cie (France) | B. |
| 20 | Penny, William John | B |
| 31 | Perkins, B., & Son | S. |
| 39 | Petit et Dumontier (France) | B. |
| 31 | Petitjean Fils (France) | B |
| 24 | Petter, James | S. |
| 29 | Pfeiffer, Carl (United States of America) | S.C.T. |
| 22 | Phillips, W., & Son | B |
| 39 | Piggott Brothers | S. |
| 30 | Piqué et Dessert (France) | S. |
| 26 | Plunkett, the Hon. John W. | B. |
| 21 | Pocock, Alfred Wilmer | S. |
| 20 | " " | B. |
| 31 | Podger, H., & Sons | B. |
| 21 | Porter, John H. | G. |
| 33 | " " | S. |
| 24 | Potter, T. G. | S. |
| 24 | Potter, Thomas, & Sons | S. |
| 26 | Price's Patent Candle Company, Limited | G. |
| 33 | " " " | G. |
| 31 | " " " | S. |
| 21 | Pringle, Robert, M.D. | S. |
| 30 | Proctor & Co. (India) | S. |
| 35 | Proust (France) | S. |
| 28 | Pulham & Son | B. |
| 29 | Quayle, D. F | B. |
| 34 | Quétin, E. (Belgium) | S. |
| 21 | Quirk, Barton, & Co. | G. |
| 28 | " " | S. |
| 20 | Radclyffe, "Dick," & Co. | B. |
| 21 | Ramsey, William | S. |
| 35 | Reck, A. B. (Denmark) | G |
| 24 | " " " | S. |
| 28 | Reed Lathing Company | B. |
| 21 | Reynolds, F. W., & Co. | B. |
| 32 | "Revue d'Hygiène et de Police Sanitaire," Proprietors of (France) | S.C.T. |
| 31 | Rimmel, E. | G |
| 23 | " | S. |
| 27 | Robert (France) | B. |
| 21 | Roberts, Charles Gay | S. |
| 21 | Roberts, Thomas | B. |
| 20 | Robertshaw, James | B. |
| 21 | " " | B (2) |
| 23 | Rogiers & Mothes (France) | S. |
| 21 | Rome, City of (Italy) | D.H. |
| 24 | " | D.H. |
| 24 | Ronvaux, Dr. (Belgium) | B. |
| 27 | Rose, William, & Co. | S. |
| 30 | Rosel, F. R. (Belgium) | S |
| 45 | Rosewarne, W. | B. |
| 20 | Ross, John | B. |
| 39 | Roth, Dr. | G |
| 29 | Rottmann, Strome, & Co. | G. |
| 30 | " " " | B. |
| 34 | Rouen (City of France) | D.H. |
| 31 | Rougeot, Dr. (France) | B. |
| 23 | Rousseau (Belgium) | B. |
| 31 | Rowe & Co. | G |
| 21 | Royle, John T. | S. (2) |
| 21 | " " | B. (2) |
| 31 | Rudolfsthaler Graphite Works (Austrian-Hungary) | B. |
| 26 | Sage, Frederick | B. |
| 23 | St. Helen's, Mayor and Corporation of | D.H. |
| 26 | Sale, Frank T. | S. |
| 34 | Salleron (France) | S. |
| 31 | Salmond, David | G. |
| 23 | Sanitary Appliance Company | G. |
| 29 | " " " | B |
| Literature | "Sanitary Engineer," New York United States of America | S.C.T. |
| 32 | Sanitary Institute | S.C.T. |
| 23 | Sanitary Paper Company | B. |
| Literature | "Sanitary Record," Proprietors of | S.C.T. |
| 22 | Sanitary Reform and Engineering Company | B. |
| 31 | Sanitary Company, Limited | B. |
| 29 | Scarborough Mosaic Floor Cloth Co. | S. |
| 24 | Schaeffer, F. (Belgium) | G. |
| 35 | " " | G. |
| 42 | Schaffer & Budenberg | S. |
| 20 | Scollick, A. J., & Co. | S. |
| 21 | " " | B. |
| 29 | Scott, Cuthbertson, & Co. | B. |
| 33 | Seagrave, G. | S. |
| 23 | Sellers, John | B. |
| 34 | Serrure, E. C. (Belgium) | S. |
| 21 | Shanks & Co. | G |
| 31 | " " | G |
| 21 | Sharp & Co. | G |
| 22 | " " | S |

| Class. | Name of Exhibitor. | Award. |
|---|---|---|
| 21 | Sharp & Co. | B (2) |
| 22 | " " | B. |
| 25 | " " | B. |
| 22 | Sharp, Henry Jones, & Co. | S. |
| 22 | " " | B. |
| Literature | Shaw & Sons | S.C.T. |
| 23 | Shilton, A. J. | B. |
| 30 | Shimidzu, K. (Japan) | B. |
| 30 | Shippo-Kwaisho Company (Japan) | B |
| 20 | Siam, Government of | B. |
| 29 | Silicate and Zopissa Composition and Granitic Paint Company | S. |
| 21 | Silicated Carbon Filter Company | S. |
| 33 | Simmons & Tulldige | G. |
| 21 | Simpson & Co. | G. |
| 33 | Simpson, James, & Co. | S. |
| 27 | Sinclair, James, 104, Leadenhall-street, E.C. | S. |
| 22 | Smeaton, John | S. |
| 22 | " | B. (2) |
| 31 | " | B. |
| 30 | Smee, William A. | S. |
| 27 | Smith & Turner | S. |
| 24 | Smiths, James | S. |
| 39 | Spencer, George | S. |
| 21 | Spencer, J. | G. |
| 27 | Spong & Co. | B. |
| 21 | Spongy Iron Domestic Filter Co. | S. |
| 23 | Spratt's Patent | B. |
| 43 | Squire & Sons | B. |
| 31 | Star Brush Company, Limited | B. |
| 30 | Starkie, Gardner, & Co. | G. |
| 24 | Steel & Garland | G. |
| 24 | " " | S. |
| 30 | " " | B. |
| 31 | Steele & Wood | B. |
| 39 | Stempel, Adolf A. | S. |
| 31 | Stephens & Woodman | B. |
| 24 | Stephenson, W. H., M.D. | S. |
| 28 | Stidder, J. G., & Co | G. |
| 21 | " " | S. |
| 23 | " " | S. |
| 21 | " " | B. (4) |
| 22 | " " | B. |
| 23 | " " | B. (2) |
| 22 | Stiff, James, & Sons | S.(2) |
| 28 | " " | S. |
| 33 | Stirrat, B. B. | B. |
| 24 | Stobbs, W. | B. |
| 20 | Stones, John | G. |
| 33 | Stopes, H., & Co. | S. |
| 25 | Stott, James, & Co. | B. |
| 26 | Sugg, W., & Co., Limited | G. |
| 24 | " " | S. |
| 27 | Swanton, W. E. " | B. |
| 21 | Syer, Milton | B. |
| 27 | Tabouet et Cie. (France) | S. |
| 25 | Thomasson & Kay | B. |
| 31 | Thompson, H. A., & Son | B. |
| 28 | Thompson, H., & Co. | G. |
| 24 | Thompson, Henry (Canonbury) | G. |
| 25 | Thompson, H., Manchester | B. |
| 28 | Thomson & Co. | B. |
| 41 | Thwaite, B. H. | B. |
| 31 | Tidman & Son | B. |
| 21 | Tilbury, W. R., & Co. | B. |
| 30 | Tokugawa, Marquis (Japan) | S.C.T. |
| 20 | Tollet, Société Nouvelle de Construction, Système Tollet (France) | S. |
| 30 | Tooth & Ault | S. |
| 28 | Towers & Williamson | S. |
| 21 | Toyo Company (Japan) | B. |
| 35 | Treliat, Emile (France) | G. |
| 29 | Treloar & Sons | B. |
| 25 | Treutler & Schwartz (Germany) | G. |
| 30 | Tubouchi, A. B. Ya (Japan) | G. |
| 20 | Tucker, J D. | B. |
| 21 | Tylor, J., & Sons | G. (2) |
| 21 | " " | G. |
| 23 | " " | S. |
| 23 | " " | S. |
| 21 | " " | B. (7) |
| 22 | " " | B. (2) |
| 23 | " " | B. (2) |
| 21 | Ullathorne, Granville Sharp | S. |
| 29 | United Asbestos Co., Limited | S. |
| 30 | " " " | S. |
| 21 | Universal Filter Company | B. |
| 28 | Val de Travers Asphalte Paving Company, Limited | B. |
| 32 | Valerius, H. (Belgium) | S.C.T. |
| 27 | Vallez, L. (Belgium) | B. |
| 24 | Van Hoecke T. (Belgium) | S. |
| 21 | Van Prasg, Alexander, & Son | S. |
| 35 | Vaudremer (France) | G. |
| 13 | Vaughan, Lukey, & Co. | B. |
| 29 | Vaux & Radford (U.S.A.) | S.C.T. |
| 29 | Verbeucken, H. (Belgium) | S. |
| 30 | Vernon's Patent China and Glass Company, Limited | B. |
| 23 | Vigers Brothers | B. |
| 31 | Von Kaiserstein, Baron (Austria-Hungary) | B. |
| 22 | Wadsworth, Henry, & Son | G. |
| 30 | Wahliss, Ernest (Austria-Hungary) | S. |
| 24 | Walker, William | B. |
| 20 | Wall, Joseph | B. |
| 23 | Waller, George, & Co. | G. |
| 22 | " " | B. |
| 31 | Waller, Thomas | B. |
| 30 | Walton, F., & Co. | G. |
| Literature | Ward, Lock, & Tyler | S.C.T. |
| 30 | Wardle & Co. | G. |
| 20 | Waring, Colonel George E. (United States of America) | S.C.T. |
| 21 | Warner, John, & Sons | G. |
| 21 | " " " | S.(2) |
| 23 | " " " | S. |
| 21 | " " " | B. |
| 23 | " " " | B.(2) |
| 30 | Warner & Ramm | G. |
| 42 | Warwick, James | S. |
| 23 | Watson, W. W. | B. |
| 29 | Watts, George | B. |
| 33 | Waygood, R., & Co. | S. |
| 20 | Weber, C. F. (Germany) | S. |
| 20 | Webster, James, A.R.I.B.A. | B. |
| 20 | Webster's Patent Aluminium Metal Company | S. |
| 21 | " " " | S. |
| 26 | " " " | B. |
| 35 | Weeks, J., & Co. | G. |
| 22 | West Central Sanitary Engineering Company | G. |
| 21 | " " " | S.(3) |
| 23 | " " " | S. |
| 31 | " " " | S. |
| 23 | " " " | B.(2) |
| 30 | Wetherilt, A. & J. | B. |
| 31 | Whalley, Smith, & Paget | B. |
| 28 | White, William, Abergavenny | G. |
| 38 | White, William, F.S.A., 30A, Wimpole-street | S. |
| 20 | Wilcock & Co. | G. |
| 30 | " " | G. |
| 20 | " " | S. |
| 22 | " | S. |
| 28 | Wilkes Metallic Flooring and Eureka Concrete Company | G. |
| 20 | Willesden Waterproof Paper and Canvas Works, Limited | G. |
| 29 | " " " | G. |
| 30 | " " " | S. |
| 26 | Williams & Bach | B. |
| 24 | Wilson Engineering Company | S. |
| 30 | Woerffel, C. F. (Russia) | S. |
| 29 | Woollams, Williams & Company | G. |
| 31 | Woolley, James, Son, & Co. | S. |
| 28 | Wortley Fire Clay Company | B. |
| 24 | Wright, John, & Co. | B. |
| 30 | Yamanoto, S. (Japan) | G. |
| 29 | Yates & Co. | G. |
| 30 | " | S. |
| 30 | Yates, Haywood, & Co. | S. |
| 24 | " " " | B. |
| 20 | Young & Hall | B. |
| 23 | Zimmerman & Co. | B. |

## BUILDERS' BENEVOLENT INSTITUTION.

ANNUAL DINNER.

THE thirty-seventh anniversary dinner in aid of the funds of this Institution was held (as we briefly announced in our last) on the 6th inst., at the Freemasons' Tavern. Mr. Stanley G. Bird, the President, occupied the chair, being supported by Mr. Ewan Christian (President of the Royal Institute of British Architects), Mr. George Plucknett, J.P., and other friends of the Institution.

The usual loyal and patriotic toasts were given by the Chairman, Major Brutton responding for the "Army and Navy," and Major Stedall for the "Reserve Forces."

The Chairman, in proposing the toast of the evening, "Success to the Builders' Benevolent Institution," said he remembered the birth of the Institution in 1847. His father was the first treasurer, and the Institution began, like most things, in a small way. A few good and earnest men met at a small public-house in the neighbourhood of Marylebone-road, and the Institution was the outcome of their discussions. After a time, Mr. Alderman Cubitt and Mr. Alderman Lawrence took an interest in it, and from that period its success was assured. If such worthy men amongst its founders as Mr. Cozens and Mr. Joseph Bird could see the great work now being done by the Institution, they would be both surprised and delighted. Since its formation the Institution had been managed by a band of earnest workers, and in looking through the lists he saw many familiar names, such as Mr. Stirling, Mr. Bolding, Mr. Bussell, and Mr. Nicholson. He mentioned these gentlemen because they were builders' merchants; and perhaps it was almost a reproach to the builders themselves that, belonging as they did to a trade which was the most important in the world, they should depend upon the support of merchants for aiding the Institution. But if this was a reproach to the builders, it was the greater honour to the merchants, who deserved earnest thanks for their great help and support. It was surprising that more builders did not belong to the Institution, because it might be termed an insurance society for them. One of the most recent of their candidates, Mrs. Austin, had been elected by her own votes, she and her husband having been liberal donors to the Institution. It had been stated that some of the candidates for election were not builders of the style or class they anticipated. He did not know whether people were desirous of seeing their friends becoming candidates for pensions, but, for his own part, he was always sorry to see even any name he knew in the list of applicants. At the present time there were twenty-nine male and twenty-nine female pensioners on the funds. The expenditure was about 2,400*l.* per annum, each male pensioner receiving 37*l.* and each female 27*l.* a year. The Institution had some 22,000*l.* invested in Consols; and if the conversion scheme were carried out they would lose about 60*l.* yearly in the shape of interest. To enable the treasurer to make up any possible loss and something besides, he asked them to contribute liberally to the funds of the Institution.

Mr. Howard Colls, in proposing the "Chairman and President," said that Mr. Stanley Bird had perhaps done more for the building trade of London than any other man of the time.

The Chairman having briefly replied,

Mr. Alfred Smith proposed "The Vice-Presidents and Trustees," coupling the toast with the name of Mr. Thomas F. Rider, who made a humorous speech in reply.

The Chairman proposed, "The Treasurer" (Mr. George Plucknett, J.P.), who, he said, was ever ready with advice and kindly help to advance the objects of the Institution.

Mr. Plucknett briefly responded, quoting words of a former friend of the Institution, Mr. Alderman Cubitt, as to the duty of builders, as of other tradesmen, to support the charitable institutions connected with their trade.

The Chairman next gave "The Architects and Surveyors." As they were favoured with the presence of the President of the Royal Institute of British Architects, he was sure they would join with him in appreciating most highly the kindness of Mr. Ewan Christian in coming to meet them. They might look upon it as a happy thing for the trade at the present time that Mr. Christian was at the head of the Institute, for this year the provincial masters had commenced negotiations to endeavour to bring about a better state of things with regard to the form of contract and tender. He would not enter into these matters, but it was a happy thing that Mr. Christian occupied the post, as all knew the high judicial character of his mind, and his great kindliness of disposition. Therefore, when the builders came before the architects they would be met in a way which, he believed, would bring about a fair settlement of the matters they had so much at heart. As to the surveyors he (the Chairman) thought they ought not to be bracketed with the architects, for they were a sufficiently important body to stand alone, and he would be glad when the toasts were given separately. He coupled with that part of the toast the name of Mr. Franklin.

Mr. Ewan Christian, in responding for "The Architects," remarked that they and the builders were brothers in one sense, at any rate, being all engaged in one of the most important industries of the world. The chairman had told them that the builders employed a larger number of men than any other trade did; and in proportion to the number of men employed, so were the risks. Sir William Tite was never tired of saying how great were the risks of the architect, and that his profession was a most hazardous one. How much more did this apply to the builder, who required to be Argus-eyed to see all that was going on in the building he was erecting. Builders would likewise require to be endowed with an enormous amount of placidity in dealing with the highly-extolled British workman. Not that he had not the highest respect for a good workman. There were black sheep in every business. No set of tradesmen were so dependent on their men as were builders; for their good name could be readily taken away by the actions of their workmen. Most of them had read "Adam Bede." He (Mr. Christian) knew the hero of that tale, who was a carpenter by trade, named Evans, and he was so highly respected and sought after that people who had churches or houses to build would wait for years in order that he might do the work. Evans informed him that he always told his foremen on commencing work:—"I cannot afford to lose at both ends. If I lose money I may replace it, but I cannot afford to lose credit; and upon that principle you must carry out your work for me." Architects were sometimes spoken of as a sort of policemen; while others thought the value of the architect was to get the most out of a builder. This had never been his principle. The architect should never be the mere tool of his employer, but rather an arbitrator between builder and client.

Mr. Franklin replied for "The Surveyors." If all architects were like Mr. Christian there would be little reason for separating the two professions. The time, however, was rapidly approaching when the necessities of the case would produce the separation which builders demanded and the interest of the public required.

Mr. R. Freeman gave the concluding toast ("The Committee and Stewards"), which was responded to by Mr. Phillips.

In the course of the evening subscriptions and donations amounting to 665*l.* 14*s.* were announced.

## Illustrations.

### THE ANCIENT PALACE OF WESTMINSTER.

IT is not our intention to present our readers with a succinct historical sketch of the ancient palace of our kings at Westminster. This has been so carefully done by Smith & Brayley that, all we could do would be simply to repeat the information to be found in their volumes; but what we propose is to indicate as nearly as possible the localities of the various buildings and apartments mentioned in ancient documents. Some of these can be discovered, but the situation of others is more or less conjectural. The origin of the Palace of Westminster cannot be clearly ascertained, and the first authentic notices of this vast historical edifice refer to the time of Edward the Confessor, who certainly made this his principal residence, and either built or rebuilt the palace, which was both historically and structurally connected with the abbey. It is presumed that the Confessor's buildings surrounded the open space known as "Old Palace-yard" on the south, east, and west sides, and it is not improbable that the old building called the "Jewel Tower" or "Parliament Office" may have formed the most western portion of his palace. There were also portions of the substructure of his buildings existing underneath the old House of Lords when that building was pulled down in 1832. This cellar gained great notoriety from its being the scene of that idiotic conspiracy known as the "Gunpowder treason."

William I. is said to have added the building known as the "White Hall," or "Court of Requests," and William Rufus erected Westminster Hall and other buildings to the north of the more ancient palace. Henry III., however, rebuilt nearly the whole of the Confessor's work, and even down to our own time, the "Prince's Chamber," the Parliament Chamber (House of Lords), the King's or Painted Chamber, were of his date. In addition to these he erected the Chapel of St. Stephen: the Pilgrimage Church called "St. Mary Le Pewe:" the oratories of the king and queen: the Antioch Chamber: and many other buildings, which were, however, all rebuilt at a later period.

In the year 1298 occurred one of those disastrous fires which have no less than five times reduced the greater portion of the old palace to ruins.

The Chapel of St. Stephen, which had been only just completed and decorated in a most costly manner, was entirely destroyed. Edward I. commenced its rebuilding upon a far more magnificent scale. Some writers have ascribed to Edward I. the credit of having erected this beautiful structure, and others have ascribed it to Edward III. Now the documentary evidence, which is very distinct upon this point, shows that Edward I. certainly *commenced* the chapel, and the works were continued during the unfortunate reign of his worthless successor, but so little progress had been made that in the seventeenth and eighteenth years of Edward III. the crypt was still in an unfinished condition, as we find accounts paid for paving and otherwise completing "the Lower Chapel." The whole of the upper chapel was certainly the work of Edward III., and the accounts for its building and decoration are still preserved, and form the most interesting series of documents of the kind in existence. Everything, including the costly pictures painted upon the walls, was paid for by day wages, the only exception being some of the statues. The names of the master masons, the painters, the stained-glass makers, and even the workmen, are given. It is difficult to say who is to be accredited with the design of this exquisite chapel, but possibly it may be ascribed to a certain "Master Thomas of Canterbury," who appears for many years to have been master mason, and who received far larger wages than any one else mentioned in the documents, even more than Hugh of St. Alban's, who was the principal painter.

The Court of Requests was almost rebuilt by Edward II., and an open-timber roof added, the walls being cramped with iron to support it. Possibly, also, the Exchequer Chamber, and its attendant apartments, were reconstructed at about this time, as also the "Queen's Hall," the "Gaol," the "Nursery Chamber," the king's and queen's private oratories, and other buildings. Many of these, however, were greatly altered in the reign of Richard II., Henry VI., and Edward IV.

Richard II., as is well known, nearly rebuilt Westminster Hall, but more of the ancient Norman edifice of Rufus was allowed to remain than is usually supposed. In fact, what Richard did was simply to heighten the walls, add new windows, and the magnificent open roof. Unfortunately Smirke's restoration of the Hall in 1825-30 obliterated nearly every vestige of the old Norman work, and succeeded in robbing Richard II.'s work of much of its interest; and even Sir Charles Barry's addition to the south end of the Hall, though very fine in itself, has rather destroyed the character of this noble apartment. Before Smirke's restoration several of the old Norman windows remained, and the Norman string below the windows could be traced in many places. Until the removal of the Law Courts a year or two back not a single particle of the Norman building was visible; but that desirable work of destruction has brought to light much of the old Norman ashlar work, which we sincerely trust will be retained and preserved.

To the west of Westminster Hall were formerly a number of ancient buildings forming, together with the side of the Hall, a series of irregular open courts. The most important of these was the Exchequer Chamber, which was frequently rebuilt. We find it mentioned in Henry III.'s time. It stood to the south-west of the Hall. To the north of this was the "King's Fishmongery," probably the place where fish was dried and salted for the use of the palace; and still further to the north, on a line with Henry VII.'s Chapel, were three chambers, called respectively "Heaven," "Hell," and "Purgatory." The origin of these names, as applied to these chambers, it is impossible to ascertain. It is, however, not improbable that they may have been derived from some pictures or hangings upon their walls, such representations being not uncommon in the Middle Ages. It is somewhat remarkable that the late buildings of the Court of Chancery occupied their site, and were it not that the name of the first apartment, "Heaven," was inappropriate, one might be led to infer that the two later names were given in anticipation.

It is evident that the west side of Westminster Hall was never exposed to view, except from some small courtyards, where a great flying buttress or two grouped picturesquely with the surrounding buildings, and we cannot help regarding the throwing open to view of this long flank of the Hall as a decided mistake. It is certain always to look too low for its length, and as it was never intended to be seen at a distance, it cannot be regarded as a restoration of any ancient design or idea. Even now we would suggest the erection of a row of buildings to the west, between the Hall and St. Margaret-street, leaving a long narrow court in their rear, from which the walls and flying buttresses might be seen in sharp perspective, which was evidently the intention of the old builders.

To the south of Westminster Hall was and still is New Palace-yard. In olden times it was a vast irregular quadrangle, at first probably only surrounded on the south and west sides by high walls. As early, however, as the reign of Edward I. a lofty clock-tower and other buildings were erected on the south and east sides, and Richard III. built a magnificent and very lofty gateway to the west. The clock-tower and the gateway were both destroyed in 1706–1707. During the fifteenth and sixteenth centuries numerous houses, inns, and other buildings were intruded upon Old Palace-yard, and in the centre a great conduit was erected. The west end or side of New Palace-yard was formed by a series of irregular buildings, amongst which was the "Star Chamber," which gained such a discreditable notoriety in later times. It appears to have been either built or rebuilt in the reign of Edward IV. An ancient water-gate led from this end of New Palace-yard to the Thames; it is said to have dated from the reign of Henry III. All these buildings, however, were pulled down in 1836, and long before that time they had been so transformed by various alterations that it is impossible to speak with certainty as to their various dates.

It will be noticed at once, upon looking at our illustration, that both Old and New Palace yards were regularly enclosed courts, surrounded by buildings and enclosed by gates, so that no street passed through Westminster, and in fact, King-street,—then the most important thoroughfare in the neighbourhood,—came to an abrupt termination with three gates, at or near to its northern end; that in the centre leading to the abbey precincts and the greater Sanctuary, that to the north leading to the "lesser Sanctuary," and that to the south into New Palace-yard. Old and New Palace yards were connected by a narrow lane, with gates at either end, called St. Margaret's-lane.

Numerous old apartments and buildings connected with the Palace are mentioned in ancient documents, amongst others "Antioch Chamber,"—why so called it is impossible to ascertain. The name, however, is evidently in some way associated with the "Jerusalem Chamber" and "Jericho Parlour" of the neighbouring abbey, probably all these names refer to the Crusades, and pictures of their exploits at the places named may have adorned their walls and originated the names which appear to us so singular.

The "Cage-room" is another ancient apartment mentioned. This is supposed to have been an aviary, and certainly overlooked the river; as a story is told of a parrot falling into the water, when, in imitation of some impatient courtier from whom he had heard the expression, cried out: "A boat! a boat for twenty pounds!" A waterman hearing this picked up the bird and asked for the reward which it had offered. The matter was referred to the King (Henry VII.), who insisted upon the parrot being brought forward as a witness. The parrot had, however, learned a new saying in the meantime, and, when brought forward, to the intense disgust of the waterman, he called out: "Give the knave a groat!"

The offices of the palace, chandlery, bakery, slaughter-house, &c., appear to have stood to the south of the inner court of the palace, parallel with the Prince's Chamber; and the buildings called the constabulary formed the south side of the Old Palace-yard, with a gateway in their midst leading to the "King's Bridge," and Millbank. The "King's Garden," the tower near the "King's Garden," the "Queen's Hall," the "Maydenes' Hall," &c., are also apartments mentioned, but their site can only be conjectured. All that is known is that they were to the south of the Painted Chamber.

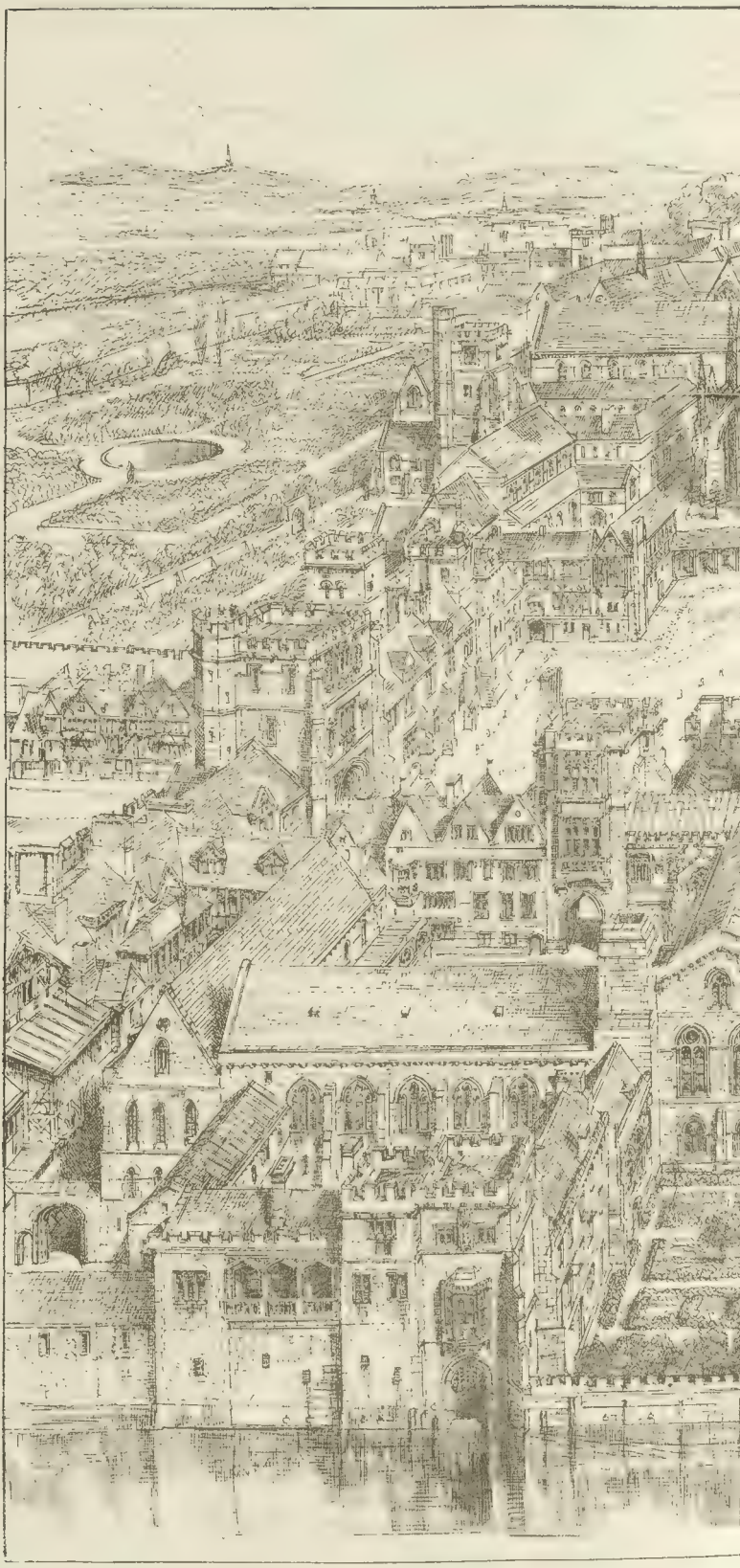
The Pilgrimage Church of "St. Mary-le-Pewe," or "Our Lady of the Pewe," stood to the south of St. Stephen's Chapel, between it and the Painted Chamber, and approached from either the one or the other. In fact, it is evident from descriptions of certain court ceremonials that in passing from the Painted Chamber to St. Stephen's Chapel the way was through the chapel of "Our Lady of the Pewe." A doorway which was discovered in the easternmost bay of St. Stephen's Chapel, was undoubtedly the way of communication between the two. The Chapel of Our Lady of the Pewe must either have been cruciform in plan, or have possessed projecting side chapels, as it contained three altars, which could not otherwise be accounted for in so small a building. The dedication is very peculiar. Some people have supposed that *Le Pewe* is the French "*le peu*" (the little); others that it is derived from "*puit*," "the well," from some spring or well having existed upon its site. We should, however, think that it was probably derived from La Puy in France, where there exists a pilgrimage church of Notre Dame de la Puy. That our Norman sovereigns should have established this devotion in England is by no means improbable.

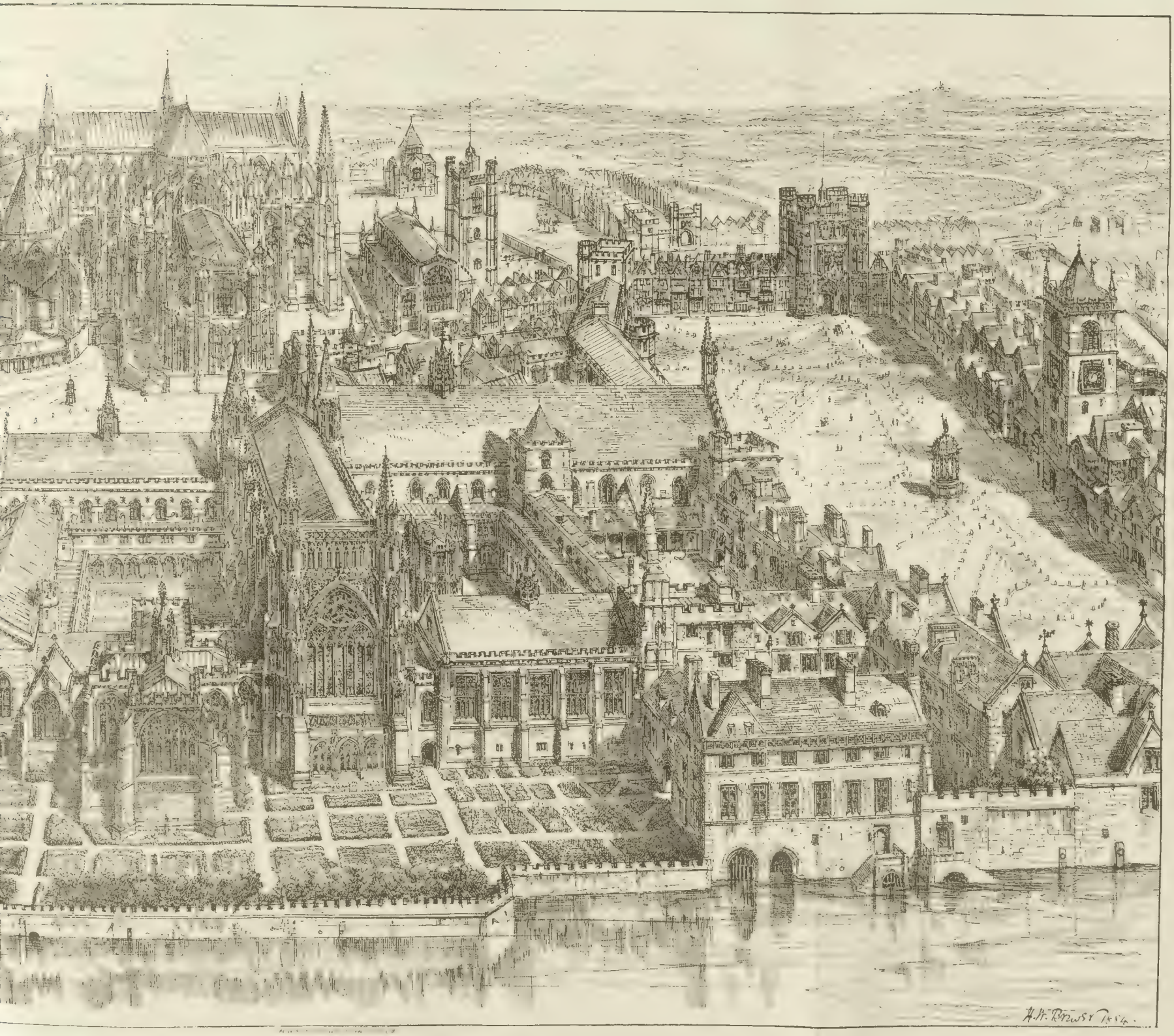
The buildings of the collegiate establishment of St. Stephen stood to the north of the chapel, and the beautiful old cloisters and double oratory are (with the exception of Westminster Hall) the only portions of the grand old historical palace now existing. They were the last works executed before Henry VIII. transferred himself and his court to his new palace of Whitehall, and were erected by the last dean, Dr. John Chambers, in 1526.

Magnificent as our modern palace of Westminster undoubtedly is, every one must regret the loss of such buildings as St. Stephen's Chapel, the Painted Chamber, the Prince's Chamber, and all the historical associations which clung to the ancient Palace of Westminster.

H. W. BREWER.

For key to, and list of the buildings illustrated by, the drawing, see p. 673.

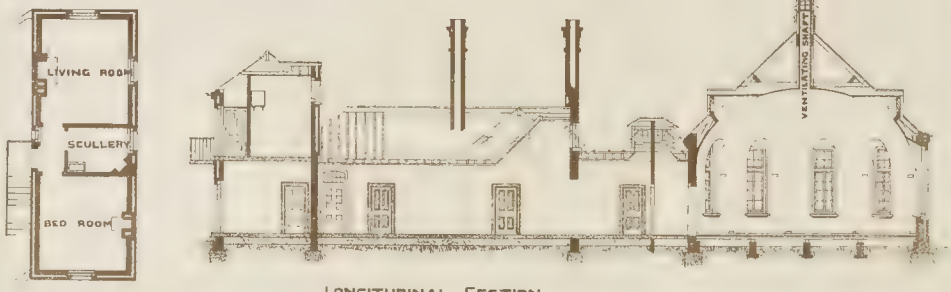




WESTMINSTER IN THE TIME OF HENRY VIII.

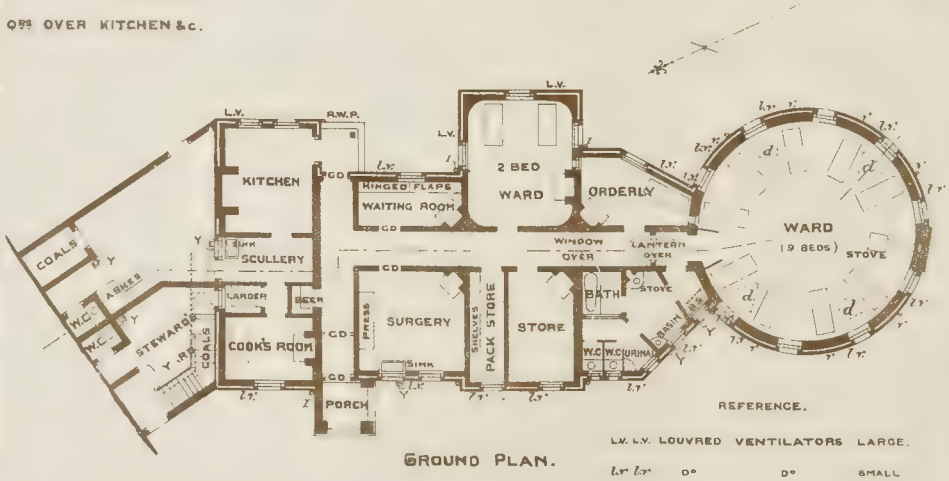


FRONT ELEVATION.




ASSISTANT STEWARD'S
Q^RS OVER KITCHEN &c.

LONGITUDINAL SECTION.




GROUND PLAN.

REFERENCE.

L.V. L.V. LOUVRED VENTILATORS LARGE.
l.v. l.v. D° D° SMALL
V. V. VENTILATORS UNDER BEDS
I I. FRESH-AIR INLETS TO FIREPLACES
Y.Y. YARD TRAPS.
G.D. G.D. GLASS DOORS
B.B. SINK FOR PORTABLE BATH

SCALE
10 5 0 10 20 30 40 50 feet

Thomas Toote Litho.

HOSPITAL WITH CIRCULAR WARD: CAVALRY BARRACKS, SEAFORTH, LIVERPOOL.

*Designed by Major-General Sir Andrew Clarke, K.C.M.G., C.B., C.I.E., R.E.*



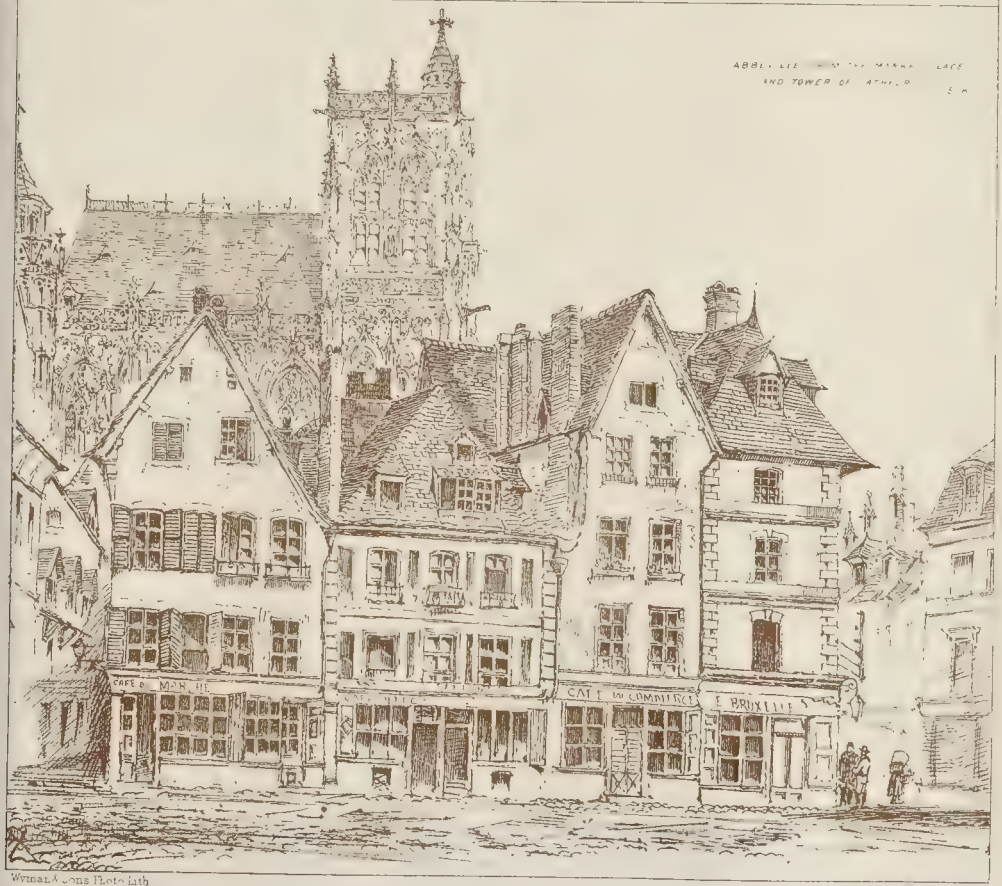

BUSINESS PREMISES, OXFORD STREET




R. Chatfeild Clarke, F.R.I.B.A., Architect.

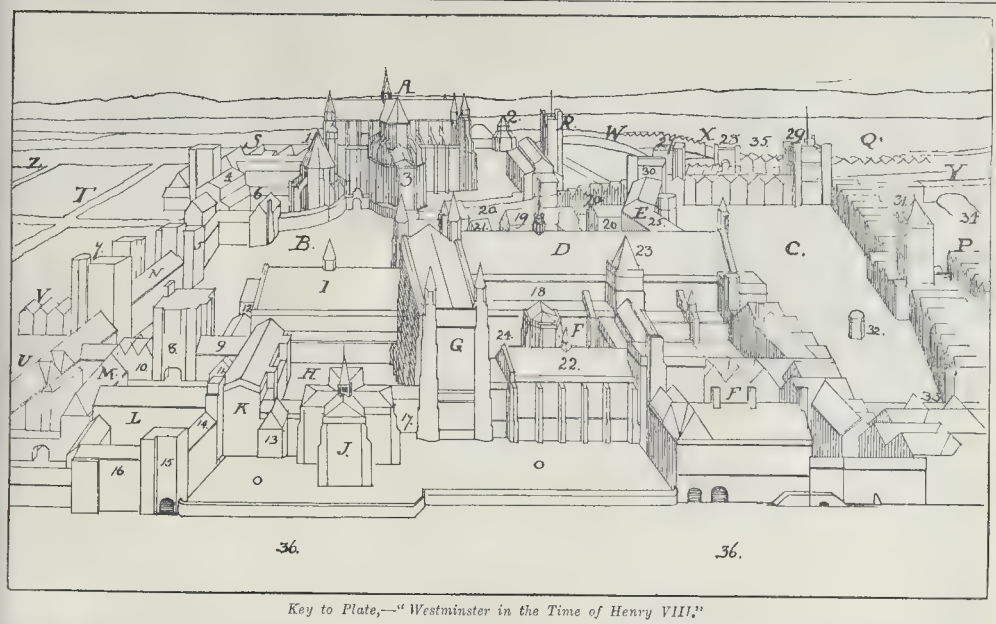





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SKETCHES BY A DISTRICT SURVEYOR. No. 5.




*Key to Plate,—"Westminster in the Time of Henry VIII."*

A. Westminster Abbey.
B. Old Palace Yard.
C. New Palace Yard.
D. Westminster Hall.
E. The Exchequer.
F. St. Stephen's College.
G. St. Stephen's Chapel.
H. Inner Court of the Palace.
I. The "White Hall" or "Court of Requests."
J. Chapel of "Our Lady of the Pewe."
K. The Painted Chamber.
L. The Parliament Chamber or House of Lords.
M. The Princes Chamber.
N. The Constabulary.
O. The King's Garden.
P. The Wool Staple.
Q. The King's Park.
R. St. Margaret's Church.
S. The Almonry.
T. The Abbey Garden.
U. The Offices of the Palace.
V. The Way to the King's Bridge and Millbank.
W. The Greater Sanctuary.
X. The Little Sanctuary.
Y. The Queen's Bridge.
Z. The Abbey Mill-stream.
1. The Abbey Chapter-house.
2. The Great Clockard.
3. Henry VII.'s Chapel.
4. St. Catherine's Chapel.
5. The Jewel House.
6. Infirmary of the Abbey.
7. South Gate of Palace.
8. Nursery Chambers (?)
9. The Queen's Hall (?)
10. Residences of Nobility in Waiting upon the King and Queen (?)
11. The Queen's Private Oratory (?)
12. The Gaol.
13. King's Private Chapel (?)
14. Antioch Chamber (?)
15. Tower "at the King's Garden" (?)
16. The "Cage Room" (?)
17. Chapter-house of St. Stephen's College.
18. Oratory in Cloisters, St. Stephen's.
19. The King's Fishmongery.
20. 20, St. Margaret's-lane.
21. "Heaven," "Hell," and "Purgatory."
22. Refectory of St. Stephen's College (?)
23. Bell Tower of St. Stephen's College.
24. Cloisters of St. Stephen's College.
25. The Greater Exchequer Chamber.
26. The "Lesser Exchequer Chamber" (?)
27. Gateway fronting Street to Greater Sanctuary.
28. Gateway fronting Street to Little Sanctuary.
29. Richard III. Gateway, or "The High Tower."
30. Gateway between New Palace Yard and St. Margaret's-lane.
31. The Clock Tower.
32. The Great Conduit.
33. The Star Chamber.
34. The River Tye.
35. The Long Ditch.
36. The Thames.

## BUSINESS PREMISES IN OXFORD-STREET.

We publish this week an illustration of some new business premises completed in the spring, standing on the south side of Oxford-street, in proximity to the Marble Arch, on the Duke of Westminster's estate.

They consist of three sets of premises, those to the eastward being built for Messrs. Holland & Holland, coach-builders; those in the centre for Messrs. Tautz & Sons, tailors and breeches makers; and those to the westward for Messrs. Peal & Co., waterproof leather manufacturers and boot and shoe makers.

The buildings throughout are faced with red brick, and have Corsehill dressings, string-courses, and cornices. The pilasters on the ground-floor are in polished red granite, with specially cast gun-metal caps and bases to Messrs. Holland & Holland's premises, having ornamental pilasters of iron on the upper stories, which have been supplied by Messrs. H. Young & Co., of Eccleston Iron Works, Pimlico.

The premises extend from Oxford-street to North-row, having an average depth of 130 ft. A considerable portion of the flooring is fire-proof, being formed of wrought-iron girders and rolled joists filled in with concrete, finished with asphalte on the surface, the ironwork being protected throughout.

For the purposes of the business of Messrs. Holland & Holland, a hydraulic lift has been constructed from the basement to the second floor, prepared to take the heaviest coaches, and this has been supplied by Messrs. Waygood & Co., of Falmouth-road, Great Dover-street, Southwark. The buildings are lighted in the centre by well-holes and skylights of ornamental character.

Messrs. Tautz & Sons' premises are heated throughout the workshops by hot water, and both this and Messrs. Peal & Co.'s heating have been executed by Mr. W. W. Phipson, of No. 1, Salisbury-street, Strand.

Messrs. Peal & Co.'s building is warmed throughout with low pressure steam, having special coils on each floor; and hydrants are furnished in various portions of the premises in case of fire, in connexion with street mains.

Especial attention has been paid to the ventilation of the premises, and the extraction-shafts for the removal of foul air from the premises have proved very effectual.

The whole of the works have been carried out by Messrs. Colls & Sons, of 53, Moorgate-street, and Camberwell, from the drawings, and under the superintendence of Mr. Thomas Chatfeild Clarke, of 63, Bishopsgate-street Within.

## SEAFORTH CAVALRY BARRACKS, LIVERPOOL.

HOSPITAL WITH CIRCULAR WARD.

The hospital which we illustrate this week, and which will be one of the accessories to the barracks now being erected at Seaforth for the accommodation of a squadron of cavalry, is one of a new type, the main feature in the design being the circular ward,—a form of hospital construction which, although recently used in one or two instances at home and abroad, has never, until now, been adopted by the British Government. The present Inspector-General of Fortifications at the War Office, however, Major-General Sir Andrew Clarke, R.E., has thought it desirable to introduce, as an experiment, this newest principle of construction into a small hospital, believing that the avoidance of angles internally, and the exposure of the external walls, in which adequate window-space is provided, to the influence of the sun's rays throughout the day, are points of the utmost importance in all buildings intended for the housing or recovery of the sick.*

* We have ourselves more than once expressed considerable scepticism in regard to the supposed advantages of the circular ward, but of course concur in the desirability of giving it full trial.—Ed.

The external walls throughout the building will be of brick, with a 2½-in. hollow space formed in them; and the hospital, as will be seen from the plan, gives accommodation for eleven patients,—nine in the main ward, and two in the ward for special cases. The room for the orderly, or nurse, is conveniently placed between the two wards, with an inspection window into each, and the small ward has a window on each of three of its sides. The "annexe,"—so-called,—contains water-closets, bath, wash-basins, and other conveniences, and these are cut off from the hospital in the manner described in the subjoined "instructions." The waiting-room is fitted with a hinged flap, at which such convalescents as are able to leave the ward may dine. There is a store for the sick men's packs, and a general store for clean linen, bedding, medical comforts, utensils, &c. The surgery is centrally placed near the main entrance.

The kitchen department is entirely cut off from the hospital proper, and any cooked provisions must first be passed from the kitchen into the outer air (under cover) before being brought into the main building; by this means no effluvia from the kitchen department can reach the inmates.

The quarters for the assistant-steward in charge are placed on the first floor, and, for the purpose of isolating his family and preventing contagion, are approached by a flight of steps outside the building. The quarters consist of a living-room, bedroom, small scullery, and a yard with accessories.

All rooms intended for habitation are ventilated by the admission of cold fresh air through movable louvred ventilators connected with a duct in the external walls and by the admission of warmed fresh air from a chamber at the back of a Galton grate, the vitiated air being carried off by an extracting flue in the chimney-breast, fitted with one of Boyle's ventilators to prevent down-draught.

The circular ward is ventilated in the manner described in the instructions forwarded from the

War Office to the Commanding Royal Engineer of the District for his guidance, and which will also describe the sanitary arrangements.

It may be mentioned, with reference to the elevation, that it had to be worked out in accordance with the features already adopted in the other buildings now in course of construction within the barrack boundary at Seaforth.

INSTRUCTIONS.

*Sanitary Arrangements.*

A disconnecting pit is to be constructed at the most secluded spot available for the purpose, near where the hospital drain meets the main drain of the barrack.

Such rain-water pipes the heads of which may be near, but not at a higher level than the window openings, should not be connected with the drains, but should discharge over gully traps. Those rain-water pipes the heads of which are at a higher level than the window openings near them, or at some distance from any window openings, need not, on sanitary grounds, be cut off from the drains, but should act as ventilators to them.

The wastes from baths, sinks, &c., should discharge over gully traps. Those called "Dean's traps" are considered the best for the purpose. The first length of drain-pipe from such traps should be provided with a socket in which a 2-in. galvanised cast-iron ventilating safety-pipe should be fixed, and be carried up to the roofs. Wastes from upper floors should discharge over open hopper heads, and the down-pipes therefrom should discharge over open gullies, as before mentioned.

*Ventilation.*

The upper or domed portion of circular ward to be ventilated by dormers fitted with louvres; each opening being provided with a hinged flap or shutter worked by lines and pulleys. The ceiling to be grooved at these points, and the openings fitted with movable perforated iron gratings, which, for the purpose of cleaning, are to be hinged at the lower, and fixed by screws at the upper, extremity.

The central extracting-shaft in this ward may be constructed in either of the following ways:—

1. In the manner shown, viz.:—By having two of the sashes at the top of the lantern hung on pivots for opening and closing, with lines and pulleys; and a perforated iron or zinc disc at the bottom, which disc should be made removable for the purpose of cleaning the shaft. This disc should be in two parts, with a hole formed in the centre for the passage of the ventilating pipe of the gas pendant.

2. By having the openings fitted with louvres, provision being made for partially closing the shaft by a pivoted flap or diaphram worked by cords or chains attached to a counterpoise weight, and running over pulleys. The counterpoise weight might extend to 10 ft. or so from the floor, and be worked by a hooked stick. This regulating diaphram must be situated high enough up the shaft to be sufficiently clear of the gas and ventilating pipes of the pendant.

3. By having louvred openings, as before described, and the bottom of the shaft fitted with a box containing Boyle's ventilators on each of the four sides, the bottom of the box being closed and made of some incombustible material, such as fire tile, slate, or a slab of Keenan's material perforated for the passage of the ventilating pipe of the gas pendant.

4. By a sunlight, the flue-pipe of which should be continued inside the ventilating-shaft, or embodied with it, in which case the construction should be of galvanised iron, together with a spirelet in ornamental zinc, of similar character to that shown. The pipe may be packed with Keenan's non-conducting material wherever the heat is likely to produce inflammability.

The space for water-closets and urinal to be enclosed by half brick walls in cement, running up to the ceiling so as to prevent the emission of tainted air, but the partitions between water-closets and urinals may be of slate, and need not be more than 6 ft. 6 in. high.

The water-closets are to have each a hinged seat, with a false seat under, covered with 4 lb. lead, so that the water-closets might be available as slop-sinks.

The lantern over the lobby outside the circular ward to be formed in two compartments, the sashes of each compartment being made to open on centres.

## SKETCHES BY A DISTRICT SURVEYOR.

V.

ABBEVILLE, on the Northern Railway of France, is the first town of importance after Boulogne, and is famous as the place of meeting between Francis I. and Cardinal Wolsey, when Francis and Henry VIII. were about to league themselves against Charles V. There are several interesting old houses, with overhanging stories, in the town. The sketch represents the square, with the towers of St. Vulfran, a fine unfinished basilica, rising beyond.

*Tours.*—The staircase in the house of Tristan the Hermit (a familiar figure in "Quentin Durward") is entirely of brick. The courses I have been careful to give, both in number as well as form. I am not quite certain that the date is correct. I should put it a little later. I give, however, the local tradition as to date.

The other stone staircase is in the cloisters of Tours Cathedral, leading to the priests' room. It was sketched on the spot, but re-drawn from an assumed position, as it was impossible to obtain an actual standpoint from which both the unique handrail and the ceiling design could be combined without a violation of perspective.

T. E. KNIGHTLEY.

**Leek.**—Mr. Albert Vicars, of Somerset-chambers, 151, Strand, London, is preparing the design for St. Mary's new R.C. Church at Leek, Staffordshire, for the Rev. Alfred M. Sperling.

## COMPETITIONS.

*Victoria Assembly Rooms, Burnley.*—This (limited) competition has been gained by Mr. G. B. Rawcliffe, architect, 8, Ormerod-street. The building is to be erected on the site of Goodham Hill Mill, St. James'-street, the principal thoroughfare of the town. The area of the site is to be increased by means of iron girders carried across the river. The auditorium will be over twenty yards square, and, together with balcony and gallery, will accommodate 2,000 persons. There will be a proscenium and large platform with dressing-rooms and all necessary appliances for operatic and other performances. The total cost is estimated at 6,000*l.*

## CROSIER AND PASTORAL STAFF.

SIR,—In reply to Mr. Slingsby-Stallwood's courteous letter on page 606, and to your own editorial comments on the communication with which I ventured to trouble you, may I be permitted to repeat what I have already said, that the distinction between a crosier and a pastoral staff drawn by many modern writers is indisputably erroneous, and is based on a false etymology. No such distinction is known to early lexicographers and writers, who on such a point are the only trustworthy authorities. It is quite beside the mark to quote Mrs. Jameson, Dr. Lee, "The Liturgical Reason Why," and other modern authorities, who simply copy one from another without going back to the fountain-head. Webster's Dictionary is, for such a purpose, absolutely worthless. Even Richardson,—a somewhat safer guide, though his etymologies are his weakest point,—goes equally wrong here, deriving "crosier" from *croix*, a cup, "of which," he says, "it has the image on the top."

There is no question of the fact that the distinctive mark of archiepiscopal dignity was a staff, with a cross at the summit, usually borne before him processionally, even as a pastoral staff is borne before a bishop by his official, but also, like the pastoral staff, capable of being carried by himself. On sepulchral brasses or other monuments it is naturally found in an archbishop's hand as a symbol of his rank.

But this cross-headed staff, I repeat, is not the crosier, nor was it ever so called except by modern blunderers. The crosier and the pastoral staff are one and the same thing under different names; and the crosier has nothing to do with a cross. This is a simple etymological fact which no one who knows anything of the history of language will care to dispute. To substantiate what I say, I will quote Professor Skeat's words, "*Crosier* formed with suffix *er* from Middle English *croce* in the same sense of 'bishop's staff.' Old French *croce* 'a crosier,' Cotgrave; modern French *crosse*; Low Latin, *crocia*; old French *croc*, a crook, *not from* cross, *to which it is* only ultimately *related*." If, for convenience sake, people nowadays choose to make a distinction between the "crosier" and the "pastoral staff," they are at perfect liberty to do so, but they must be warned that it is in direct defiance of etymological truth.

EDMUND VENABLES.

*The Precentory, Lincoln*, Nov. 5.

SIR,—Referring to crosiers, I beg to hand you some extracts from heraldic writers on the subject.

Boutell says:—"Crosier, the cross-staff of an archbishop; distinguished by its form from the pastoral staff (with a crook-head) of bishops."

Aveling describes it as "the cross-headed staff of an archbishop."

Cussans speaks of it as "a staff bearing a cross at the top, belonging to an archbishop," and says the bishop's staff is like a shepherd's crook.

On the other hand, Hugh Clark and Ellen J. Millington speak of the crosier as the bishop's or abbot's pastoral staff; and in other works of a minor character it is so described.

Parker says:—"The crozier of an archbishop was surmounted by a cross *after* the twelfth century."

I am inclined to think that Boutell and Cussans are the best authorities on this subject, but would like to see further notes about it from other correspondents. JOHN BAGNALL.

*Cheltenham*, Nov. 5th, 1884.

*** These letters were unavoidably postponed last week.

## ADMIRALTY AND WAR OFFICES.

SIR,—In your issue of last week [p. 622] illustrating my design, it is said "we give the two principal plans and a view, from the *architect's drawing*, of Mr. Porter's design," &c.

Will you allow me to say that my personal energies were devoted to the preparation of the plans, sections, and geometrical elevations, and that the *perspective views* were prepared for me by Mr. E. F. C. Clarke, of 7, Westminster-chambers, whose ability (as a perspective draughtsman and colourist, and also as an architect) is well known to the profession, and I trust will every year be better known to the world at large? THOMAS PORTER.

## THE PLUMBERS' CONGRESS.

SIR,—Will you allow me to relieve the mind of Mr. Robert Gibson [p. 641], or any other clerk of works, by stating that as it is now about twenty-five years since I was a journeyman plumber, any remark made by me in reference to my contact with clerks of works then need not cast any depreciatory inference upon "clerks of work of *the present day*," as a quarter of a century may make a great difference. I do not think I used the word "journeyman," however, but "apprentice," and at the time I referred to many clerks of works, I believe, knew very little about plumbers' work; and even although a clerk of works were able to distinguish readily between "5 lb. and 6 lb. lead," or "7 lb. and 9 lb.," he would not be of much value in promoting good plumbers' work unless he knew a great deal more.

I think Mr. Gibson has been rather hasty with his letter, and drawn a very strained inference from my remarks, and one the context in no way conveys.

W. P. BUCHAN.

## DERBY LUNATIC ASYLUM COMPETITION.

SIR,—There is a rumour in the air that one of the competitors in the Derby Lunatic Asylum Competition has had his design rejected on account of his estimate, 32,000*l.*, being too high. This, of course, is too good a joke to be true, as I should suppose the Derby authorities would know from experience that nothing like that sum would be sufficient to carry out the work. This competition has remained undecided for a most unreasonable time; and I believe I am justified in saying that the whole of the competitors would feel most justly treated if a competent and independent assessor were called in to advise the committee not only as to the merits of the designs, but also as to the trustworthiness of the estimates. T.

Nov. 12th, 1884.

## CHURCH BUILDING NEWS.

*Bristol.*—St. Andrew's Church, Montpelier, has been re-opened, after undergoing alterations and improvements. The work so far carried out under the improvement scheme consists chiefly of a modification as well as decoration of the nave and transept roofs, giving to the interior of the church an effect of loftiness and brightness, as well as improving the acoustic properties of the building. The old western gallery, which projected some 23 ft. into the church, has been removed, and a new one constructed extending only half the distance, having a stone front supported on moulded and enriched arches, red Devonshire polished marble columns, foliated capitals, and enriched cornice. The carving has been executed by Mr. Wilmot. The solid partition and doors which originally stood in the entrance under the tower have been removed, and the walls and ceiling decorated by Mr. John Powell. A new staircase has been constructed to the gallery; also a new belfry floor and tower roof. Much, however, remains to be done. The walls of the nave and transepts have been distempered as a ground for future decoration, and new seating is greatly needed in the body of the church. The contractor for the works now carried out was Mr. W. E. Walters, of Montpelier, the architect being Mr. John Bevan, of Unity-street, Bristol. The cost of the alterations up to the present is about 400*l.* Mr. Bevan has been appointed architect for the new Church of St. Alban, Ashtongate, Bristol.

*St. Kew (Cornwall).*—St. Kew is an out-of-the-way place some four miles from Wadebridge. In its old parish church of St. James there are many features which remind the architectural student of Somersetshire handiwork. The fabric was restored a few years ago at an expense of several thousands of pounds, and at that time a rood-screen was erected. It was not, however, rendered complete by the placing thereon of the cross which was so essentially a feature of all old rood-screens. This, how-

ever, has now been done. It is a foliated cross, made entirely of stout English oak. The upright post and the arms are ornamented by boldly-carved crockets, and the eastern and western faces are panelled with tracery. Upon the one facing west at the junction of the cross-piece are the letters I H S. At the base is a triple array of crocketed pinnacles which are connected with and support the main portion by means of flying buttresses. The cross has been made by Mr. Harry Hems, of Exeter, from the designs of Messrs. Hine & Odgers, architects, Plymouth, under whose supervision the general restoration of St. Kew Church took place.

*Cross Inn, Llandebie* (*Wales*).—The foundation-stone of the new Church of St. Michael and All Angels, at the village of Cross Inn, about two miles from Llandebie, has been laid. The church will be Early Decorated in style. The architect is Mr. D. Jenkins, Gorlâs, Llanarthney; the builder, Mr. Benj. Jenkins, Brecon; and the cost is estimated at about 1,000*l*.

*Roath* (*Cardiff*). — St. Germain's Church, Roath, Cardiff, has been opened by the Bishop of Llandaff. The building is Gothic in style. It comprises nave, aisles, and chancel. Its internal dimensions are 120 ft. in length by 62 ft. in width. The chancel arch, from the floor level to the apex, is 55 ft. high. The roofs of the nave and north and south aisles are divided by Bath stone moulded arcades. The arches spring from eight massive moulded columns, 24 ft. high and 2 ft. 3 in. in diameter. The chancel is lighted by five mullioned and traceried windows. The six-light east window has moulded mullions and transoms supporting rich tracery. This window is a principal feature in the building. The roof of the chancel is carried by three moulded Bath stone arches, supported by three-quarter Bath stone columns resting on moulded corbels. The south aisle is to be a chapel. The roof of the aisle is carried on Bath stone ribs springing from moulded corbels. From the aisle are doorways leading into the clergy and choir vestries. The floor of the south aisle is laid with wood blocks and buff tiles, divided by bands of Hopton Wood stone. Here is a small altar, approached by two steps laid between with dark blue slate and Hopton Wood stone. The altar is approached by six steps of slate filled with Hopton Wood stone and slates, the pattern giving the appearance of black and white marble. Under the choir stalls are laid wood blocks for the choristers to stand on. From the chancel arch is suspended a richly-carved rood, resting on a massive moulded beam, supported on two carved corbels, supplied by Messrs. Farmer & Brindley, of London. On the south side of the church is the organ-loft. This is approached by winding stone stairs. Above the chancel arch on the outside starts a small bell turret to the height of 50 ft. above the ridge, surmounted by a cross, in which is hung a bell, weighing about 10 cwt., supplied by Mr. Thompson, of Loughborough. The style of the architecture is thirteenth-century Gothic. The whole of the work is from the designs of Messrs. Bodley and Garner, of London, and has been carried out by Messrs. Shepton & Son, of Cardiff, under the supervision of Mr. David Knight, clerk of the works, at a cost of about 12,000*l*. The church is heated by hot-water pipes, supplied and fixed by Messrs. Fox & Co., London, and the gas-fittings are by Messrs. Watts & Co., London.

*Sheffield.*—The parish church, St. Peter's, is about to be enriched by the addition of a carved reredos. The feature was included in the general idea when the church was restored, and Messrs. Flockton & Gibbs (with the late Sir G. Gilbert Scott, R.A., as consulting architect) then prepared a design for a reredos, which circumstances did not at the time allow of being carried out. The idea was not lost sight of, however, and now we learn that the original design, subject to some minor alterations and additions, is to be immediately carried out in its entirety. The reredos will be made of well-seasoned English oak, and Decorated in style. It will extend the entire width of the chancel,—*i.e.*, some 21 ft.,—and will rise at its highest altitude about 9 ft. The lines are all managed so as not to interfere with or block in any way the four-light window above. The central portion has three arcaded panels, separated by niches, about and over which will be a wealth of canopied and pinnacled work. At each side of this are highly ornamental arcades of six bays each, whilst the blank spaces bounding the great window will be utilised by carrying up another arcade similar in character to that immediately beneath. The work has been placed in the hands of Mr. Harry Hems, of Exeter, whose name is so frequently mentioned in our columns that it may be interesting to state that in his early years he toiled in one of the dirtiest of Sheffield manufactories as a cutler's lad.

*Skelton-in-Cleveland.*—The Archbishop of York has consecrated the new church of All Saints, at Skelton-in-Cleveland, which has cost 13,000*l*. The edifice is in all respects a striking contrast to the last-century parish church which it has replaced. The new church, the site of which is in the village, while that of the old church is some distance away, is capable of comfortably seating 700 adults. Seen from the outside, a striking feature of the church is its freestone tower, 24 ft. square, with large buttresses at each angle, and rising to a height of more than 80 ft. This tower, together with a peal of bells and a clock, has been built at the entire cost of Mr. J. T. Wharton, Skelton Castle, lord of the manor. The bells have been provided by Messrs. Taylor, of Loughborough. They number six, and weigh 79½ cwt., with a tenor bell of 23 cwt. The clock has 6-ft. dials, it strikes the Cambridge quarters, and has been supplied by Potts & Sons, of Leeds. The church was commenced at the beginning of 1881. The plan shows the building to consist of nave, with north and south aisles, choir, chancel, organ-chamber, and vestry. The walls are built of hammer-dressed freestone, principally obtained from a local quarry; the south front, the windows, doors, piers, and arches being of freestone. The principal entrance is at the west end of the south aisle, through a porch connecting the church with the tower. The style of architecture adopted is the Curvilinear Gothic of the fourteenth century in its later form of transition to the Perpendicular. The chancel has a fine east window of five lights, placed rather high in the wall, and beneath is a carved reredos of oak. The wood-carving has been executed by Mr. Hedley, of Newcastle. The floor of the chancel is laid with marble mosaic by Messrs. Burke & Co., of London. The roof is of pitch-pine. The walls are plastered, relieved with a deep oak panelling, with a moulded and carved cornice running round the building. The architect was Mr. R. J. Johnson, of Newcastle; the contractor, Mr. F. Caldcleugh, of Durham; the clerk of the works, Mr. Hindmarsh, of Middlesbrough.

*Aveton Gifford.*—The Parish Church of St. Andrew, Aveton Gifford, is one of the most interesting of South Devon churches. Walter de Stapledon was rector ere he became Bishop of Exeter in 1307. The church was generally restored under the direction of Mr. Elliott, architect, Plymouth, in 1869; until then the remains of a pair of fine old carved oak parclose screens occupied the two easternmost bays of the south arcade in the chancel. These were so sadly decayed, however, that they were removed, and have ever since been stowed away in the depths of the rectory cellar. It is to the credit of the rector that he has resolved to have these most interesting specimens of Mediæval art workmanship carefully renovated, and once again placed *in situ*. With this end Mr. Harry Hems, of Exeter, has been commissioned to take them in hand. The two screens will each be about 12 ft. long and about the same height. The old work exhibits much delicate manipulation of an unusually clever character. It is all late fifteenth-century handiwork, the carving is crisp and vigorous, and although very much decayed is reported to be by no means past making good.

*Hunslet* (*Leeds*). — The new Church of St. Cuthbert, Hunslet, has been consecrated by the Bishop of Ripon. It is situated in Kirkland-street, Beeston-road, and is erected in the Early Pointed style, of fine red brick inside and outside, with stone dressings and terra-cotta enrichments. The plan of the church has been specially arranged to meet the contracted nature of the site, which is a short parallelogram. It consists of a nave, with clearstory, choir, sanctuary, and north and south aisles. The stone arcade of the former extends from the west to the east end as far as the sanctuary. The choir is raised four steps above the nave floor, and is enclosed by a low stone wall. The roofs are of pitch-pine unvarnished, covered with boarding, felt, and light green Westmoreland slating, and having red ornamental Staffordshire ridge cresting. The floors throughout are laid with marble mosaic concrete. The heating is by low-pressure hot-water apparatus, and the lighting by gas jets arranged along the clearstory. The pulpit is of Caen stone, on a base of blue stone. The font is a circular bowl of solid alabaster on a base and steps of blue stone, and enriched with blue stone and alabaster shafts, with moulded caps and bases. The church will seat 500 persons. The works have been carried out by Messrs. Longley Bros., of Hunslet; and their sub-contractors have been Messrs. Sharp & Harper, slating; J. Woffenden, plumbing and hot-water apparatus; J. Bond, lead windows; J. Appleyard, general stone carving, pulpit, and font; Wood & Son, painting, all of Leeds. The air-extractor was supplied by the Harding Ventilating Company; the marble mosaic concrete floors were laid by Messrs. Diespeker & Co., of London; the brass altar standards were supplied by Messrs. Jones & Willis, of Birmingham; the brass eagle lectern by Mr. Hodkinson, of Coventry. The bell was cast and hung by Messrs. Mears & Stainbank, of London. The architects are Messrs. Perkin & Bulmer, of Leeds.

*Cork.*—An addition has been made to the eastern end of St. Mary Shandon Church, in the shape of a carved oak reredos, extending the entire width of the sacrarium. The central part is higher than the two wings, and is divided into five compartments. They are supported by columns carrying carved capitals, over which runs a continuous cusped arcading. The main cornice is embattled. In the central panels are the words, "This do in remembrance of Me." Each of the other four panels contains in the upper parts circular recesses, in which are Tudor roses, whilst below are vesicas. In these latter are carved respectively in high relief Alpha and Omega, as well as wheat and the vine. The reredos has been made by Mr. Harry Hems, of Exeter.

*Walthamstow.*—The Bishop of St. Alban's dedicated on Sunday, November 2nd (the tenth anniversary of the consecration of the church), a chancel-screen, erected in St. Saviour's Church, Walthamstow, in memory of the late vicar, the Rev. T. H. G. Robinson. The interior of the building called for some relief to the unbroken vista looking towards the chancel and the coloured mosaic reredos on the apse walls, and the proposal to insert a screen of alabaster and marble was quite approved by the architect who had designed the church itself. The appearance of the reredos, with its blue background, is much enhanced by being seen through this warm-coloured open framework of arches and tracery, the material having been specially selected from the Fauld Quarries at Tutbury, in North Staffordshire, by the masons, Messrs. Dyke & Son, of Highgate-road. The plinth is of dark alabaster, inlaid with marbles, Cork red marble being used for the columns. An inscription is cut, in gilt letters, along that portion of the screen nearest to the stall occupied by the late vicar. The central archway is to be flanked by two guardian angels, for which the commission has been given to Mr. H. Armstead, R.A., the architect of the screen being strongly of opinion that any sculpture introduced in a church should be the best that can be got. The bronze gates have been executed by Messrs. Hart, Son, & Peard, of Regent-street, who have also re-arranged the gas lighting. The whole has been carried out from the designs and under the superintendence of Mr. Edward J. Tarver, architect.

*Aberdeen.*—St. Andrew's Church, Aberdeen, has just acquired one of the handsomest sculptured reredoses in Scotland. It is constructed of Caen stone and Devonshire marble in the Early English style of architecture, and is intended to serve as a memorial to the late Bishop Suther. It has been made from the designs and full-sized detail drawings of Messrs. Pirie & Clyne, architects. The carrying out of the work was entrusted to Mr. Harry Hems, sculptor, of Exeter. The reredos is about 15 ft. high, and fills all the east wall beneath the window. In outline it presents three lofty stilted and crocketed gables, standing on the apex of the central one. At each side,—that is, upon the springing stones of this middle gable,—are other sculptured angels kneeling in adoration. But the most striking portions of the work are the three groups of sculpture in the round, which occur immediately over the super-altar. Immediately beneath this re-table is a tabernacle of delicately-wrought brass work, whilst on either side, in raised letters, is an inscription dedicating it to the

memory of Bishop Suther. The panel on the north side represents Our Lord blessing children. The south panel is about 7 ft. high. It is illustrative of the Sermon on the Mount. The central panel is devoted to a statue of Our Lord as the Good Shepherd.

## ROMAN CATHOLIC CHURCH-BUILDING NEWS.

*St. John's Wood.*—The Church of Our Lady, Grove-road, St. John's Wood, was the first Roman Catholic Church built in London after the Emancipation Act, and one of the first Gothic churches of the Revival, the contract drawings being dated October, 1832. It was designed by Mr. J. J. Scoles. The church was re-opened on Sunday, Oct. 12th, after thorough repair and the erection of a new stone and alabaster altar, with a rich reredos of the entire width of the nave, and rising so as to form an architectural composition with the large triple lancet window. It is contrived so as to occupy the whole thickness of the wall, with pierced traceried openings to the staircase and passage behind, for access to the throne used in the rite of exposition. The floor of the sanctuary and chapels has been laid with parquet work. The whole of the works has been executed by Mr. Anstey, from the designs and under the superintendence of Mr. S. J. Nicholl, who was a pupil of Scoles, the original architect of the church.

*Clitheroe.*—Special services have been held in connexion with the dedication of the new Lady Chapel of the R. C. Church at Clitheroe. The chapel has been constructed on the right-hand side of the principal altar. In its main features it harmonises with the architecture of the church. The floor is formed of mosaic work, marble, and alabaster, and the pillars, arches, &c., of the chapel are of marble. Mr. S. J. Nicholl, of London, is the architect, and the work has been done by Mr. Anstey. On the right-hand side of the entrance there is an alabaster statue of the Virgin, and within the chapel there are three paintings by Mr. Joseph Bouvier, portraying incidents in her history. The first one on the background beneath the altar represents the "Tomb of Our Lady, and the ten Apostles showing St. Thomas where her body had been laid, but the body was not there, there being only flowers in the tomb." Behind the altar is a picture of the "Assumption." Higher still there is the representation of the "Coronation of the Virgin by the Angels in Heaven."

*Stabannon (Ireland).*—The foundation-stone of a new church at Stabannon, in the county of Louth, was laid on the 5th ult. The estimated cost of the new building is 4,000*l.*, but before it is finished and fully embellished a good deal more than this will have to be expended upon it. The church, which consists of nave, sanctuary, tower, and porch, with priests' and boys' sacristies, is in the style of Gothic known as Early English. The total length of the church internally is 100 ft., of which 78 ft. 6 in. is given to the nave, and 21 ft. 6 in. to the sanctuary. The width of the nave is 28 ft. and that of the sanctuary 20 ft. clear inside measurement. The nave is lighted by eight lancet windows, with trefoil heads in the sides, and three large lancet windows in the west end, over the principal entrance door. The sanctuary is lighted by two lancets in flank, and by a large triplet window in end. The height of the side walls is 20 ft., and to apex of roof 45 ft. The height to top of cross on spire is 97 ft. 6 in. The chancel arch is richly moulded, supported on corbel shafts of polished granite, with angels carved in stone beneath. The roof of the nave is of open timber work, with arched and moulded ribs to trusses; that of the sanctuary is divided by moulded ribs into panels for future decoration. The work is being carried out by Messrs. Matthews & Colligan, contractors, Stabannon, under the superintendence and from the designs of Mr. William H. Byrne, architect, Dame-street, Dublin.

*Castleisland.*—On the 5th ult. the new church of Castleisland, Tralee, was opened for worship. There were seven designs submitted in competition for the erection of the church, and that of Mr. D. J. Coakley, South Mall, Cork, was selected. Mr. John Sisk, of Cove-street, Cork, was the builder. The church is built in the Early Gothic style, and is cruciform in shape. It consists of nave and aisles, chancel and transepts, with side chapels, vestry, porch, and tower. The length of the building is 136 ft., 81 ft. across the transepts, and 65 ft. across the aisles. It is 60 ft. high. The tower stands at the south-western angle, and will be 150 ft. high. Neither spire nor belfry has yet been erected, and the portion of the tower erected is only the same height as the roof of the church. The church is built of local dark limestone faced, and the dressings are of a light grey chiselled limestone. The organ was built by Mr. Magahy, of Cook-street, Cork.

## DISSENTING CHURCH-BUILDING NEWS.

*Glasgow.*—The Wellington United Presbyterian Church, in University-avenue, was opened on the 12th ult. The building, which is among the most notable of recent ecclesiastical buildings in Scotland, occupies a highly-favourable site, facing southwards, and overlooking the University grounds and Kelvingrove Park. The site is a corner one at the junction of Ann-street with University-avenue, and it extends to about one acre. The principal front of the church consists of a portico of ten fluted Corinthian columns, approached by an open flight of steps from University-avenue. The church itself is about 90 ft. by 60 ft. and 47 ft. high inside. Its general form is rectangular on plan, with a gallery recess at the south end, and an organ recess at the north, the latter being covered by a half-dome richly moulded and decorated. The ceiling of the church consists of three arched or vaulted spans springing from what have the appearance of two longitudinal beams stretching from end to end of the church, and without pillars. The sides of the ceiling are coved and groined, and the whole is enriched with arched ribs and panels. The construction of the roof is of a novel character, consisting of two malleable iron lattice girders about 80 ft. long and over 7 ft. deep, stretching from one end of the church to the other. Between these two girders the middle arch of the ceiling rises, and between the walls and the girders the side arches spring, and the ceiling is thus supported entirely on the girders and side walls. The roof-principals and purlins are also of malleable iron. The church is provided with side and end galleries, and seats 1,050 persons. To the north of the church are situated the hall, 50 ft. by 35 ft., with an end gallery, the library, 35 ft. by 21 ft., and session-house, vestry, ladies' room, and numerous class-rooms, together with a church-officer's house. The total length of the building, including the outside stair, is about 200 ft., and its width at the north end is 100 ft. The height of the apex of pediment above University-avenue is about 75 ft. The columns of the portico and side walls, of which there are twenty, are 35 ft. high and 3 ft. 6 in. diameter. The total cost of the building, exclusive however of the cost of site, organ, furniture, &c., is 15,000*l.* The stone used is from Overwood Quarry. The following are some of the leading contractors for the work:—masons, Messrs. James Watson & Son; wrights, Messrs. Allen & Baxter; slater, Mr. Wm. M'Ewen; plumbers, Messrs. Wallace & Connell; plasterer, Mr. R. A. M'Gilvray; heating engineers, Messrs. J. Combe & Sons; painters, Messrs. A. & J. Scott; glaziers, Messrs. Wm. Meikle & Sons and Messrs. W. & J. J. Keir; gasfitters, Messrs. D. & G. Graham and Messrs. R. Laidlaw & Son; ventilating, Messrs. J. G. Carrick & Co.; marble mosaic pavements, Messrs. Walker & Emley; wrought-iron railing and gates, Mr. R. A. Stoffert. In working out the iron girders of the roof, the architect consulted with Messrs. Wharrie, Colledge, & Brand, civil engineers, and this contract was carried out by Messrs. Arrol, of Germiston Ironworks. The organ has been built by Messrs. Forster & Andrews, of Hull. Mr. T. L. Watson, F.R.I.B.A., is the architect.

*Newlyn East (Cornwall).*—A new Wesleyan chapel has been opened at Newlyn East. It is Gothic in style. The external walls are of native grey stone with granite dressings. The plan is a parallelogram. The main front has a central gabled recessed doorway with three-light traceried windows over, flanked by buttresses raised somewhat higher than the roof, and finished with ornamental pinnacles. The chapel will accommodate about 600 persons, and when all the details have been completed it will cost about 1,750*l.*, of which nearly three-fourths have been raised. The plans were furnished by Mr. John Ennor, of Newquay, under whose superintendence the work has been carried out by Messrs. J. Hawkey (Newlyn East), Jury Bros. (St. Austell), and Best & Bennetto (St. Dennis and St. Enoder).

## STAINED GLASS.

*Emanuel College, Cambridge.*—The whole of the windows in the chapel of this college have lately been filled with stained glass. The style of the work is Classic, and the arrangement consists of rich figure work panelled, under canopies, with a framework of elaborate detail. Each window contains two figures of men celebrated in history for their great learning as types of scholarly character. They are arranged to commence at the east end, and read thus:—(1) Origenes; (2) Jo. Erigena; (3) John Colet; (4) Wm. Tindale; (5) Benjamin Whichcote; (6) Peter Sterry; (7) John Smith; (8) Wm. Law; (9) St. Augustine; (10) St. Anselm; (11) John Fisher; (12) Thos. Cranmer. The Rev. A. Rose, M.A., Bursar of the College, lent valuable assistance in providing the authorities with details for the landscape background for this part of the work. Messrs. Heaton, Butler, & Bayne, of Garrick-street, London, designed and executed the work, under the supervision of the architect, Mr. A. W. Blomfield.

*Uxbridge (Middlesex).*—A window in the Late Decorated style has been inserted in the west gable of the south aisle of St. Margaret's Church, and filled with stained glass in memory of the James family. The window was designed by Messrs. Charles J. & C. Herbert Shoppee, architects, Doughty-street, Bedford-row. The stained glass is by Messrs. Clayton & Bell, of Regent-street, the subject being the Ascension. The window is in five lights. The stonework was carried out by Messrs. Fassnidge & Son, of Uxbridge.

# The Student's Column.

## ON THE CONSTRUCTION OF ROOFS.

III.

COLLAR ROOFS are frequently found over old buildings of moderate span, such as the nave or chancel of village churches, where considerable height is gained in the interior by having the roof open to the ridge. In these roofs (fig. 6) the heads of the rafters R are generally

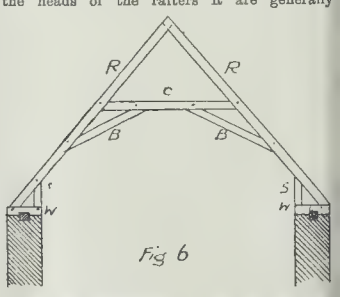


Fig 6

halved on one another instead of abutting against a ridge-piece, and the feet are let into a horizontal *wall-piece*, W, with a mortise and tenon, and stiffened by means of the vertical strut, S, let into the inner end of the wall-piece, and also into the underside of the rafter: the wall-piece itself is notched down on a wall-plate laid along the centre of the wall. The collar, C, is placed high up on the rafters, and also tenoned into them; the collar and rafters being further held together by the oblique braces, B. All these pieces are fastened by means of oak pins driven through the tenons. The strength of such a piece of framing depends upon the unalterable property of the triangle, of which figure there are five in the present example; for it is a principle in geometry that the angles of a triangle cannot change without a corresponding change in the length of the sides. As long, therefore, as the pins hold in the tenons the framework will be perfectly rigid.

*Curb Roofs* are commonly used for town houses, and are formed of two pairs of rafters instead of one pair, as shown on fig. 7. The rafters B C, D E, whose ends rest on the top of the wall, are nearly upright, and connected at the feet with the floor joists, C E; their upper

ends are connected by ceiling joists or collars, B D, and support the rafters A B, A D, which are usually laid at a low angle of pitch. By this arrangement better rooms can be obtained in the roof than in the ordinary collar roof before described, without necessitating the carrying up of the walls higher than the floor level. The name "Mansard" is sometimes given to this form of roof after a celebrated French architect, who erected many roofs of the kind during the seventeenth century. The upper rafters having a low pitch are subjected chiefly to a transverse strain, as described under shed-roofs; while the lower ones having a high pitch may be considered to act as pillars, supporting the load of the upper roof, and to be subjected to a comprehensive strain only.

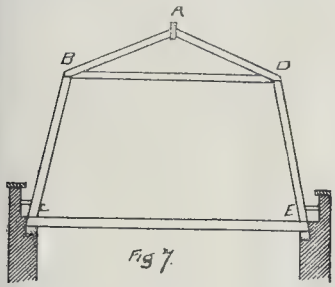


Fig 7.

The amount of this load can be ascertained by adding together the lengths, A B, B C, in feet, and multiplying the sum by 66, which will give the load, W, down each rafter, B C. Then, if we divide W by 1,800, and multiply the square-root of the quotient by the length, B C, in feet we have the sectional area in inches of the upright rafters of fir.

For example, let B C be 10 ft., A B 8 ft.; then W is 18 multiplied by 66, or 1,188 lb., which, divided by 1,800, gives ·66, the square-root of which is ·812, and this, multiplied by 10, gives 8·12 square inches as the sectional area required, or the scantling of the rafter B C may be 2½ by 3¼ for fir.

*Framed R ofs.*—When the span between the walls of a building is considerable, and the strength of the walls insufficient to bear much horizontal thrust, a *truss* is formed of timbers framed together in such a manner as to throw the load perpendicularly on the walls, and on this truss the common rafters and roof covering are placed. We have already shown how the rafters of a shed-roof can be supported on *principals* by means of *purlins*, and the same method is adopted in *framed* roofs. In fig. 8

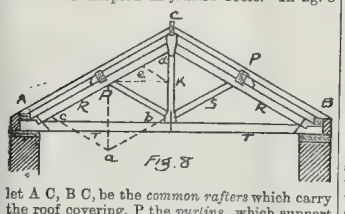


Fig. 8

let A C, B C, be the *common rafters* which carry the roof covering, P the *purlins*, which support them in the middle, and themselves rest upon the *principals* R. Then, in order to counteract the thrust upon the walls of the principals, their feet are framed into a horizontal *tie-beam*, T, to which they are securely held by iron straps placed obliquely, and bolted to the beams to prevent them from slipping. But as the tie-beam is liable to *sag* or bend in the middle from its own weight, and that of a ceiling, which it generally has to support, the upright beam K is introduced, and is called the *king-post*, into the head of which the heads of the principals, R, are framed so as to hold it up above the tie-beam. To this king-post the tie-beam is tied up by means of an iron strap passed under it, and bolted to the king-post, which prevents the sagging of the tie-beam. One half of the weight of the tie-beam is thus thrown upon the king-post, which has also to bear one fourth of the weight on the rafters, which is thrown upon it, by the ridge piece, C, resting upon its summit; and all this has to be borne by the principals. As the purlins, P, bring a heavy load to bear on the middle of the principals, a *strut* or *brace*, S, is fixed between the foot of the king-post and the part of the principal immediately under the purlin, by which means a part of the load is conveyed to the king-post, and the *sagging* of the principal is prevented. The purlins are usually fixed square with the rafters, and to prevent them from sliding downwards, blocks of wood abutting against them are nailed down on the principals. The feet of the common rafters are notched and spiked to *pole-plates*, A and B, which are spiked and notched on the ends of the tie-beam, while at their centre the rafters are notched and spiked on the purlins.

We will now consider the part which each beam in this truss has to play, and the nature of the strain it is required to bear. The purlins have to support about half the weight of the covering, which acts as a distributed load and produces a cross strain upon them, as in the case of a floor-binder. The principals have to bear the strain of the king-post and of the loads at C and P, which act mostly in the direction of their lengths as a compressive force. They may, therefore, be considered as long pillars supporting a load acting down their axis. The king-post has to bear the vertical strain arising from the struts and tie-beam, and is subjected to a tensile or stretching force. It also sustains a compressive force at the joints of the struts and principals, which press upon its foot and head. The struts are compressed by the pressure they have to sustain of the load on the principals, and they may also be considered as pillars supporting a load down their axis. The tie-beam is strained by the outward pressure of the feet of the principals, which produces a tensile or stretching force upon the tie-beam in the direction of its length. When the tie-beam has to support the weight of a ceiling or floor the principal strain upon it will be transverse, as in the binder of a floor, in which case the tensile strain need not be taken into consideration, as a beam that can carry the weight of a ceiling will more than suffice to resist the thrust of the principals. If there is no ceiling or floor to carry, a wrought-iron rod with nuts and screws at the ends will serve all the purposes of a tie-beam. As the king is entirely under tension a wrought-iron bolt is often used instead of timber, and the heads of the principals let into a cast-iron head through which the king-bolt passes, while its lower end is furnished with nut and screw to pass through the middle of the tie-beam and sustain its load, with corresponding cast-iron shoes for the feet of the struts.

The relation between the various strains on the timbers of the truss can be ascertained by a simple application of the mechanical principle known as the "Resolution of Forces," by which two forces can be found in any directions equivalent to a third force acting in some other direction. This is done by taking a straight line to represent the magnitude and direction of the third force, and describing a parallelogram with this line as the diagonal, and the direction of the other two forces for the sides. Thus, in figure 8, let P *a* represent the pressure at P, which is one-fourth of W, if W is the whole weight of the roof which rests on one truss; draw *a c* parallel to the strut P *b*, and *a b* to the principal P *c*; then P *b* represents the compression down the strut, P *c* that down the principal, arising from the load at P. If we draw the horizontal line P K, this will represent the horizontal pressure on the foot of the king at *b*, which is balanced by an equal and opposite pressure from the strut on the other side; the length, K *b*, represents the tension down the king-post from the strut, and as there will be a similar one from the other strut, twice the length K *b* will be the tension in the king-post from this cause. To this we must add half the weight of the tie-beam and any load it has to carry, and we have the total amount of tensile strain to which the king-post is subjected.

The strain on the king-post produces a compression down the principals; and if we take *b d* to represent the total strain on the king-post, the length P *d* will be the compression down the principal from this cause. There is also the load at C of one-fourth W, half of which is supported by each principal; and if the length K *d* represents one-eighth of W, and K *e* is drawn parallel to B C, then *d e* will be the compression down the principal from this cause. Adding all these amounts together we get the total compression down the principal, and can find its scantling as a long pillar by the rule given in the articles on "Floors." If the trusses are 10 ft. apart and the load is taken at 66 lb. per square foot, the value of W in pounds will be the length (in feet) of one rafter multiplied by 1,320. The strain down the king-post will be one-fourth of W, together with half the weight of the tie-beam, which latter may be taken at 120 lb. per foot of length when it carries a ceiling only. This is the only part of the roof which is unaffected by the angle of pitch; it may be safely strained with 750 lb. per square inch of section.

The compression down the principal, when the pitch is 30°, will be half W, together with half the load of the tie-beam; and that down the strut S will be one-fourth of W. With these data the student can easily calculate for himself the scantling of the several timbers for roofs of various spans.

The graphic method of showing the strains on the parts of a truss by means of a geometrical diagram, which was introduced by the late Professor Clerk Maxwell, can be readily applied to a roof of this kind; the vertical strains at the several points being known, the other strains are shown by the diagram. To apply the method to a king-post roof, draw the vertical line A F (fig. 9), and take A F to repre-

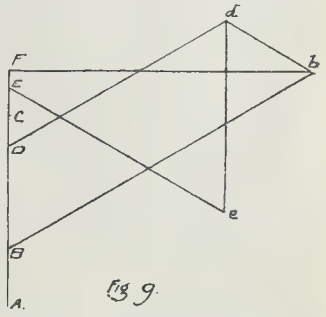


Fig 9.

sent on scale half the weight, W, of roof with its load of covering, &c., together with half the weight, *w*, of the tie-beam and ceiling. Measure (on same scale) A B to represent one-eighth of W plus one-fourth of *w*, which is the load at A (fig. 8); take B D to represent one-fourth of W, the load at P; take D C to represent one-eighth W, or half the load at C (fig. 8); take C E equal to C D, and C F to represent one-fourth the load of the tie-beam and ceiling, or half the strain down the king-post arising from the tie-beam.

Draw B *b* parallel to A C (fig. 8), and F *b* horizontal, meeting the former line in *b*; draw D *d* parallel to B *b*, and *b d* parallel to the strut S (fig. 8); draw E *e* parallel to the rafter B C (fig. 8), and draw the vertical line *d e*. Then B *b* represents the compression down the lower half of each principal, while D *d* is that down the upper half; *b d* is the compression down the strut, and *d e* is the tension in the king-post; the horizontal line F *b* represents the tension in the tie-beam. All these strains can therefore be measured accurately by the same scale as was used for the vertical line A F.

An account of this method, with an example worked out in detail, will be found in a paper on "Building Materials," by Capt. Seddon, R.E., read before the Royal Institute of British Architects on April 22nd, 1872, and published in the "Transactions."

For a roof of 20 ft. span the scantlings of the timbers when fir is used should not be less than as follow:—Tie-beam, 7 in. by 4 in; principals, 4 in. by 4 in.; struts, 4 in. by 2½ in.; king-post, 4 in. by 2½ in. at the smallest part, and 4 in. by 5 in. at the head and foot; purlins, 7 in. by 4 in.; common rafters, 4 in. by 2 in. For a span of 30 ft. the tie-beam should be 9 in. by 5 in.; principals, 6 in. by 5 in.; struts, 5 in. by 3 in.; king-post, 5 in. by 3 in. and 5 in. by 6 in.; purlins and common rafters as before. In this case there should be two purlins on each side between the ridge and pole-plate, otherwise the purlins and common rafters must be made stronger.

## PERSPECTIVE.

SIR,—Some weeks ago there was a paper in the *Builder* on "Perspective as applied to Architectural Drawings," showing a simpler method than that taught in Schools of Art.

I am articled to an architect, and have obtain

my full Certificate from the Department of Science and Art, and should be obliged if the writer of that article would show me how his simple plan could be applied to the *plan* of a drawing, and I have no doubt there are other readers of the *Builder* who would be equally interested in knowing.

R. M. C.

*** The principle as illustrated was really of general application in perspective problems, but we will take an opportunity of illustrating its further application to plan. We hope student readers who wish for further information in regard to any subjects treated in this column will never scruple to ask questions, which we shall always be happy to answer to the best of our power.

## Books.

*British Mining.* By Robert Hunt, F.R.S. London: Crosby Lockwood & Co. 1884.

In his comprehensive treatise on the metalliferous mines of the United Kingdom, Mr. Robert Hunt has done ample justice to a subject of great importance, inasmuch as our minerals form a principal source of national wealth. Our mines are also of deep interest to the public at large, from the numbers employed in them and the capital embarked. The mines of England are among the oldest worked in the world, and have for many centuries been a field for the employment of honest labour and speculative capital, and from the earliest times when the Phœnicians came to our shores in search of tin, down to the present day, have been in constant activity, yielding large profits, and producing a mining population equal to any in the world, who have done more than any other miners in discovering and opening out the mineral deposits of new countries. With so vast and varied a subject it is not surprising that Mr. Hunt has written an interesting book, and with the opportunities he has had for obtaining correct information, in the capacity of secretary to the Royal Cornwall Polytechnic Society, and afterwards as Keeper of the Mining Records for many years he has been able to make his work not only interesting but useful, and instructive as well.

The volume is divided into four sections:—Historical Sketch, Formation of Mineral Deposits, Practical Mining, and the Future Prospects of British Mining.

The early history of mining in Cornwall is obscure and uncertain, as we have it carried down by tradition over long intervals of time, and the only records we possess of its past existence are the holes known as "Jews' pits," and the heaps of old refuse called "attal-Saracen." The so-called "Jews" of early times were probably Phœnicians, who may have owned and worked mines for tin. Certain it is that at a very early period the inhabitants of Cornwall were trading with Eastern people. After minutely chronicling the early events in the mining industry of Cornwall, Mr. Hunt says,—"The conclusion to which the examination leads us is that many centuries before the Christian era a trade had been established between the natives of Western Britain and Eastern Europe in the metal tin." Thus we must consider tin as the first article of commerce exported from England, and the Cornish miners the first traders in a country destined to become the greatest trading community of the world. The presence of tin gave to Britain a reputation for mineral wealth among the ancients which probably led to its conquest by Julius Cæsar. Certain it is that the Romans were in Britain, as in every country they conquered, active miners, and traces of their subterranean operations are to be found in every mineral field of the kingdom. Gold and silver were the metals most sought after by the Romans, and in England they knew of and possibly worked the gold-bearing rocks of North Wales, and certainly mined the lead mines extensively. They were in all countries energetic and successful miners, and worked underground to a remarkable extent, considering the total absence of mechanical aid. They have left evidences of their mining industry in the old mines of ancient Dacia (Transylvania), Italy, Spain, Portugal, Germany, and, in fact, in every country they ever occupied. In England they must have mined the iron ores very extensively, judging from the great heaps of cinders which were found in the Forest of Dean, and which are traced to their occupation. When they left England mining seems to have been in abeyance, and Mr. Hunt remarks, "After the departure of the Romans from Britain we have for a long period no light to guide us in our endeavour to trace the progress of mining." It may be also said that after the fall of the Roman Empire the art of mining languished all over Europe. During the Early Christian period and Middle Ages the mines were neglected for other pursuits. The monks were not miners. The wealth they acquired was not by burrowing in the earth. The knights and land owners of the Middle Ages did not encourage or value mining. In Domesday Book no mention is made of a mine, yet the tin trade had been long established, and the Stannary Court originated in the time of Athelstane (A.D. 950). The Stannaries, or rights to mine for tin, were in the gift of the Sovereign, and bestowed on court favourites until in 1376 the miners obtained the sanction of Parliament to their rules and regulations. But very little attention was paid to mining until the reign of Queen Elizabeth, who bestowed much attention on them. Among other things, she granted, by letters patent in 1564, permission to certain German mining adventurers to search for and work mines in several counties in England and Wales. These German miners were the first to introduce the divining-rod, which for many years was firmly believed in by the ignorant and superstitious. During the seventeenth century mining progressed, though slowly; but early in the eighteenth it received a great impetus by the introduction of the steam-engine, first in 1705 by Newcomen, improved by Trevethick, and perfected by Watt in 1777.

From the very interesting historical sketch the author passes on to and discusses the abstruse subject of the formation of mineral veins and the question of practical mining. With reference to the latter subject, every practical miner will agree with Mr. Hunt's declaration that, "notwithstanding the attention which has been directed to the laws regulating the deposits of metallic ores, it must be confessed that we are still without any certain guide to the presence of lodes beneath the surface of the earth." The phenomena connected with the existence of mineral deposits in the earth are such that science, based on observation and experience, has hitherto failed to methodise them under any fixed laws, and hence no general rules for the guidance of miners have been successfully laid down. It is really impossible to prognosticate the value of any vein or lode many fathoms in advance or in depth of the actual face which is being worked. Hence the elements of uncertainty and expectation which constitute the charm of mining, but at the same time introduce the chance-like character of results to be obtained from a commercial view. The discovery of lodes is mostly due to accident. In many cases springs of water indicate by their aspect and component parts the near presence of minerals, and frequently veins show at the surface in a decomposed condition. The German miners have a proverb, "There is no lode so good as that which wears an iron hat."

In recent times no new appliances have exerted so much influence as rock-boring machinery and powerful explosives. With these modern inventions time and labour are greatly economised. But the old stamp-mill still remains as perhaps the best of pulverisers in its improved form. It is mentioned in Agricola's "De Re Metallica," and is in the present day still employed in the newest gold-dressing plants.

In the last division of the book, "The Future Prospects of British Mining," Mr. Hunt reviews the gradual development of British mining, the necessary exhaustion of some of the fields, and the importation of foreign ores. It must, we think, be admitted that, with this array of facts before us, the prospects of British mining at present are not very promising. Mr. Hunt tells us that "the production of tin-ore, from surface-deposits, cannot much longer be regarded as likely to be of much value." And again, "The quantity of copper ore above 300 fathoms from surface cannot be large." The records of old workings show that the ore lying within easy reach of the surface has been worked out, and that we must be prepared to follow the ore veins to great depths in future. Mr. Hunt, in reference to this, remarks truly that "without great improvements in the principles of mining it will not be possible to work, at a profit, many of our deeper and more extensive mines."

We cannot leave this book without recommending it to all interested in mining. It is full of facts and information, admirably classified, and the text is assisted by numerous well-executed illustrations.

*Die Lokomotiv - Feuerbüchse, gesammelt von* Johann Pechar. Vienna: Spielhagen & Schurich. 1844.

Technical education in this country is now happily receiving some of the attention it has long deserved, but when we consider the great efforts made in the same direction by the various nations in competition, much still remains to be done to enable us to maintain successfully our supremacy as manufacturers.

Our attention has been called to the matter by the number of technical books and publications issued on the Continent during the last few years, more especially in Germany, which has in addition translated many English standard works. These books, in most cases, deal not only with the scientific side of the various questions, but enter into practical details. We have one of these before us, "Die Lokomotiv-Feuerbüchse." This illustrates the different systems of constructing locomotive fireboxes, with special reference to the consumption of smoke and economy of fuel. The author commences with a series of notices, with illustrations, of the different English systems of construction, but is apparently unaware that several of them are more or less obsolete. These are followed by others showing various plans pursued in America, France, Germany, and Austria, finally coming to the système Nepilly, which he especially advocates. Amongst the advantages claimed for this system may be mentioned that the atmospheric air necessary for combustion is raised to a considerable degree of heat before passing into the fire, thus allowing it to mix at once with the various gases, and so preventing in a large degree the formation of smoke. The fire-bars, furnace bridge, and draught can be readily adjusted to burn various kinds and qualities of coal to the best advantage, and the admission of the right quantity of air necessary for combustion regulated accordingly. The inclination of the adjustable fire-bars and bridge is altered as required by a lever worked from the foot-plate. Various tables are attached showing the results obtained from actual trials. The book consists of ninety-five pages only, and, even if we take some of the statements of results *cum grano salis*, it should still be of very considerable service to railway companies and others engaged in the construction or working of locomotive engines.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

260, Improvements in Fireproof Floors. H. H. Bridgman.

The principle of this invention is chiefly to prevent draughts or air-passages under the flooring by closing up all spaces below the boarding, thus greatly reducing the chance of fire or the danger of burning. At equal distances splayed wooden fillets are imbedded in concrete. These fillets rest on the iron joists, and are dovetailed into the concrete, the top of the concrete is brought up level with the top surfaces of the fillets. On this upper or top surface, a layer of mastic, such as asphalte, lime, and hair mixture, or other cohesive material or compound, is spread. As the successive portions of the surface are treated, the floor-boards are screwed or nailed on to the fillets. Of course, when grooved or tongued boards are used for the floor, nails or screws are not necessary, and the mastic material will serve to unite the whole of the floor substances in one thickness from the floor above to the ceiling below into a solid cohesive and compact mass. Felt, sand, or blown slag may also be used for filling up the floor. The space between the floor and the ceiling may be reduced. The gain in safety is very great, as thus the air-passages under the floor are closed, while the cost of construction has been ascertained to be less, all things considered, than that according to the present method of constructing concrete floors.

661, Improved Ventilator, Edward Woolfenden.

The points aimed at by this invention are simplicity and economy in ventilation. It is chiefly serviceable for workshops or large rooms. A metal casing is fixed in the roof of the building which contains a hollow metal tube or cylinder, the upper and outer end of which projects beyond the casing and terminates in a cap or cowl of the hood form with a feather or tail to keep the opening facing the direction of the wind. The metal tube is perforated at its lower end, and projects into the room, and it is closed near the bottom of the tube by a hinged door or valve which is opened or closed by a chain to admit more or less fresh air as required. The casing round the tube is open and projects down into the room to be venti-

lated. The hot or foul air passes from the room up through this space, and is free to escape under a rain cover into the open air.

108, Improvements in Ventilators. Thomas Jones.

Simplicity is here the point aimed at, to prevent them getting out of order, and at the same time to insure their perfect efficiency. One form is adapted to admit fresh air, and the other to draw off foul air. The apparatus for drawing off the foul air consists of a box or case made of cast iron, with a slot or orifice at or near the top of its front side, and a similar one at or near the bottom of the back. The case may be formed with a flange in front made the full width of the chimney, and of a depth equal to the thickness of the bricking of the chimney-breast to which it is to be applied. The orifices may be covered with fretwork and ornaments with any suitable design. A hole is cut in the chimney-breast at the top of the room to be ventilated, and the chamber or case inserted so that the front side is flush with the inside of the wall of the room, and the back flush with the inside of the chimney, all irregularities and cracks being filled up with plaster and cement. It is maintained that a ventilator so constructed will syphon or draw off the hot vitiated air in the top of the room, but will not permit the smoke to enter the apartment. A similar case or chamber is made and fixed for the admission of fresh air, but on this a perforated metal plate is adjusted to form divisions, and cause the air to flow to the outlet leading it to the apartment.

### APPLICATIONS FOR LETTERS PATENT.

*Oct.* 31.—14,393, J. Stansfield, Manufacture and Laying of Asphalte.—14,398, G. H. Brown and A. Brown, Domestic Fireplaces.—14,430, A. B. Joy and J. J. Lewen, Making Imitation Marble.—14,443, A. Putney, Wood Flooring, Ceilings, and Dados.

*Nov.* 1.—14,463, E. L. Stacey, After-flush to Water-closets.—14,480, H. C. Gilchrist and C. Bellamy, Gas Pliers.—14,482, J. Peirce, Wood-planing Machine.—14,487, H. Thompson, Stoves and Grates.

*Nov.* 3.—14,511, F. Cuntz, Intermittent Flushing Apparatus.—14,514, W. Heatley and G. Hutchins, Raising or Lowering Builders' Materials, &c.—14,521, H. Curzon, Filtering Rain-water in its flow from Roofs to Tanks.—14,522, F. Jupp, Automatic Door-closer.

*Nov.* 4.—14,554, J. Trolley, Air-tide Ventilator.—14,567, G. Connell, Dormer Windows.—14,585, W. Buckwell, Boring and Excavating Apparatus.

*Nov.* 5.—14,611, J. Howard, Automatically Regulating the Closing of Doors.—14,614, W. Corteen, Opening and Closing Windows.—14,616, E. Shrimpton, Glazing Roofs, &c.—14,618, A. Parkinson, Stench Traps.—14,621, J. Hatfield, Manufacture of Artificial Stone.

*Nov.* 6.—14,648, J. Samuel, Metallic Roofing Slate.—14,687, W. R. Lake, Supplying Fresh Air to Dwelling-houses.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

2,984, F. George, Connexions for Lead Pipes, &c.—11,718, R. Stanley, Chimney Tops or Ventilators.—12,942, J. Dixon and C. J. Appleby, Links for Roofs.—13,016, A. G. Browning, Flushing Cisterns for Water-closets.—13,181, J. Rogers, Temporary Closing of Openings in Fireproof Partitions.—13,339, J. S. Bruce, Apparatus for Opening, Closing, and Locking Ventilators and Casements.—13,355, W. Smith, Waterproof Cement.—13,375, J. Main, Iron or other Metallic Roofs.—13,389, H. Smith and D. Smith, Window Fasteners.—13,626, E. Wood, Composition for Washing and Renovating Stonework.—13,684, S. Pooley, Machines for Sawing Timber.—13,700, G. Coultas, Pipe Joints.—13,779, J. Walker, Attaching Door-knobs to their Spindles.—13,907, E. Newman, Window-sash Fastener.—14,010, H. J. Cooper, Manufacture of Portland Cement.—13,379, A. Cuff, Improvements in Balconies.—13,430, P. A. Ames, Construction of Ceilings, &c.—13,364, C. Conzaga, Veneers.—13,692, A. L. Dennison, Cutting Wood for Parquetry and Marquetry Work.—13,914, J. James and C. James, Machinery for Sawing or Cutting Wood.—13,915, P. Rees, Protecting the Edges of Saws and other Tools when not in use.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

46, E. L. Garbett, Fireproof Building.—953, W. E. Baker, Plastering Machines.—1,707, E. W. Harding, Manufacture of Portland Cement.—1,874, J. Swindells, Slotting Wood transversely or diagonally.—1,884, H. J. Johnson, Manufacture of Portland Cement.—13,021, A. McMillan, Door-springs.—13,053 and 13,054, W. H. Lindsay, Girders for Fireproof Structures.—1,200, P. Scholes, Construction of Fireproof Floors and Ceilings.—1,427, F. Brown, Window-sash Fasteners.—2,173, T. Atkins, Fixing Knobs, Handles, &c., to their spindles.—2,377, W. Beddows, Chimney-pots.—3,363, J. Elliott and F. J. Parsons, Manufacture of Artificial Stone, Paving Slabs and Blocks.—5,222, J. C. Bothams, Chimney-tops.

## RECENT SALES OF PROPERTY.

NOVEMBER 6.

By NEWBON & HARDING.

Finchley—Elm Park-road, five plots of freehold land ..... £400

By MARSH, MILNER, & LANGTON.

Brompton—Edith-grove, Ground-rents of 42*l.* a year, reversion in 42 years ..... 1,480
Fulham-road, Ground-rents of 34*l.* a year, reversion in 42 years ..... 1,255
Twickenham—Ford-place, five freehold and copyhold cottages ..... 800
The Reversion to one-fifth share of leasehold houses, yielding 364*l.* 8*s.* a year, and to 650*l.* cash, life aged 81 years ..... 250

NOVEMBER 7.

By HERRING, SON, & DAW.

Clapham—Thornton-road, Westfield House, and 3¼ acres, 40 years, ground-rent 62*l.* ..... 2,125

NOVEMBER 11.

By W. B. HALLETT.

Newington-causeway—29 to 43 odd, Uxbridge-street, 24 to 30 even, Devonshire-street, 13, 14, and 15, Linwood-place, and a ground-rent of 12*l.* a year, 25 years, ground-rent 52*l.* 18*s.* ..... 1,230
Harrow—Palmerston-road, The Poplars, freehold... 560

By H. A. COX.

Bermondsey—32, Jamaica-road, 33 years, ground-rent 4*l.* 10*s.* ..... 420

By VENTOM, BULL, & COOPER.

Lillie-bridge—Lillie-road, Ground-rent of 10*l.* a year, reversion in 48 years ..... 255

By DEBENHAM, TEWSON, FARMER, & BRIDGEWATER.

Lindfield, Sussex—The Finches, and 26*a.* 3*r.* 29*p.* freehold ..... 17,100
Brixton—1 to 5, Townley-cottages, freehold ..... 1,100
London Docks—80, 81, and 82, Pennington-street, freehold ..... 695

By — CRONKS.

Chiddingstone, Kent—Little Sidcup farm, about 8 acres, freehold ..... 800
Hartley, Kent—A plot of freehold land, 4*a.* 1*r.* 22*p.* 85

NOVEMBER 12.

By J. P. LASH.

Limehouse—2, 3, and 4, Wilson's-place, freehold .. 580
South Hackney—25, Cassland-crescent, 61 years, ground-rent 6*l.* 5*s.* ..... 520

NOVEMBER 13.

By T. DANN.

Westminster—13, Great Queen-street, freehold 4,700

By NEWBON & HARDING.

Islington—127 and 129, Upper-street, freehold, area 5,500 ft. ..... 3,380
Highbury—149, Petherton-road, 65 years, ground-rent 7*l.* 7*s.* ..... 670
Upper Holloway—42, Kingsdown-road, 74 years, ground-rent 6*l.* 6*s.* ..... 360
69, Cromwell-road, 85 years, ground-rent 6*l.* ..... 155
Hampstead—57, Guyton-road, 84 years, ground-rent 8*l.* ..... 780

By E. STIMSON.

Clapham—6, Gaskell-road, 77 years, ground-rent 5*l.* ..... 320
Camden-town—13, Lyme-street, 54 years, ground-rent 8*l.* ..... 560
Islington—8, Albert street, 63 years, ground-rent 6*l.* ..... 340

By C. C. & T. MOORE.

Mile-end—12, Chapel-terrace, 58 years, ground-rent 3*l.* 10*s.* ..... 380
Leytonstone—5, Albert-terrace, The Ruby Beer-house ..... 400
Stratford—25, Manbey-grove, 478 years, ground-rent 3*l.* 5*s.* ..... 315
Bermondsey—26-33, Hickman's Folly, freehold ... 800
St. George's-in-the-East—1-9 odd, Yule-court, 48 years, ground-rent 17*l.* 10*s.* ..... 215
17 and 19, Watney-street, 13 years, ground-rent 16*l.* ..... 210
Ratcliff—5, White Horse-street, freehold and copyhold ..... 345

By C. D. FIELD & SON.

Bermondsey—44, Frean-street, 32 years, ground-rent 1*l.* 10*s.* ..... 170
10-13, Drappers-road, 52 years, ground-rent 18*l.* 1,100
16, 21, and 23, Drummond-road, 49 years, ground-rent 4*l.* ..... 560
25-31 odd, Drummond-road, 49 years, ground-rent 8*l.* ..... 705
Rotherhithe—76 and 78, Rotherhithe-street, freehold ..... 580
Croydon—Thornton-road, Chestnut Cottage, freehold ..... 700
Thornton-road, Vine Cottage, freehold... 175
A Plot of Freehold Land ..... 200

By S. WALKER & RUNTZ.

Bayswater—98, Norfolk-terrace, 59 years, ground-rent 7*l.* 7*s.* ..... 700
St. George's-in-the-East—19 and 19*a*, William-street; 15, 17, and 19, Samuel-street; and 1, 2, and 3, Elijah-cottages, 17 years, ground-rent 32*l.* ..... 580

## MEETINGS.

MONDAY, NOVEMBER 17.

*Royal Institute of British Architects.*—Mr. Hugh Stannus on "The Architectural Treatment of Cupolas in general, and that of St. Paul's in particular." 8 p.m.

*Leeds and Yorkshire Architectural Society.*—Mr. J. Wreghitt Connon on "The Royal Institute of British Architects."

TUESDAY, NOVEMBER 18.

*Institution of Civil Engineers.*—Discussion on Mr. Jamieson's paper on "Electric Lighting for Steamships." 8 p.m.

*Statistical Society.*—Inaugural address by the President, Sir Rawson W. Rawson. 7.45 p.m.

WEDNESDAY, NOVEMBER 19.

*British Archæological Association.*—(1) Mr. C. H. Compton on "The Roman Bridge recently discovered in the River Trent," (2) Mr. C. Lynam on "The Excavations of Hulton Abbey." 8 p.m.

*Society of Arts.*—First meeting of the 131st Session. Opening Address by Sir Frederick Abel, Chairman of Council. 8 p.m.

*Royal Meteorological Society.*—(1) Mr. Hugo Leupold on "A new Method of reading the direction of the Wind on Exposed Heights and from a Distance." (2) Mr. Alfred N. Pearson on "A Component Anemograph." (3) Mr. C. C. Walker on "The Injury by Lightning (April 28, 1884) to the Duke of Sutherland's Monument at Lilleshall." (4) Col. the Hon. Arthur Parnell on "The Mechanical Characteristics of Lightning Strokes." 7 p.m.

FRIDAY, NOVEMBER 21.

*Architectural Association.*—Mr. George Aitchison, A.R.A., on "The Prospects of Architecture." 7.30 p.m.

## Miscellanea.

**Architecture in Relation to Landscape Gardening.**—The sixth and concluding lecture on the above subject was delivered by Mr. G. Richards Julian, A.R.I.B.A., at the Crystal Palace School of Art on Wednesday afternoon. In continuation of that part of his subject which dealt with garden decorations to harmonise with Renaissance buildings, gate piers, bridges, fountains, pavilions, and seats were in succession considered. Modern architecture, commencing with the Greek revival, and tracing the influence of Sir Charles Barry and his introduction into England of the astylar form of the Early Renaissance, was then described, and followed by a short account of the Gothic revival. Coming to our own day, the rise of the so-called "Queen Anne" revival was reviewed, and present tendencies alluded to. In connexion with this, the lecturer said, "There is a strong feeling afloat that any system of design that may be attempted must be one founded on a due recognition of the needs, the habits, and the social circumstances of the nineteenth century." Mr. Julian then expressed his great satisfaction with the protest, which appeared in a letter from Mr. E. J. Tarver in last week's *Builder*, against the proposed execution of sham mediæval work in the building to be added to the side of Westminster Hall. Modern architecture in France was then described, from the time of Louis XV. to the present day. Defining the aim of the art of architecture as being, in common with all the fine arts, "the expression of that sense of beauty which is a part of human nature," the lecturer went on to point out that the lessons to be learned from a study of the history of architecture were,—that if we would be real artists we must be true,—true to ourselves and to the age in which we live. At the close of the lecture, the Principal of the School of the Art of Landscape Gardening, Mr. H. E. Milner, A.M. Inst. C.E., said that he thought on this occasion they must depart from their usual rule and give Mr. Julian a vote of thanks for his interesting lectures.

**Builders' Benevolent Institution.**—We would commend to the notice of our readers the work of the Builders' Benevolent Institution, some account of which will be found on another page. The Institution has now been in existence for nearly forty years, and has done much good work, but expression has more than once been given to the feeling that it is not so largely supported as it deserves to be by the class for whom it is specially intended, viz., "masters who have been engaged in the building trade and its branches." Some of the risks which are attendant on the pursuit of business by master builders were alluded to by Mr. Ewan Christian, in his speech at their dinner the other evening. The presence of the President of the Institute of Architects on this occasion, and the genial tone of his remarks, were much appreciated by the members of the trade who were present. We understand that a special appeal in aid of the funds of the Institution is about to be made to master builders.

**The Royal Arms.**—Mr. James Hill, of Queen Victoria-street, E.C., whose locks and patent door-furniture have been for many years largely used by her Majesty's Office of Works and other departments of the Government, has just received official intimation from the Lord Chamberlain authorising him to use the royal arms, coupled with the words "By Appointment to the Queen."

**Public Buildings.**—Her Majesty's Office of Works have placed the contract for the next three years and a half for the general repairs to all the Palaces, Houses of Parliament, Courts of Justice, Post-offices, and civil buildings generally in the London District, in the hands of Messrs. Perry & Co., of Tredegar Works, Bow.

**Accident at the Midland Railway Extension Works, Birmingham.** — What might have been an alarming and fatal accident if it had happened during working hours, occurred about 3.30 A.M. on Sunday last at the above works. As it is, it has had no worse effect than to stop the traffic on the Birmingham and Worcester Canal for a time and to fill the railway works with water and *débris*. The canal comes through that part of the town at a high level, and is carried on arches, having a street called the Gullet below. The new railway tunnel runs parallel to this street and at right angles to the canal, and the contractors, Messrs. Firbank, have been obliged to destroy a considerable section of the old water-way and arching to make room for the new tunnel and other works below; but, for the purpose of enabling the traffic on the canal to be continued, they have formed timber aqueducts of just sufficient width to allow of the passage of one boat at a time, with a passing place in the middle of its length. The water in the canal was well stanked or dammed up with sheet piling and puddled clay. But as the excavations here go a depth of some 30 ft. to 40 ft., the whole of the ground adjoining has shifted, and on Sunday morning, when a boatman was taking through his boat, the stank gave way, and let the water of the canal into the works. A provision had been made for such a contingency by having at each end of the aqueduct planks fitted in grooves to stop the water; but one of these barriers had been taken out to allow the boat to pass, consequently the canal emptied itself to the Barr Lock Gates, a distance of some 500 yards, filling the workings, which are still blind at each end, about 25 ft. deep with water and some 200 tons of soil.

**Output of Coal in New South Wales.**—The total output of the New South Wales collieries for 1883 exceeded 2¼ million tons, the exact figures, 2,521,457 tons 1 cwt., being 412,175 tons in excess of the output for 1882, the average price per ton in 1883 being 9s. 6·40d., as against 8s. 11·97d. per ton in 1882. There has been considerable activity in the search for coal during the year, and there is reason to believe that several new collieries will shortly be opened up. A new coal company has been formed, and has started working a seam of coal between four and five miles from the Mittagong Railway Station; and one has been formed to work a coal seam about three miles from the Erith Colliery; the seam is said to be 7 ft. or 8 ft. thick, and a seam of coal, 5 ft. thick, has been struck by boring about one mile south of the Erith Colliery. The Berrima Coal Company, while working the upper seam, is boring for another seam of coal some 60 ft. or 70 ft. deeper. A seam of coal is reported to have been discovered at Bungawalbyn, about twenty-five miles from Lismore, but nothing has been done on it yet. A seam of coal, 2 ft. thick, containing 15 in. of good bright clean coal, was passed through at Grafton, at a depth of 183 ft., while boring for water. Coal of the best quality, and in very large quantities, is said to exist in the Coolah Valley.—*Iron*.

**Birmingham Architectural Association.** The annual *conversazione* of this Association was held last week, at Queen's College, to inaugurate the opening of the eleventh session. There was a large loan collection of drawings from London in addition to those contributed by members, together with specimens of tapestry, wrought-iron, and other materials of architectural interest. The president, Mr. F. B. Osborn, opened the proceedings with an inaugural address, in which he entered minutely into the work of the various classes and the general progress of the Association. The following is the list of officers for the ensuing session:—President, F. B. Osborn, F.R.I.B.A.; Committee: Chairman, W. H. Kendrick; ordinary members of Committee, O. Essex, A.R.I.B.A., F. G. Hughes, A.R.I.B.A., C. E. Bateman, T. W. F. Newton, F. E. F. Bailey, A.R.I.B.A., H. H. McConnal, A.R.I.B.A, E. Wood; Hon. Treasurer, A Reading, A.R.I.B.A.; Hon. Librarian, A. Hale; Hon. Secretary, Victor Scruton, 13, Corporation-street, Birmingham.

**Sanitary Assurance Association.**— At the ordinary Council meeting of this Association, held at 5, Argyll-place, W., on Monday last, Sir Joseph Fayrer in the chair, it was arranged for four lectures to be given on sanitary subjects during November and December, to which admission will be free.

**New Club Buildings in Piccadilly.**—On the north side of Piccadilly, not far from Hyde Park Corner, and overlooking the Green Park, an extensive block of buildings, designated the Badminton Club, is at present in course of erection. The buildings cover a ground area of 8,000 ft. The Piccadilly elevation is in Portland and Bath stone, and is 88 ft. in height to the apex of a bold and lofty gable, flanked with carved finials, at the east end of the frontage. The building contains five floors, the central portion of the ground-floor, to the depth of between 35 ft. and 40 ft., consisting of a large shop. The first, second, and third floors have mullioned bay windows, with balconies. The fourth floor is lighted by dormer windows. The entrances lead to a flower court on the ground-floor at the bottom of the central area or well-hole. It is 27 ft. square, and is intended to have a floor paved with mosaic. Adjoining are several bath and dressing rooms, whilst at the rear is a servants' hall, together with kitchens and other apartments connected with the cuisine. On the first floor is the morning-room, an apartment overlooking Piccadilly, 38 ft. by 35 ft., and immediately to the rear, on each side of the octagonal open space above the flower court, are the card-room and smoking-room. At the extreme rear of this floor is the coffee-room, a lofty apartment 48 ft. in length, and 26 ft. in width, which is intended to be very richly decorated. The second, third, and fourth floors have each two sitting-rooms at the Piccadilly frontage, and there are besides upwards of forty bedrooms. The members' and strangers' billiard-rooms are on the second-floor. Mr. R. W. Edis, of Fitzroy-square, is the architect, and Mr. T. Boyce, of the Eagle Works, Hackney, is the contractor. Mr. Gregory is clerk of the works, and Mr. Brunton the foreman.

**"International Exhibition. London, 1885."**—Under this title an exhibition is to be held at the Alexandra Palace next year, commencing about the 31st of March next, and remaining open for six months. A prominent feature in the prospectus is that 10 per cent. of the gross receipts from admission-money is to be set apart for distribution amongst the principal London hospitals. For this purpose a committee, composed of the following gentlemen, has been appointed:—Colonel Sir Herbert Sandford, R.A. (chairman), Admiral Sir Edward Inglefield, C.B. (vice-chairman), General Sir Michael Kennedy, K.C.S.I., Sir Henry Pitman, M.D., Sir Andrew Clark, bart., M.D., F. D. Dixon-Hartland, esq., M.P., and George Johnson, esq., M.D. The Exhibition, like those at South Kensington, will not rely simply upon the attractiveness of the exhibits, but will include amusements of a varied nature. The building and grounds are to be brilliantly illuminated by the electric light.

**Glasgow Philosophical Society.** — A meeting for the election of office bearers in the Sanitary Section of the Philosophical Society of Glasgow was held on the 5th inst., Dr. James Christie, A.M., in the chair, who was re-elected President for another year. Mr. W. P. Buchan was elected vice-president in room of Mr. Kenneth Macleod, whose term of office had expired. He was elected a member of Council. Dr. Eben. Duncan, past-secretary, was also elected a member of Council, the new secretary being Mr. William Church, jun. Dr. Christie promised to deliver his presidential address, on zymotic diseases, during the winter, and remarked that he fully expected that Glasgow would be visited by the cholera shortly, and that to make its visit as short and harmless as possible good sanitary precautions must be persevered in.

**West London School of Art.**—In connexion with this school, a travelling studentship, of the total value of 50*l.*, is offered by the Painters' Company, from a fund given by Mr. William List, liveryman of that company, for the encouragement of the study of coloured decoration. The conditions of the competition may be obtained on application to the Head-master (Mr. John S. Rawle), at the School, 155, Great Titchfield-street.

**Dimensions.**—A correspondent in the building trade suggests that dimension-books of every class should be spaced with columns for time of day, wind, weather, and other natural conditions at the time of measuring. There is no doubt the statistics so collected would be very interesting, and probably in the long run useful, but we fear few practical measurers would be properly grateful for such an increase in the bulk of the measuring-book.

**Stamp Duty.**—We have received an official notice from the Commissioners of Inland Revenue, Somerset House, calling the attention of house agents, builders, and the public generally, to the law regulating the stamp duty on agreements for letting lands and unfurnished houses. From this notice it appears that such agreements are chargeable, not, as is often supposed, with the uniform duty of 6d. applicable to ordinary agreements under hand, but with the same rates of duty as if they were actual leases for the term and consideration mentioned, according to the following scale (if the term is definite, and does not exceed thirty-five years, or is indefinite):—

| | | | | | |
|---|---|---|---|---|---|
| Not exceeding 5*l.* per annum ..... | | | | £0 | 0 6 |
| Exceeding 5*l.* and not exceeding 10*l.* ..... | | | | 0 | 1 0 |
| ,, 10*l.* | ,, | ,, | 15*l.* ... | 0 | 1 6 |
| ,, 15*l.* | ,, | ,, | 20*l.* ..... | 0 | 2 0 |
| ,, 20*l.* | ,, | ,, | 25*l.* ..... | 0 | 2 6 |
| ,, 25*l.* | ,, | ,, | 50*l.* ..... | 0 | 5 0 |
| ,, 50*l.* | ,, | ,, | 75*l.* ..... | 0 | 7 6 |
| ,, 75*l.* | ,, | ,, | 100*l.* ..... | 0 | 10 0 |
| Exceeding 100*l.*, for every full sum of 50*l.*, and also for any fractional part of 50*l.* thereof.. | | | | 0 | 5 0 |

Such agreements, if not drawn upon stamped paper, must be presented for stamping within two months after the date of the first execution thereof. After that time, a penalty of 10*l.* may be imposed. An unstamped or insufficiently stamped agreement cannot be enforced in any Court of Justice, or before any arbitrator or other competent authority. A lease made subsequently to, and in conformity with, an agreement duly stamped is chargeable with the duty of 6d. only. Postage-stamps cannot be used for stamping agreements for letting lands and unfurnished houses (other than dwelling-houses, or any part thereof, for any definite term less than a year, where the rent does not exceed 10*l.*), but such agreements must either be taken to Somerset House to be stamped with the proper impressed stamp, or be left for that purpose at the office of a Distributor or Sub-Distributor of Stamps, or of a Postmaster.

**Liverpool Engineering Society.**—At the meeting held on the 5th inst., at the Royal Institution, Colquitt-street, Mr. R. R. Bevis, jun., president, in the chair, a paper was read by Mr. W. E. Mills on "Steam as a Mode of Heating." The author began his subject by pointing out the advantages possessed by steam over hot water as a mode of heating large buildings. Steam, from its own elasticity, would permeate every part of the system of pipes in which it was employed equally, while water, being itself inert, required power to drive it, especially if the length of piping was at all extensive, and this involved the use of a boiler of considerable dimensions. Owing to the severity of the winters in America rendering some means of artificial heating absolutely necessary, even in dwelling-houses and buildings of moderate dimensions, more powerful than a hot-water apparatus could supply, steam had been adopted in that country to a great extent.

**Building Stone in Queensland.**—A correspondent writes:—"Hitherto, in the absence of any good building stone within a reasonable distance from Brisbane, it has been the practice to employ bricks, covered with cement to imitate stone, or, when a public building is erected, stone has had to be imported at considerable expense from New Zealand or New South Wales. Within the last few months, however, some excellent building stone has been discovered within fifty miles of Brisbane, upon the estate of Mr. Robt. Wm. Le Grand, J.P., at Wooyumboong, while excavating some cellars for a new house. This stone has been reported upon by the public analyst, and pronounced to be of a very durable and non-friable nature, so there is every prospect of its speedily taking the place of the stucco now so commonly employed. Bricks are now fetching from 40s. to 50s. per 1,000, and cement is selling at 16s. to 17s. 6d. by cask of 400 lb."

**Society of Arts.**—The first meeting of the hundred and thirty-first session will be held on Wednesday next, when the opening address will be delivered by Sir Frederick Abel, Chairman of the Council. Among the Cantor lectures promised for the ensuing session are series on the "Use of Coal Gas," by Mr. Harold B. Dixon; on "Artists' Colours," by Mr. J. M. Thomson; and on "Carving and Furniture," by Mr. J. Hungerford Pollen.

**The Supply of Teak.**—A special prize of 50*l.* has been awarded by the Executive Committee of the International Forestry Exhibition to Mr. W. T. Oldrieve, of H.M. Office of Works, Edinburgh, for his essay upon "Maintaining the Supply of Teak."

**Bedminster (Bristol).**—The corner and memorial stones of the new schools in connexion with Hebron chapel have been laid. The premises are intended to accommodate 1,000 scholars. The site is at the back of the present chapel, and, extending out to Sion-road, has a frontage of 40 ft., the depth to the chapel being 116 ft. On the ground-floor there is to be a large room open to the roof, 71 ft. by 25 ft. Here will be the secretary's room, library, boys' and girls' entrances, &c. The first floor is to be arranged in two tiers, providing fifteen class-rooms. The front of the new building will be in the Elizabethan style, and the whole will be built of brick with freestone dressings. Mr. A. H. Beaven has accepted the contract for 3,295*l.*

**Examination of Local Surveyors and Inspectors of Nuisances.**—At an examination held by the Sanitary Institute of Great Britain on the 6th and 7th of November, twenty-seven candidates presented themselves,—eight as local surveyors, and nineteen as inspectors of nuisances. The Institute's Certificate of Competency to discharge the duties of local surveyor was awarded to Messrs. B. R. Phillipson, J. Eworth, and Gilbert Thomson; and Certificates of Competency to discharge the duties of inspectors of nuisances to Messrs. W. Daley, J. Brooks, J. Houghton, J. Keal, T. Wheat, W. Fraser, J. Loach, J. Marshall, F. S. Winser, J. T. Simpson, A. H. Rollinson, and Ben. Potter.

**Fire-resisting Floors.**—We have received from Mr. H. H. Bridgman, the architect for the new block of the St. Pancras Workhouse, a report made by Captain Shaw, at the request af the St. Pancras Board of Guardians, on the fire-resisting qualities of the building, which is floored on Clark & Bunnett's "Ligno-concrete" system. Captain Shaw reports very favourably of this and of the fire-resisting properties of the building generally. The St. Pancras Guardians, in asking for a special report by the chief officer of the Fire-brigade, have set an example which might well be followed in similar cases.

**Fire at a Builder's.**—Early on Thursday morning last, a fire occurred on the premises of Messrs. J. Simpson & Son, builders and contractors, Paddington-street. A building, 50 ft. by 30 ft., and workshops and stacks of timber in the yard, were destroyed.

**The Patent Laws.**—At a meeting of the executive council of the Inventors' Institute, held at their rooms, Lonsdale-chambers, Chancery-lane, on Monday last, it was resolved "that the first meeting in every month should be devoted to the consideration of the Patents, Designs, and Trade Marks Act of 1883; that the Act should be gone through regularly by sections; and that a report should be drawn up of the result of the discussions; and that visitors should be invited to attend these meetings. The first meeting for the consideration of the Act will take place on Monday, December 8th.

**Hydraulic Power.**—Messrs. Clark, Bunnett, & Co., Limited, have just completed fixing their hydraulic lifts to the General Post-offices at Manchester and Liverpool, and have received instructions from the Corporation of Birmingham to fix one of these lifts at the Smithfield Market, Birmingham. —— Messrs. Archibald Smith & Stevens, of Queen's-road, Battersea, have been instructed to erect, for Messrs. Spiers & Pond, at the Windmill Restaurant, Cannon-street, one of Stevens & Major's patent hydraulic suspended lifts, to be worked in connexion with the Hydraulic Power Company's mains.

**Hampton's Home for Indigent Blind People.**—This institution, situate at Putney Bridge-road, appears to be doing a good work. Provision has lately been made for fifty additional beds for aged blind persons without means, and we are informed that the recipients of its benefits include members of all branches of the building trades. The committee are making strenuous efforts to extend the work, but for this funds are needed. As will be seen by an advertisement in our present issue, a concert in aid of the institution is to be held at the Horns, Kennington, on Wednesday next.

**Leeds and Yorkshire Architectural Society.**—At the second meeting of this session, on the 17th, Mr. J. Wreghitt Connon will read a paper on "The Royal Institute of British Architects." Among further papers announced are "English Homes in the Seventeenth Century," by Mr. J. A. Gotch (January 12th); "Architectural Competitions," by Mr. Cole A. Adams (February 23rd); and "The Architecture of the Last Half-Century," by Mr. Walter Smith (March 23rd).

## CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Street Watering Posts, &c. | Southend Local Board | A. Clayton | Nov. 17th | ii. |
| Blue Guernsey Granite and Siftings | Dover Town Council | *Official* | Nov. 18th | ii. |
| Main Sewerage Works | Blackpool Corporation | T. Sunderland | Nov. 20th | xx. |
| Fittings for Sorting Office, Liverpl. Post-Office | Commissnrs. of Works | *Official* | Nov. 24th | ii. |
| Making up Roads | Wandsworth B. of Wks. | do. | Nov. 25th | ii. |
| Broken Granite | Southgate Local Board | C. Griffin Lawson | do. | ii. |
| Paving | Greenwich Bd. of Wks. | *Official* | Nov. 26th | ii. |
| Wrought-Iron Girder Bridge | do. | do. | do. | ii. |
| Wrought-Iron Fencing | Lyndhurst Burial Brd. | do. | do. | ii. |
| Pipe Sewer | Bexley Local Board | E. R. Boulter | do. | ii. |
| Engine and Boiler Houses, &c. | St. Helen's Corporatn | D. M. F. Gaskin, C.E. | Nov. 28th | ii. |
| Erection of Infants' School, &c. | St. Ives School Board | E. W. Robb | Nov. 29th | ii. |
| Enlargement of Sub-District Post-Office at Peckham | Commissnrs. of Works | *Official* | do. | i. |
| New Museum, Chester | | Thos. M. Lockwood | do. | ii. |
| Erection of Club-House, Neath | Neath Constitutnal Club | | Dec. 1st | xx. |
| Reservoir Tank and Drainage Wrks. S'thmptn | Commissioners of Works | *Official* | do. | ii. |
| Main Drainage Works | Acton Local Board | do. | Dec. 2nd | ii. |
| Completion of New Infirmary | Paddington Guardians | A. & C Harston | Dec. 10th | ii. |
| Erection of Five Houses, Stepney | | C. A. Legg | Not stated | xx. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Assistant Surveyor | Finchley Local Board | 100*l.* per annum | Nov. 22nd | xviii. |

### TENDERS.

For the erection of new house in Brondesbury, for Mr. Thomas Brock. Mr. C. Styche, architect:—

| | |
|---|---|
| W. Hodgson | £3,340 0 0 |
| Rider & Son | 2,868 0 0 |
| H. B. Oldrey | 2,849 0 0 |
| S. J. Dainton | 2,795 0 0 |
| G. & W. Watson | 2,787 0 0 |
| W. Oldrey | 2,630 0 0 |
| A. Herris | 2,553 0 0 |
| W. Taylor & Co. (accepted) | 2,444 0 0 |

For taking down 174, Commercial-street, Newport (Mon.), and erecting thereon shop and offices. Mr. E. A. Lansdowne, architect. Quantities supplied:—

| | |
|---|---|
| J. Linton, Newport | £2,789 0 0 |
| Jones & Co., Gloucester | 2,650 0 0 |
| Forse, Bristol | 2,600 0 0 |
| C. Miles, Newport (accepted) | 2,379 0 0 |
| W. Blackburn, Newport | 2,298 0 0 |

Accepted for the erection of "Barrack" buildings at Plymouth, for the Salvation Army. Mr. E. J. Sherwood, architect and surveyor, 101, Queen Victoria-street. Quantities by architect:—

Isaac Foot, Notte-street, Plymouth £2,150 0 0

[Architect's estimate, £2,127.]

For "Barracks," Batley, Yorkshire, for the Salvation Army. Mr. E. J. Sherwood, architect. Quantities supplied:—

| | |
|---|---|
| Wm. Holt, Cheetham, Manchester | £1,750 0 0 |
| E. Chadwick & Sons, Staincliffe, Dewsbury | 1,616 0 0 |
| Parker & Sharp, Bradford-road Batley | 1,599 9 4 |
| Garthwaite & Blackburn, Halifax-road, Dewsbury | 1,532 15 2 |
| Henry Brooke, Knottingley Wells, Batley * | 550 10 0 |

* Joiners' and carpenters' work only.

For alterations and new fittings to the ground floor of the Alfred's Head public-house, Newington-causeway, for Mr. H. R. Cope. Mr. C. Barnard, architect:—

| | Alterations. | Mahogany Bar Parlour. |
|---|---|---|
| Shurmur | £342 0 0 | £243 0 0 |
| F. W. Gill | 315 0 0 | 263 0 0 |
| Canning & Mullens | 305 0 0 | 255 0 0 |
| Mower | 275 0 0 | 260 0 0 |
| J. Beale | 299 0 0 | 240 0 0 |
| W. & F. Croaker (accepted) | 290 0 0 | 195 0 0 |
| Sanders & Son | — | 370 0 0 |
| Warne | — | 232 0 0 |
| Heath | — | 259 0 0 |

*Counter and Pewterers' Work.*

| | |
|---|---|
| Sanders & Son | £247 0 0 |
| Warne | 245 0 0 |
| Heath (accepted) | 197 0 0 |

For proposed public hall, Greenwich. Mr. W. Rickwood, architect. Quantities supplied:—

| | |
|---|---|
| Mower | £2,986 0 0 |
| Proctor | 2,811 1 3 |
| A. White & Co. | 2,420 0 0 |
| Staines & Son | 2,340 0 0 |
| Pack Bros. | 2,145 0 0 |
| R. & O. Evans | 2,139 0 0 |
| Lonergan | 2,135 0 0 |
| H. & L. Holloway | 2,115 0 0 |

For paving Ravensbourne-street, for Greenwich Board of Works, as a new street:—

| | |
|---|---|
| Marshall | £790 0 0 |
| Woodham & Fry | 649 0 0 |
| Mowlem & Co. (accepted) | 648 0 0 |

For making new road at Walthamstow. Messrs. H. & F. Houghton, surveyors, Old Broad-street:—

| | |
|---|---|
| Pound | £490 7 0 |
| Bloomfield | 435 0 0 |
| Wilson | 419 0 0 |
| Bell | 355 0 0 |
| Woodham & Fry (accepted) | 324 0 0 |

For alterations to the Globe, Goldsmith-row, Hackney-road, for Mr. F. Herbert. Mr. Edward Brown, surveyor, Hanbury-street, Spitalfields:—

| | |
|---|---|
| Kiddle & Sons | £500 0 0 |
| J. Anley | 498 0 0 |
| J. C. Christopher | 439 0 0 |
| C. Marr (accepted) | 432 10 0 |

For restoring the Coat and Badge, Chrisp-street, Pop'ar, for Messrs. Truman, Hanbury, Buxton, & Co. Mr. Ed. Brown, surveyor:—

| | |
|---|---|
| C. Marr | £510 0 0 |
| D. D. & A. Brown | 500 0 0 |
| S. Salt | 420 0 0 |
| S. W. Hawkings (accepted) | 392 0 0 |

For pulling down one and making alterations and improvements to five cottages on the new Maiden Estate, Surrey, for the Trustees of the estate. Mr. J. R. Gover, architect:—

| | |
|---|---|
| Scharien & Williams | £856 0 0 |
| Jones & Edwards | 795 10 0 |
| Wood & Co. | 777 0 0 |
| Davis | 725 0 0 |
| Saunders & Co. | 625 0 0 |
| Knapton & Harding | 550 0 0 |
| Stewart & Co. | 525 0 0 |
| Warr | 425 0 0 |
| Robinson & Miller | 385 0 0 |
| Hayes | 375 0 0 |
| J. Robinson | 360 0 0 |
| Clissold (accepted) | 350 0 0 |

For cottage residence, Send Tannery, near Woking, Surrey, for Mr. Samuel H. J. Ashford. Messrs. Peak, Lunn, & Peak, architects, Guildford:—

| | |
|---|---|
| T. E. Downes, Guildford | £476 0 0 |
| Whitburn, Woking | 475 10 0 |
| Christmas, Ripley | 460 0 0 |
| Shears, Woking | 398 0 0 |
| Banham, Stoughton (accepted) | 357 10 9 |
| Wilson, Woking (withdrawn) | 313 0 0 |

For pair of cottages and small stable, &c., Martyr-road, Guildford, for Mr. R. Shillingford. Messrs. Peak, Lunn, & Peak, architects:—

| | |
|---|---|
| Butt, Woking | £925 0 0 |
| G. & R. Smith, Guildford | 720 0 0 |
| Strudwick, Guildford | 720 0 0 |
| Billimore & smith, Guildford | 713 0 0 |
| Tribe & Robinson, Guildford | 694 19 6 |
| Sayers, Guildford | 693 0 0 |
| Glew, Worplesdon | 690 0 0 |
| Skuse, Guildford | 675 0 0 |
| Elliott, Guildford | 595 0 0 |
| Carrington & Peto, Guildford * | 575 0 0 |
| Banham, Stoughton (withdrawn) | 519 10 0 |

* Accepted.

For new entrance lodge, Summersbury, Shalford, near Guildford, for Mr. Edwin Ellis. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

| | |
|---|---|
| Pink, Milford | £474 0 0 |
| Wells, Bermondsey | 445 0 0 |
| Mitchell Bros., Shalford (accepted) | 395 0 0 |

For rebuilding 58, Broad-street, Ratcliff. Mr. J. Sargeant, architect. Quantities supplied:—

| | |
|---|---|
| Deacon | £800 0 0 |
| Parker | 731 0 0 |
| Hack | 692 0 0 |
| Richards | 692 0 0 |
| A. White & Co. | 687 0 0 |
| W. Holt | 659 0 0 |
| Oliver | 657 0 0 |
| Jones & Edwards | 641 0 0 |
| Doughty | 606 0 0 |
| Scharien & Williams | 6?4 0 0 |
| Weir | 584 0 0 |

For the construction and erection of a Propagating House at the Abbey Park, Leicester, for the Corporation of Leicester. Mr. J. Gordon, Borough Surveyor :—

| | |
|---|---|
| Bowles & Son, Leicester | £230 5 0 |
| T. D. Brown, Leicester | 225 10 0 |
| Messenger & Co., Loughborough | 221 0 0 |
| T. Sharman, Leicester | 214 10 0 |
| W. H. R. Sharman, Leicester | 191 8 10 |
| A. Plant, Leicester | 188 10 0 |
| T. & H. Herbert, Leicester | 188 0 0 |
| J. O. Jewsbury, Leicester | 186 10 0 |
| Meikle & Philp, Edinburgh | 186 0 0 |
| F. Major, Leicester (accepted) | 183 5 0 |

For hurdle fencing in St. Margaret's Pasture, Leicester, for the Corporation of Leicester. Mr. J. Gordon, M. Inst. C.E., Borough Surveyor :—

| | |
|---|---|
| Cort & Paul, Leicester | £230 0 0 |
| R. Edlin, Leicester | 194 12 6 |
| Wright Bros., Leicester | 190 15 6 |
| Vipan & Headley, Leicester | 185 8 0 |
| E. C. & J. Keay, Birmingham | 179 18 6 |
| Hydes & Wigfull, Sheffield | 174 15 6 |
| W. T. Burbidge, Leicester (accepted) | 148 11 6 |

For hurdle fencing along the towing-path from Belgrave Lock to Abbey Park-road, Leicester, for the Corporation of Leicester. Mr. J. Gordon, Borough Surveyor :—

| | |
|---|---|
| Vipan & Headley, Leicester | £611 19 0 |
| R. Edlin, Leicester | 593 15 0 |
| Wright Bros., Leicester | 590 12 6 |
| Hydes & Wigfull, Sheffield | 567 0 0 |
| E. C. & J. Keay, Birmingham* | 542 12 6 |

* Accepted.

For additional work to stables, and general repairs, at the Blue Yard, Islington, for the London General Omnibus Company, under the superintendence of Mr. G. T. Lanham :—

| | |
|---|---|
| Bolding | £797 0 0 |
| Jackson & Todd | 773 0 0 |
| J. R. Hunt | 704 0 0 |
| Garrud | 697 0 0 |
| Aldridge & Jeavey | 580 0 0 |
| Evans | 574 15 0 |
| Stevens Bros. | 572 0 0 |
| Richens & Mount | 542 0 0 |
| Parker | 519 0 0 |
| Dearing & Son | 490 0 0 |
| Scharien & Williams (accepted) | 487 0 0 |

Accepted for alterations and repairs to the Barkworth Arms, Barkworth-road, S.E., for Messrs. Smith, Garrett, & Co. Messrs. Hills & Fletcher, architects :—

| | |
|---|---|
| C. F. Hewlitt | £165 0 0 |

[No competition.]

For alterations and additions to news office, for the Directors of the Grimsby News Company. Mr. E. W. Farebrother, architect, Grimsby :—

| | |
|---|---|
| C. Simons, Grimsby | £405 0 0 |
| R. Hollingworth, Grimsby | 386 0 0 |
| Willows & Roebuck, Grimsby* | 367 0 0 |

* Accepted.

For the erection of new farmhouse, &c., and engine-shed, for the Trustees of Mr. Alfred Hyman Allenby. Mr. E. W. Farebrother, architect :—

| | House. | Engine. |
|---|---|---|
| John Milns, Lincoln | £540 0 0 | £149 0 0 |
| Frank Parker, Binbrook | 505 3 0 | 188 0 0 |
| H. W. Clark, Louth | 500 0 0 | 185 0 0 |
| C. Mackarill, N. Thoresby | 497 7 7 | 184 0 9 |
| S. Simonson, Grimsby | 492 0 0 | 190 10 0 |
| Riggall & Hewins, Grimsby | 473 16 0 | 152 15 0 |
| Joseph Jessup, Grimsby | 399 0 0 | 158 0 0 |
| G. S. Mashford, Cleethorpes | 387 10 0 | 134 10 0 |
| John Holmes, Wainfleet | 425 0 0 | 145 0 0 |
| Cooper Snowden, Grimsby | 384 10 0 | 125 0 0 |
| Janney & Hill, Fulstow* | 383 4 11 | 136 18 0 |

* Accepted.

For additions to drapery establishment, Market-place, Great Yarmouth, for Mr. G. B. Palmer. Messrs. Bottle & Olley, architects :—

| | |
|---|---|
| B. Springall | £1,410 0 0 |
| Rand & Cooper | 1,408 0 0 |
| I. S. Cooper | 1,352 0 0 |
| J. F. Bray (accepted) | 1,331 0 0 |
| *Gas Fitting.* | |
| Gray & Palmer | 38 0 0 |
| Barge & Freeman (accepted) | 29 15 0 |

For the erection of two villa residences at Woburn Sands, Bucks, for Mr. R. Newton. Mr. F. T. Mercer, architect, St. Paul's-square, Bedford. Quantities supplied :—

| | |
|---|---|
| E. George, Woburn Sands | £1,020 0 0 |
| G. Harrison, Bedford | 999 0 0 |
| T. Laught n, Bedf rd | 980 0 0 |
| J. Whiting, Woburn Sands | 960 0 0 |

For new roof over the stage and auditorium, at the Surrey Theatre, for Col. Temple Temple West. Mr. Harry Percival, architect, 2, Great George-street, Westminster Quantities supplied by the architect :—

| | Credit old Materials. |
|---|---|
| J. Gregory, Clapham Junction | £786 — |
| H. Hammond, Finsbury Park | 770 27 |
| Janson & Co., King Henry's-road | 678 20 |
| Laing & Co., Duke-street, Strand | 660 13 |

For laying 4 in. cast-iron main and supplying fire appliances at the Surrey Theatre, Blackfriars-road, for Col. Temple Temple West. Mr. Harry Percival, architect. Quantities by the architect :—

| | |
|---|---|
| Bunney & Sons, Victoria-street | £175 0 0 |
| Shand, Mason, & Co., Upper Thames-street | 165 0 0 |
| Merryweather & Son, Greenwich | 157 1 3 |

For the erection of engineer's shop, for Messrs. Palmer & Co., oil-refiners, Stratford :—

| | |
|---|---|
| J. Morter | £207 0 0 |
| Wm. Gregar | 173 0 0 |
| J. Abraham (accepted) | 165 0 0 |

Accepted for alterations and repairs to the Globe Tavern, Crutchedfriars, Mark-lane, for Mr. James Keene :—

| | |
|---|---|
| C. F. Hewlitt | £256 0 0 |

[No competition.]

*New Road, Britann a Park Estate, Hampstead.*—In the list of Tenders for this work given in the *Builder* of the 1st inst., Messrs. A. & F. Culverhouse's tender is given as amounting to £3,270. This should have been £2,270.

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# The Builder.

VOL. XLVII. No. 2181. SATURDAY, NOVEMBER 22, 1884.


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### *Earthquake and English Architecture.*

THE shock of earthquake felt in Yorkshire at 5h. 10m. p.m. on the 14th of November current was an alarm rather than a disaster. But it was an alarm, in the true sense of the word (that is, a call to arms), which it would be folly to neglect for fear of being called alarmists. Coming after the more serious shock felt some little time since in Essex, it is enough to show that we have no reason to place implicit reliance on that secular impunity from seismic action which we have so long happily experienced. Geology appears to indicate that the subterranean energy acts through great cycles of time, of the cause and the measure of which we are ignorant. And at all events it is indisputable that the geological strata of England which were deposited before the great upheaval of the North of England (the seventh of the great seismic elevations traced by D'Orbigny), have been in some places shattered by earthquake in a manner to which we know no parallel. When the line of the South Wales Railway, which runs through a district of great geological antiquity, was in course of construction, it became important to utilise the stone of the country for the construction of the railway bridges and stations. Between Carmarthen and Haverfordwest quarry after quarry was opened for this purpose, but opened only to be abandoned. Hard grit stones of the carboniferous series were met with, and on the first baring of the surface it appeared as if the quarrymen only encountered such schistose or laminated beds as often form the upper strata of sound rock, as, for instance, in the oolitic beds of the Cotswold range. But as depth increased, and the expense of quarrying augmented, the desired thick and sound beds failed to appear. Stone there was in abundance, hard and durable, but so shaken in its structure as to yield no blocks fit for the service of the builder. The expense thus caused was considerable; and it ultimately proved that it was only in the mountain limestone, or in those peculiar beds which in Pembrokeshire bear the name of calp, that stone fit for railway bridges could be expected with any certitude. The beautifully coloured sandstones of the trias, which had been used by Nash for the restoration of St. David's Cathedral, were brought, at great expense, from the vicinity of St. David's, for the sills and quoins of the station buildings at Haverfordwest. These beds, deposited after the period of upheaval to which we refer, were regular and unshaken; they worked freely, and yielded the most beautiful results when freshly wrought. But they had no durability. They began to decay, as they had done in the cathedral, almost as soon as the buildings were completed, and were only saved from crumbling away by being painted over with a liquid silicate. This, of course, is beside the question of earthquake; but it forms part of the experience collected that shows how violent was, at an early period, the seismic action in this part of England. Much the same experience was attained, about the same time, in Cornwall, where quarries of the most beautiful green and red serpentine, bought and wrought at high prices, were found to be so shaken throughout as only to afford materials for articles of very small size; the slabs and columns which were confidently expected being entirely unproducible from the quarries.

England, then, at a remote period of time, must have been, at least in some parts, as repeatedly and violently shaken by earthquakes as any part of the world of which we have the geological record. That a seismic period may be again setting in is, although we trust highly improbable, at all events not impossible. As to the effect of any such change on the houses of many of our vast centres of population, it is perhaps useless to inquire. But the case is different when we remember that there are from 40,000 to 50,000 houses now in course of construction in England and Wales, and that, taking the year round, we daily turn out upwards of 200 houses in every successive week. With regard to, at all events, some of them, the architect will do well to inquire, "How do they build in countries known to be subject to earthquake?"

The destructive force of earthquake is encountered by the architect in three different manners. In Italy, earthquakes are recurrent. They are nowhere unknown in that peninsula, and Calabria is the very cradle of the scourge. And it may be added, as illustrating the coincidence of the shock of the 14th with a high state of the barometer (which we found to read 30·78 in. at 200 ft. above sea level on the morning of the 15th), that in Italy it is said that earthquakes may be expected if the mercury of the barometer approaches the height of 31 in. The precautions of the Italian architect take the form of giving to his work a solidity to which we are unaccustomed in England. In Naples a house,—most of them are of very large size,—is built with the purpose of standing, without very material repairs, for 100 years. Within that time it is anticipated that it will be more or less damaged by earthquake. But the readiness with which the Italian mason, commanding as he does such admirable mortar and cement, fills up cracks and underpins settlements caused by earthquake, should be seen to be appreciated. The noble palaces of Naples and of Caserta, the work, if we do not err, of Van Vitelli, show seams and cracks that can readily be referred each to its special year of earthquake. We cannot, at the moment, state the thickness of the walls. But in the palace which, during the Spanish occupation, was reared for the viceroy of Naples, about the time that the straight course of the Toledo high street was run north and south through the whole length of the city, the walls, we can state from personal knowledge, in the basement story are as much as 17 ft. thick. It is true that the immunity that Naples enjoyed from damage by the earthquake of 1858, which killed 30,000 people in Calabria, in which occurred no fewer than twenty-seven shocks, and which raised the whole circuit of the Bay of Naples 8 in. in level, in one night, as indicated by the water-line of the Mediterranean, was ascribed, by the terror-struck inhabitants, to the special interference of St. Januarius and St. Orosius, whose statues are fixed on a bridge, with menacing gestures directed towards Vesuvius. But it may be conceded that the massive structure of the *palazzi* of Naples had something to do with the escape. We may well doubt whether many buildings in London would have survived such a shock as that.

In Japan, which is another earthquake-haunted region, the movement of the earth is neutralised in another fashion. The buildings of the Japanese architect may be compared to our domestic tables. They are framed substantially of wood, but, instead of being rooted in the ground as are the Italian palaces, they are supported on what may be called legs, or portions of converging framework on which the higher parts of the building rest. Thus, in some cases at least, it is conceivable that a building could actually be displaced by the exertion of adequate power without being overthrown. And thus, in point of fact, that mysterious and terrific earth wave, which no one who has not witnessed it can realise, passes underneath the buildings; which may shake, but which do not fall. Even lofty pagodas defy earthquake in Japan.

The third method is rather to encamp than to build. A military tent is tolerably secure against the earthquake. In Algeria, where towns have been observed from the mountains to crumble and disappear,—an experience which led the observer at first to doubt his command of his own senses,—the camps were uninjured. Nor is it only the bell-tent or the *tente d'abri* of the French soldier, or the black goat-skin

lean-to of the Arab, that thus escapes, like the reed in the fable when the oak was overthrown. Huts of cane, walled with mats of grass, form earthquake-proof, though by no means fireproof, cities.

If there be one class of men more than any other which has cause to dread the occurrence of earthquake in England it is the cheap and unprincipled builder. He would soon find his occupation gone when once it was noted how his houses stood, or rather, did not stand, the shocks. But are we quite right in leaving his punishment to the chance of the appearance of such a *deus ex machinâ*? We might take a leaf with advantage, in this respect, out of the Italian law. The liability of a builder in Italy does not cease with the completion of a house, or even with the payment for the work. We will not state the exact terms without referring to chapter and verse, but for a term of years,—five, we think, or seven,—the Italian builder is responsible for maintenance. Were this plan adopted here it might raise rents, but it would hardly raise the cost of housing a family. Such discoveries, for example, as that the house sewage was conducted through inadequate or ill-laid pipes, would lead to correction at the cost, not of the tenant, but of the builder. The danger, or the fear, of the advent of any of those great scourges in the presence of which man is comparatively helpless, is not to be lightly anticipated. But the policy of the ostrich is not safe, and the echo of the sound which was so alarming at Clitheroe the other evening should not be allowed to die away without the practical result of leading us to inquire—"How are we building the habitations of the people in our great centres of population?"

## ARAB ART.

A MOVEMENT is on foot for encouraging the systematic study of Coptic or Saracenic domestic art in its home and birthplace. It is proposed to form a club of architects, artists, art-students, and others interested in the subject; to appeal to the art-loving public for funds, and with these to send qualified students, male and female, under proper protection and guidance, to Cairo, for the purpose of earnest study of this unique phase of art, for the faithful record of its still remaining, but fast perishing, examples, and for the acquisition and preservation of the movable portions of those Cairene houses whose destruction is either progressing or imminent. The remarkable success of the Egyptian Exploration Society, which is now in the third year of its existence, and, beginning with the enthusiasm of a lady (Miss Amelia B. Edwards) is now assuming larger and larger proportions, and doing more and more useful work, has suggested the formation of a similar association for the rescue and record of the later art of the same marvellous people.

Mr. Reginald Stuart Poole, in an address, on Saturday last, to the members of "the College of Working Men and Women," in Queen-square, Bloomsbury, and to a few invited friends, explained, with his wonted grace and facility, the genesis and *rationale* of this Saracenic art, tracing its history and development in both hemispheres, and its fusion with Western art in the countries which border the Mediterranean. His remarks received most valuable illustration and emphasis from a series of exquisite and quite faithful water-colour drawings of the most remarkable Cairene examples by Mr. Frank Dillon, the interiors being of special and remarkable beauty.

Mr. Poole visited Cairo whilst young enough to be admitted with his mother to the interiors of the various harems, and the impression which the extreme beauty of their architecture and decorations made upon his mind has never been effaced. These he dilated upon with an energy and an enthusiasm which he imparted to his hearers, and it is possible that he will be supported by a strong body of followers. An excellent reason for engaging lady students in the work is that they will be accorded entrance into apartments jealously guarded against the approach of man,—apartments which, moreover, receive the larger share of the decorator's attention.

With this new enterprise we are in entire sympathy, and should like to see the fragment of a Cairene house now at South Kensington form the nucleus of a collection in every sense representative of this beautiful art.

But the ladies and gentlemen who share Mr. Poole's desire to investigate and record the beauties of Eastern art will forgive us if we cannot go the lengths of their leader as to its universal applicability to English wants, or believe with him that it will quite satisfy the yearnings of those "seekers after truth" of whom he spoke. Some hard things were said about our houses,—their square box-like rooms, their ever-recurring right angles, their unadorned surfaces, their many constructive shams, and their multitudinous meannesses. Even the blank windows,—which we do *not* now build,—and other obsolete follies, were once more held up to ridicule, and "thrice he slew the slain."

The horizontal unrelieved ceiling under which we are nearly all compelled to live came in for a large share of vituperation, and its bad habit of occasionally falling down *en masse* having shown itself in the "College for Working Men and Women," itself lent point to his remarks, and brought them home to all his hearers. This is all very well; but when in turn Mr. Poole descanted upon the rectitude of the Cairene constructive scheme, he ventured upon dangerous ground and forgot, not being a practical architect, or overlooked, the fact that the beautiful honeycombed roofs of his loved Eastern halls are plaster shams, and neither better nor worse constructively than the detested Palladian "coffering" which provoked his ire. But worse remains behind. It must have struck his Christian hearers that, after all had been urged in praise of the Saracenic scheme of architecture and decoration, it left a great want unsatisfied,—that something was absent which the Western mind looks for instinctively and must find, if its aspirations are to be satisfied,—

> "So coldly sweet, so deadly fair,
> We start, for *soul* is wanting there."

Geometrical patterns, ever so artfully involved, and glass mosaics, put together ever so cunningly, carry no lesson to the human heart. They may suit the sensuous languor of the Asiatic, but we want a more robust style, and cannot afford to eliminate that priceless "human interest" which characterises all our native efforts.

The Eastern house was built on lines adapted to Eastern life, and the very completeness with which it fulfilled its object unfits it for Western use. We cannot live in enormous tile-lined halls, almost windowless, the light entering furtively through closed clearstory lattices; nor could the active Western mind find satisfaction in dreaming away "the leaden-footed hours" in the midst of the most splendid of divans, and surrounded with acres of meaningless ornament, however gorgeous and costly. A stray example in each important house,—a boudoir, a smoking-room,—we should be grateful for, but nothing more. Let the followers of Mr. Poole set themselves to preserve so much of the art of Cairo as may be in jeopardy, and by patient scrutiny wrest from its Saracenic authors the secret of their wonderful success with a few colours, and having gained this knowledge, let them brighten and beautify our homes to their hearts' content. They have our hearty good will, and shall have our unswerving support.

But no radical change in our native domestic art is wanted from them, and if they attempt such,—as the address hinted,—if they desire to substitute the peculiarities of the Eastern house in its plan, arrangement, and construction for the homes which have grown with our nation's growth and embody, however poorly, our native ideas of comfort, then we say that they are doomed to disappointment and that they imagine a vain thing.

## NOTES.

THE award of the jury in the competition for the new Exchange Buildings Amsterdam, was sent in to the Burgomaster and Town Council on Saturday last, accepted by them, and the numbers and mottoes of the successful designs published in the Amsterdam evening papers of Monday, the 17th. They are as follow:—*Prizes of* 1,000 *Gulden* (83*l.*).—No. 3, "A. G. R."; No. 20, "La Bourse ou la Vie"; No. 38, "Ne(e)derland"; No. 69, the coat of arms of the town of Amsterdam, with the motto, "Je Maintiendrai"; No. 73, "Mercaturæ"; No. 83, "Perseverance"; No. 91, "Ammerack"; No. 106, "Lieven de Key"; No. 150, the coat of arms of the town of Amsterdam, with the motto, "In hoc Signo Floresco"; No. 172, "Y." Of these ten designs the authors of the following numbers were selected to take part in the final competition,—Nos. 20, 73, 91, 150, 172. Two hundred designs were sent in, nearly the whole of which were hung in the rooms of the New Museum. They occupied about 6,700 ft. run, and covered about 40,000 ft. superficial. The five designs selected for the final competition are all Dutch or Flemish in style, and consist of a mixture of brick and stone, in harmony with the surrounding buildings as regards material.

THE case of "Fleet *v.* The Metropolitan Asylums District Board," was decided on Wednesday last in favour of the defendants,—a conclusion which every unprejudiced person must have foreseen from the course of the evidence. The case was, as most of our readers are aware, that the defendants had established a small-pox convalescent camp in such proximity to his residence and house property at Darenth as to be a source of danger. Mr. Justice Pearson found no fault with Mr. Fleet for bringing the action, but found that the defendants had done nothing in which the law was bound to restrain them. It was not, the learned Judge thought, sufficient to prove that infection *might* be conveyed through the air, under the circumstances; it must be proved that it probably would be; and the evidence of the medical experts did not warrant that conclusion. We consider the verdict a right one. No care or precaution seems to have been spared in the construction and regulation of the camp hospital; and, though no one would be particularly anxious to have a camp hospital established a third of a mile from his residential property, it does appear to us that, considering that such hospitals must be somewhere, and their establishment under special circumstances is for the general good, there is a certain amount of selfishness and cowardice in the way in which one owner after another attempts to prove that *here*, at least, where *his* property lies, is not the place for a hospital. We have always believed, and acted on the belief, that those least liable to danger from infection are those who, without neglecting ordinary precautions, think least about it. The persons who are always in a state of scare on the subject remind one of those (spoken of in the Epistle to the Hebrews) "who through fear of death are all their life-time subject to bondage."

WE are informed that the post of Consulting Architect to the Education Department of the Privy Council has been offered to Mr. E. R. Robson, F.S.A., who has undertaken to accept it, as affording more time for private practice than that of Architect to the School Board for London. Of course Mr. Robson has to resign the latter appointment and to undertake to build no more elementary schools. Mr. Robson has carried out, during his connexion with the School Board, an amount of work which furnishes remarkable testimony both to his energy and power of grappling with arduous duties, and his perception for architectural fitness; he has covered London with school-buildings not, we confess, in a style altogether after our own hearts, but, nevertheless, looking eminently like schools, and characterised by sufficient variety, com-

bined with so much general unity of style as may serve to mark them as a class of buildings erected by one special body for one special purpose; and they are all well and solidly built, which is much to say in these days. It is to be hoped Mr. Robson's place will be adequately filled.

LORD BRABAZON, the energetic Chairman of the "Metropolitan Public Garden, Boulevard, and Playground Association," has recently made public two propositions on behalf of this Society, one for the use of the main drainage embankment from Victoria Park to Barking Creek as an East-end boulevard, the other for permission for cricket to be played on a space of 200 by 100 yards on the east side of Kensington Gardens, "between the trees skirting the Serpentine and the semicircular walk from the Magazine to Victoria Gate." Both applications have been refused by the authorities respectively appealed to. The Metropolitan Board of Works, who state that they had already received application from the *employés* at the Beckton Gas Works for permission to use the embankment as a road, do not give their reasons for their refusal. It would have been better if they had done so, as many people will certainly be inclined to think that there were no sufficiently good reasons to give. In refusing to sanction the cricket in Hyde Park, on the other hand, we hold that the Office of Works are perfectly right, and are acting, as Mr. Mitford says, "in the general interests of the public" in refusing the permission. A much more practical and reasonable appeal in relation to open spaces has been made by the Rev. S. A. Barnett in the *Times*, who points out the absurdity of keeping all the Board School playgrounds closed on the Saturday half-holidays, when the children most need a playground. He adds, "At an expense of 5s. a-week the ground around a Board school in this parish has been opened on Saturdays. The streets are clearer and the ground is full. Parents and children are alike pleased." Surely there can be no difficulty in carrying out so sensible an idea in the Board schools generally.

WE hope that the idea which has been talked about during the past week of making a large concert-hall in London to seat 3,000 or upwards, so as to reduce the cost to the hearers of high-class orchestral concerts, will not be rashly taken up. For all the highest purposes of the art, concert-halls beyond the size of,—say St. James's Hall, as a well-known example,—are a mistake. They mean coarse and forced execution and imperfect hearing. It may be better that people who cannot afford high prices should hear great works imperfectly than that they should not hear them at all. Let there be a large people's concert-room built if it is wanted, but not as supplying the deficiencies of St. James's Hall. It is perfectly true that we are most wofully in want of a better concert-room in London, but that is not because St. James's Hall is too small; it is just about the right size, and its acoustic properties are not bad, considering the monstrous initial mistake of building a music room with a semicircular roof, one of the last shapes which ought to have been chosen. We want a new concert-room, because St. James's Hall is the most ill-planned, awkward, and uncomfortable room, both in its seating, in its approaches, and in the malarrangement of its orchestra, that was ever tolerated in a distinctly musical capital, which London is. It is really wonderful how people have borne with it for so long; but whenever the enterprise and the capital are forthcoming for providing London with a really adequate concert-room, do not let the promoters fall into the error of making it larger. It might pay commercially, but it will be a fatal mistake artistically.

UNDER the heading "Our Future Watches and Clocks," attention is drawn in the last number of *Nature* to the probability of the extensive adoption for many purposes of the "more rational method" of counting the hours of the day continuously from midnight through twenty-four hours to the midnight following, instead of the present awkward division into two sets of twelve hours distinguished by "A.M." and "P.M." Our contemporary thinks that the adoption of this method for scientific time-reckonings is not unlikely to be followed, and ought to be followed by its general adoption at no very distant date, and considers the question of the best way of dividing clock and watch faces for the purpose. The division of the circumference into twenty-four hours would, of course, entail a reduction of one-half in the rate of travel of the hour-hand, and therefore could not be applied to any existing clocks or watches; but the addition of an inner circle of figures continuing the numbers up to twenty-four would enable the same movement to register the whole number of hours, the outer circle being read in the morning and the inner in the afternoon. Our contemporary seems to doubt if this would not be the best method for permanent adoption, having regard to the fact that most people read the clock rather by the position of the hand than by looking at the figures. We should be disposed to say that if the change is adopted of counting the whole twenty-four hours through, the hour-hand movement should be altered accordingly, as the logical result for permanent adoption, though of course this would render the change from one system to another more difficult for the moment. The dial should then be numbered "II., IV., VI.," &c., with a mark for the intermediate hours, so as not to overcrowd the figures, and the main stations of the dial would thus still coincide with the habitual division of the 60 minutes into groups of five for the reading of the minute-hand.

A QUESTION was asked on p. 642 as to District Surveyors' fees. Four houses were erected in the case in question; the District Surveyor surveyed them, and sent in his bill for about 10*l.*, with a request for payment. The builder, who was primarily liable for the fees under his contract, was paid in full by his employers, but apparently forgot to pay the district surveyor. The builder became bankrupt, and the bill was sent to his employer direct. It is obviously hard that the building owner should have thus to pay twice over, but the district surveyor would, on his side, consider it a hardship not to be paid at all. None of this would have happened if the receipt for the fees had been shown when the last instalment was paid to the builder. Section 51 of the Building Act is very clear. It enacts that,—"The district surveyor shall be entitled to receive the amount of his fees due to him from the builder employed . . . . or from the owner or occupier of the dwelling," and means for the recovery of the fees by summary process are provided. District surveyors are so far happy that they are creditors by order of the law; but though occupying very satisfactory positions in the main, even they have at times their little difficulties. If they press for their money eagerly they are called greedy, and not very much liked; and if they are easy, good-natured critics think they well deserve to be forgotten by their grateful debtors.

THE preservation of wood has been the subject of constant experiment for the last eighteen years by Dr. Joseph Jones, of New Orleans, who has succeeded in developing a method of arresting decay for great periods of time, which, he believes, might extend to centuries. The process is simple enough, and consists in the saturation of wood with certain bituminous, resinous, and antiseptic substances. The sap and moisture of the wood are transformed into steam, and the albuminous constituents coagulated by heat, the wood thus treated being immediately plunged into a boiling solution of asphalte or bitumen and carbolic acid. The combination may be varied according to the age and density of the wood. As the preservative liquid and wood cool, the vapour is condensed, and the asphalte solution is driven into the pores and permeates the wood. The solvent of the asphalte rapidly evaporates from the surface of the wood after it is removed from the preservative fluid, leaving a smooth, polished surface, impervious to all moisture. Even such a heavy piece of work as a railway bridge may be treated in this fashion by keeping the individual parts in the solution for from two to twelve hours, and then coating each part with asphalte, so that the whole structure presents the appearance of having been carefully painted by hand with durable black varnish. Indeed, Dr. Jones claims for the process that the necessity for painting is done away with, and this would more than equal the expense of treating the wood. The wood may be subjected to the asphalte solution without preliminary heating. A drying-room for the wood, and a tank heated by steam for the preservative liquid, are the only forms of apparatus needed.

ONE of the best furniture woods in India is the Toon wood or Moulmein cedar (*Cedrela Toona*), being light, soft, red, and with no heartwood. As it is impervious to the attacks of white ants it is much valued by builders, especially for door panels and carvings. In Burmah, whence it is exported, it fetches 65 rupees per ton, the cost of cutting and delivery being about 44 rupees. In Bengal and Assam it is the wood principally used for making tea-boxes, but it has been in such demand of late years for this purpose that it is getting decidedly scarce, at all events as large trees, a great number of them having been used to make dug-out canoes. The Bhotias use the wood for shingles, wood-carving, and also for rice-pounders. If not interfered with, the Moulmein cedar grows to a very large size, with a girth of 20 ft. and a height of 80 ft. to 100 ft. of clear stem; and trees of this description may still be seen in forests which have been little worked, such as in the Chittagong Hills.

AT the Madison-square Theatre, New York, the orchestra is placed over the proscenium opening in an open loggia, which is treated in an effective manner architecturally. By this arrangement the space usually occupied by the orchestra is made available for the accommodation of the stall audience. Sketch-plans of the building are printed on the back of the programmes of all theatres in New York, by direction of the municipal authorities, showing the staircases and exit doorways. The value of these plans would be considerably enhanced if they were drawn to scale, which does not appear to be the case in the example before us, in which the size of the staircase and doorways is clearly exaggerated.

IN a recent lecture at the Exhibition of the "Union Centrale des Arts Décoratifs," M. Paul Sédille, whose name has been familiar to our readers from various lectures of his from which we have given extracts, gave a summary of the present architectural situation in France,—"l'architecture Française contemporaine,"—in which, sketching rapidly the history of French architecture for the last century, he dwelt on the great influence which had been exercised by the "École de Percier," and the "École romantique," both which occupied themselves too exclusively with the exterior treatment of architectural design, without taking into account the interior causes which led or should lead to the shaping of the exterior forms. After speaking of Viollet-le-Duc as the regenerator of Middle Age architecture, M. Sédille came to the actual French school of the day, of which the leading masters, omitting those now living, were Duban, Labrouste, Louis Duc, and Vaudoyer (we presume Le Sueur was regarded as representing a period previous to the "État actuel"). These, and others their pupils and followers, had, he thought, by a better directed and more complete study of antiquity, penetrated to something like permanent principles of an architecture which they would fain see "belle, mais vraie; élégante, mais utile; et portant toujours

dans ses manifestations un reflet de l'âme de l'artiste." This last is exactly what some of our own critics tell us it should not have. According to them, architecture was great in the Middle Ages, because it was impersonal. M. Sédille followed these remarks by a raid against the "collectionneurs," the amateurs who modelled their houses after Mediæval châteaux, and fitted them with appropriate furniture made on the pattern of the period. Here we do it at present with Queen Anne furniture. This kind of "vanity" has appeared in many periods and in many lands, and seems inherent in human nature,—of the modern world, at least. The worst of it is, that in all its forms it soon palls.

WE have received from the Fine Art Society a copy of a correspondence between them and the Secretary of the National Gallery, in regard to the concessions lately made to both French and German firms to remove pictures from the walls, and to remove the glass from glazed pictures, for the purpose of engraving or otherwise copying them, while the previous request of the Fine Art Society for similar concessions in order to facilitate the reproduction of pictures by photogravure had been denied. On the face of the case, as stated in the correspondence, it appears to us that both the Fine Art Society and their customers, the English public, have some right to complain. The publications of the Society have been of a very high order; and why the copying of pictures by French and German firms should be specially facilitated in the English National Gallery, to the exclusion of English firms, is a thing we cannot profess to understand, unless it is the result of some special wire-pulling.

THE *Pall Mall Gazette*, which is neither so judicious nor so well informed upon architectural subjects as upon some other matters of public interest, publishes in its last Wednesday's issue a kind of illustrated "puff," for it can be called nothing else, of the work done at the Tower under the instigation of the authorities of the Office of Works. The article appears to be an inspired one, and is as remarkable for its extravagant laudation of the Office of Works as for its simplicity in regard to architectural æsthetics. The extent of this simplicity may be imagined when we say that after speaking with enthusiasm of the "new tower and wall," the writer adds that there is still to be cleared away "another eighteenth-century warehouse *and the sham Gothic horse armoury*" (the italics are ours); in order to clear the view, be it observed, of the other specimens of sham Gothic which have been erected by the æsthetic beneficence of the Office of Works. The *Pall-Mall Gazette* adds that a new and better guide to the Tower is much wanted, and that Mr. Mitford is the person best able to produce it; and if it is not produced quickly the *P.M.G.* will produce one that will be still better. It is to be hoped this interesting competition will come off. Two rival guide-books to the Tower (of course entering into the philosophy of "sham Gothic") by Mr. Mitford and the scribe of the *P.M.G.* will at least be likely to afford amusement, if not instruction.

## THE TOWN BUILDER—MODERN STYLE.

As you step from the dirt and squalor of the narrow street into his place of business, the wide folding doors closing noiselessly as you enter, you find yourself in a region of warmth, comfort, and comparative silence. The open lobby leads into a vestibule: the vestibule into a hall, spacious, clean, light, and gay with a most elaborate encaustic tile floor. Abutting on the long line of corridor to the right are seen a succession of small enclosures parted from it and from each other by glazed mahogany screens. The companion corridor gives access to the rooms of the principals. A gentleman-like young man steps out to receive you. He takes your card and regards it somewhat critically. Mr. —— is engaged just now on an important matter. You guessed as much from the handsomely-appointed brougham at the door, with its pair of sleek ponies and dapper coachman. He will not be long. Then you will wait. You are shown into an adjoining room. It has no outlook, the sashes being filled with ground glass. A series of old almanacks, varnished and framed, with faded chromolithographic pictures on them *apropos* of nothing, adorn the walls. Not very interesting. A good fire is blazing in the grate: a roomy arm-chair invites repose; and the *Times*, cut and dried and neatly folded, is at your service. The musical clink of the masons' chisel is borne faintly from the adjoining yard, reviving the pleasant memories of your youth, and the low plaintive moan of the circular saws, broken by pauses in which they hiss and whirr like a groom at his work, comes muffled through the intervening doors. You yield yourself up to the seductions of these accumulated attractions, and have scarcely got well into a wrangle between a noble lord and a Cabinet Minister when the gentlemanlike young man summons you to the presence. You are not altogether pleased at the interruption. The fact is you are *not* very busy, and could, if left alone, spend half an hour very pleasantly. But if *you* are not busy *he* is, and despatches his callers with the celerity of the fashionable physician. He receives you with perfect address, and although you are a stranger to him you feel instantly quite at your ease. He is a pale handsome man of some five-and-thirty years, neat in his attire, with a cautious reserved manner; a clear, cold, grey eye, and a somewhat hard expression of face: altogether more like a banker than a builder. A confidential clerk occupies a seat at a neighbouring table, and notes down in shorthand the material points in the conversation. Documents are required, and he retires for them. The conversation is adroitly turned to the topics of the day. Politics are avoided. Mr. —— is not sure as to your bent. He has spent his holiday in the Engadine. Has returned by way of Rome, Milan, Florence, as the case may be, and has cleverly dodged the quarantine regulations of all Europe. He talks with considerable knowledge of art and architecture, and knows all the more prominent painters, sculptors, and architects. Or he has taken a run over to America to see the great Yellowstone Park before it is vulgarised out of all charm. Or again he has been loitering through the bazaars of Cairo in quest of treasures overlooked by previous explorers. The real business of your visit having at last commenced, you find him alive to all the points involved. Though comparatively young he astonishes you by the scope and variety of his experience and his acquaintance with technical matters. But his strong point is administration, and in finance he has few equals. It falls to him to see large undertakings "through" in all parts of the world, providing ofttimes the means in the widest sense of the word. A thousand men do his bidding with the precision and regularity of a vast machine. To him they look for their weekly wages and are never disappointed. They would as soon expect the sun to stand still in the Heavens as that the exchequer upon which they rely should fail. He is rarely seen by them or at the works which are carried out under his name. But his confidential agents are alert and ubiquitous. His Mr. Brown, Jones, Robinson, and the rest are models of diligence and ability. Were they otherwise they would have to seek employment otherwhere. He will undertake work of very modest importance,—replace a fallen slate or drive a railway through the unfrequented desert, and what he undertakes to do he will do well,—at his own price. His profits are proportioned to the risk, and both are sometimes very great. He takes, from the first, an independent position, and keeps it. When a certificate is due he notifies the fact, curtly demanding rather than asking for it. You will not receive from him the conventional fib about the shortness of cash and the large amount which must be made up by next Wednesday. He is the personification of system, and order is his first law. Your errand demands a visit to a neighbouring manufacturer, and he offers to accompany you. He has a round to go, and it will not be out of his way. As you pass into the cold and cheerless street you are surprised to see the brougham still in waiting. He opens the door and waives you in. So, then! it was not a client's after all! He asks your pardon while he peruses and dockets a file of papers placed ready for him. Your business brought to a close he leaves you with a graceful adieu, somewhat suddenly.

He has everything handsome about him, a house in Cromwell-square and a "place" in Hampshire, whither he regularly repairs on a Friday evening,—Saturday is a broken day now and not worth coming to town for,—and so he spends it pleasantly in the country with a few friends. City men, Directors of Banks, &c., so that nothing is lost by making it a "holiday." A clerk brings down letters and receives instructions. His master owns some broad acres and half a village, where he has amused himself by building some model cottages. He subscribes liberally to the local charities without distinction of creed, and is himself a stanch Conservative and a sound Churchman. He affects the sportsman and hampers himself quite unnecessarily with the stiffest of gaiters and the heaviest of boots as a sort of protest against the enforced primness of his every-day costume. His partridges and pheasants are so useful in his business that they may almost be looked upon as members of his staff, and a well-preserved little trout stream, which runs through his grounds, has before now determined a difference which might else have filled the lawyers' pockets. On Monday morning you will see him at his office punctually at nine, and in an hour the brougham, with the matched and matchless bays, will be again in waiting at his door. He has invested 50,000*l.* in "the concern," and no one will grudge him the luxuries which such a fortune can in almost every walk of life command.

On learning that he is the junior member of the firm, a portentous image of the splendour of the head thereof rises in your mind. You are wrong. The senior partner is a very homely person, belonging,—as is said, apologetically,—to the old school. His clerks rarely see him, though he is known to be about, and they entertain for him an almost superstitious respect. His judgment is always taken in the last resort, and he is, in fact, the main spring of the business, although, like other main springs, concealed by more showy surroundings.

## DAMAGES OR INJUNCTIONS IN ACTIONS FOR THE INFRINGEMENT OF RIGHTS TO LIGHT.

IT has been suggested by some who have given consideration to the subject of the law in regard to what are technically called ancient lights that in all cases where a right has been interfered with such interference should be compensated by the award of damages. It has been said that if the interference with a right to light is to be ground for an action in a court of law it would be much better for the community at large that there should be what may be termed freedom of building, subject only to the award of damages for injuring the rights of a neighbouring building. There is a good deal to be said in favour of this view, but it is, perhaps, of more practical importance and use to discover, if possible, what is the judicial view which now exists of the power of a court to grant an injunction or damages. Since the passing of Lord Cairns's Act there has been an absolute discretion in the Court to grant one or other of these remedies. But every exercise of judicial discretion must be in accordance with some kind of rule, so that the interesting point is to discover by what rule the judges are guided in their judicial action. The rule is formulated in Roscoe's "Digest of the Law of Light" as follows:—"A mandatory injunction . . . . will only be granted if pecuniary damages will not fitly recompense the injured party." In stating with precision rules which can only be collected from a number of judicial decisions it is very easy to rather overrate a proposition, and, therefore, this rule is coloured by a subsequent note to the effect that its application much depends on the circumstances of each particular case. But, on the whole, a judicial decision on this point since the publication of the work in question seems to show that this is a quite accurate statement of the existing law. This decision also seems to show that the tendency of the judicial mind is in favour of awarding damages rather than injunctions. The case to which we refer is that of Holland *v.* Worley, "Law Reports," 26, Chancery Division, p. 578, which was decided this year by Mr. Justice Pearson. It is a noteworthy case because the judge examines several previous decisions with a view of extracting from them some definite rule to guide him in the matter. And this is the conclusion to which he comes after considering a judgment of the late Sir George Jessel:—"I do not think I shall

be misinterpreting the Master of the Rolls if I say that his opinion (in which I heartily concur) seems to me to be this, that if the defendant is doing an act which will render the plaintiff's property absolutely useless to him unless it is stopped,—in such a case, inasmuch as the rule of compensation which could be given to the plaintiff would be to compel the defendant to purchase his property out and out, the Court will not, in the exercise of the discretion given it by Lord Cairns's Act, compel the plaintiff to sell his property to the defendant. But in other cases, where the injury to the plaintiff would be less serious, where the Court considers that the property may still remain the plaintiff's, and be substantially useful to him as it was before, and the injury, therefore, is one of a nature that can (without taking away the plaintiff's property) be compensated by money, then the Court, if it thinks right, may exercise the discretion given to it by the Court." Now this exposition of the law seems to amount conversely to exactly the same thing as the rule quoted from the "Digest of the Law of Light,"—a rule which, as we have said, was not, as it seems to us, quite so certain two years ago as it is now.

There is another circumstance which makes this view, as we believe, a correct one. In 1877 Lord Justice (then Mr. Justice) Fry decided a case somewhat to the same effect, and the main reason why he awarded damages instead of an injunction was because the injury done to the plaintiff's building was done by an integral part of a very important building scheme. Coupling this fact with the other that though the plaintiff's building was injured, yet that the occupation of the house would not be seriously affected, the judge came to the conclusion that his proper course was to award damages to the amount of 200*l.*, and not grant an injunction. This was a decision of a judge who now sits in the Court of Appeal, and therefore we may accept his opinions, with those of Mr. Justice Pearson, and regard the view of the judicial mind as being now disposed to the giving of damages rather than to the ordering of a demolition of part of the building. It is not out of place either to point out the improvement in legal procedure in late years. So recently as 1865 a case in which, though the Court would not grant an injunction, it considered damages might be awarded, was sent down to a Common Law court for the purpose of the damages being assessed. Now no judge of the Chancery Division for a moment hesitates to assess the damages himself, and thus save the parties both delay and expense.

Returning for a moment to the main point, it is true that there are observations of the Court of Appeal in the recently-decided case of Newson *v.* Pender, which seem to show an approval of injunctions rather than of damages. For it was not certain in that case, which was one of an interim injunction, to what extent the plaintiffs would be injured, or whether they had been substantially injured at all, though there was a *primâ facie* ground for saying that they were. Moreover, the defendants offered to give an undertaking to pull down the offending building if it was proved at the final hearing of the case to substantially interfere with the rights of the plaintiff. But the Court of Appeal decided to continue the interim injunction ordered by Vice-Chancellor Bacon, and it did so partly because it could not "feel with confidence that upon the facts coming before the Court the result might not happen which has happened upon other occasions where the Court has felt the destruction of property to be very undesirable, and a view has been taken which the plaintiff has been unable to resist, that he should accept compensation in the form of damages instead of the pulling down of the premises." This expression of opinion seems to show a leaning towards the more violent method of redress, but it has also to be borne in mind that this was a question of continuing an injunction already ordered by a judge of the Court below, and next, that if the rule which we have extracted from the legal work already mentioned, and from recent judicial utterances, be properly applied, a plaintiff is never bound to be satisfied with damages unless they fairly compensate him for the injury done to his property.

**Daylight Reflectors.**—Mr. P. E. Chappuis, of Fleet-street, has just received a letter from the Lord Chamberlain appointing him Daylight Reflector Manufacturer to the Queen.

## THE INTERNAL ARCHITECTURAL TREATMENT OF CUPOLAS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The second ordinary meeting of the present session took place on Monday last, Mr. Ewan Christian, president, in the chair.

Mr. Hugh Stannus read a paper on "The Architectural Treatment of Cupolas in general, and that of St. Paul's in particular." He commenced by stating that he proposed to confine himself to Italian or Classic cupolas, and at the outset he would like to amend the title of his paper, and term it "The Internal Architectural Treatment of Cupolas." Referring to the several kinds of cupolas, many would term the square cupola a coved square room. Square unpenetrated cupolas were uncommon. Octagonal cupolas were numerous enough, the most celebrated being that of the Duomo of Florence. Twelve-sided cupolas were less common, and he only remembered that of Siena; while polygonal cupolas must remain unnoticed for the present. Circular cupolas were legion, notably those of St. Peter's and St. Paul's. Elliptical cupolas were sometimes to be met with. At Pisa the ellipse is over the crossing. Mr. Stannus exhibited a model of what he termed an "abcissate" cupola, good examples of which are to be found of the Byzantine period, such as St. Sophia at Constantinople, and St. Mark's at Venice.

The difference between these and penetrated cupolas was that the latter were cut by lines of vaults and the sides of openings, and were not necessarily in a vertical plane. Penetrated cupolas and vaults showed the soffit, which would be as deep as the amount of the oversailing. The number of good vaults which had been spoiled by the treatment of their soffits was very great. It had become a canon that the penetration should be at axial points, and figure decoration applied to the remaining parts of the cupola surface would be unaxial. Some cupolas pierced with circular windows were exceedingly beautiful. The bull's-eye seemed to lend itself to simple and easy treatment, and circular panels were equally good. When cupolas were penetrated the contour of the penetration should give the *motif* for the architectural treatment. There were three things to be considered in regard to treatment: first, the plan of the cupola; next, the existence or non-existence of any opening or eye at the centre; and, thirdly, the treatment of the remaining portion when the cupola was cut away. There were several courses of treatment suitable in reference to the subjacent architecture; there were cupolas which acknowledged the four axes of the subjacent parts, which was the broadest and best treatment; there were others which acknowledged every axis, as St. Peter's at Rome; while some cupolas ignored the subjacent parts altogether. The first typical treatment of cupolas which occurred to one, supposing they had a cupola supported by piers, was to arch from one pier to another. There was a further development where it was succeeded by arches, each springing on the crown of the tier below it. These were vaultings which had evidently been taken from the *motif* of the aqueducts.

Ribs had been very much used in cupola treatment. These were found in large cupolas, which would bear subdivision, and surmounted by lanterns, which seemed to demand some expression of rib-treatment to suggest a support for the lantern. It had been said that though ribs and panels were suitable for an octagonal dome, to cut up a hemispherical dome in that fashion would destroy its idea of mystery and infinity, and to parcel it out into measurable littlenesses. Both the experiments made by Mr. Poynter and himself were fragmentary in effect, and presented a more strongly marked ribbiness than a wider section would have shown. He was not strongly in favour of the rib treatment, but had used it because it was part of his commission. He referred to the Sistine chapel of St. Maria Maggiore, at Rome, as an example of ribbing in domes. Its great charm was the articulation between the cupola and the subjacent architecture. There were many examples of the rib treatment, and he might instance that of the British Museum Reading-room, designed by Mr. Smirke. Sub-panelling with circles between ribs was one of the commonest things in Italy; it was a pleasant way of treating the ground, and making a decorative effect. Another treatment was that of intersecting ribs, and stellar cofferings. This was an essentially Arabic treatment, the Arabs being fond of evolving wonderfully intricate geometrical patterns. The treatment of St. James's Hall by Owen Jones showed his study of Alhambresque work, the oblique ribbing of the ceiling being very beautiful. Applying that treatment to a circular plan they obtained a stellar cupola, like that at Cordova; but this treatment would be unsuitable for St. Paul's.

Mr. Stannus next referred to the treatment of perspective or scenic architecture, which had its greatest development when the art of perspective was first reduced to scientific rules. In more recent times the treatment of the Chapel at the Palace of the Legion d'Honneur was most extraordinary. This was really so much scene painting, and was unworthy of any monumental building.

Another treatment was that of coffering, and here they entered upon a large field. In the Church of San Bernardino at Verona the articulation was very beautiful, and it was one of the most charming examples of articulated coffering. There was another treatment which he termed "coffering with omitted articulation," and Sir Christopher Wren had used it in his beautiful church of St. Stephen, Walbrook. He only knew of one other case, and that was in a Roman church. Coffers of different widths were sometimes used, as were coffers between ribs, as at St. Maria della Salute, Venice, where the ribs were axial with the pilasters, and between these were square coffers. This being so thoroughly articulated, had a beautiful effect. There were hexagonal and octagonal coffers of various kinds, and he instanced Palladio's Rotunda at Vicenza, a circular hall between four square walls. Here Palladio recognised the axiality of the dome by making long and short coffers. The old Stock Exchange had a barrel vault coffered, and the cupola was also coffered. Mr. Cole's magnificent new dome there was a remarkable example of modern cupola treatment. Radial figures might be considered as an application of a frieze all round a cupola: they were much used in St. Mark's, and seemed to loom and brood over one, giving a solemn impression to the spectator. Another method of treatment was seen in the beautiful little mausoleum at Ravenna, where there was an "abcissate" cupola with a blue ground and gold stars. It had been suggested to use gold only, the beautiful effect of which might be seen in the charming Arab hall of Sir Frederick Leighton's *palazetto*. Marginal panelling was also a typical treatment, and examples of it were to be found in the Jesuits' Church at Venice and elsewhere. Zones were also used, as those who had seen the Baptistery at Florence would remember. There was a treatment associated with the name of Coreggio. Unfortunately the painter was then thought more of than the architect, and they all knew that those painters who had tried architecture had been conspicuous examples of "how not do do it." Michelangelo set a bad example in the Sistine Chapel. It was a grand thing to have the strength of a giant, but those who followed him set a fashion which had left some terrible results. In some instances limbs were allowed to project over the architecture, and there were churches where the artist had actually put a piece of wood, representing the wings, across the arches.

Good decoration required articulation with the existing architecture at St. Paul's; and if there were any features in the subjacent parts, they should be considered. Certain intercolumniations of the peristyle were blocked up, and any treatment should give a *raison d'être* for these. Then it should give scale to the cupola; it should be subdivided, and not override the architecture; it should provide space for appropriate storiation; it should be original if possible, and treated in such a manner as to be *sui generis* and not a copy; it should emphasise the four axes of the cross; and further, it should suit the gradual unfolding as the worshipper walked up the nave. Articulation might be in actual relief, and hence he had endeavoured to make such a design as could be produced in plaster relief. Canvas plaster was so much cheaper than mosaic, that it would make a difference of about 7,000*l.* in the cost.

In applying anything they had learned from the types of treatment to St. Paul's, they would find the plan was circular, there was an eye, and the cupola was not broken, nor abscissate. The square heads to the windows made a very

abrupt stop, and these might have been treated with arches as at St. Peter's, though it would be undesirable. He had tried the scheme of arching over the piers, but found it would not do. There might be a narrow rib over each pilaster, or a broad rib over each buttress; but it would be better to have the broad rib, especially as it was more suited to cupola treatment than to a polygonal dome. Intersecting ribs or parallel ribs would not do; and then came scenic architecture, which degraded a noble cupola. Coffering was intended by Sir Christopher Wren: there was point and fitness in coffering the cupola, but the result would be rather a want of interest. If the coffering had been in existence, they would have hesitated in altering it, but as it was not in existence they could do something worthier. Coffering could be improved by articulation, but they might dismiss it as not sufficiently important. Then came axial panels and subjects, which might do fairly if well articulated. With respect to radial figures, the size of the cupola would make them unsuitable, unless they were of such gigantic dimensions as would dwarf the architecture. Marginal panels, again, were not necessary at St. Paul's, and zones were open to objection, as they dwarfed the apparent height of any cupola. Then there was the treatment, which he would term the plane-section, this being the characteristic treatment of a circular cupola. He claimed the merit of the plain section for the late Alfred Stevens, who adopted circles as the main features of his design. The circle, too, was the characteristic shape for visions and imaginings, and it was only when the painter had a square frame that he filled up the angles. Another advantage to the circle was that though other geometrical figures were distorted by being seen on concave surfaces, the circle made an ellipse only. The gold ground permeating everything he held to be essential. [This statement evoked much applause.] One then felt that the whole surface was going round, without a break in its continuity. Clearness at the base of the cupola was necessary, but if it lost colour and became more golden as it went up, it would preserve the mystery that now existed. But there was a difference between disappearing in the dirty dinginess of Thornhill and melting into the golden light described in Dante's vision. Another matter was the question of scales: whenever Thornhill's work was seen it dwarfed everything, but Stevens increased the apparent size by multiplying, and adding dignity to the fabric. Three years ago he (Mr. Stannus) conceived that the ribs might be omitted, and he submitted a version showing this to the Sub-Committee, who said they had no power to consider it. Mr. Stannus concluded a long paper by some remarks on the storiation of the dome; and by expressing his indebtedness to the Dean and Chapter, Mr. Penrose, Mr. J. O. Scott, and others.

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Mr. H. H. Statham proposed a vote of thanks to Mr. Stannus for his interesting lecture and the valuable examples of dome-treatment he had shown, bringing before the meeting really a compendium of the subject. There were two main issues suggested in regard to the decoration of the dome of St. Paul's; the first was, the question upon which Mr. Stannus had dwelt so much, viz., the relation of the decoration to the architecture; the second being the consideration of what in the shape of design should be put there when the first principle was decided upon. The great point brought forward and emphasised by Mr. Stannus was what he very happily termed the articulation of the design with the subjacent architecture. Mr. Stannus's idea,—and on the face of it there was a good deal to be said for it,—was that as the peristyle was divided into so many sections by the solid piers at intervals, the decoration of the dome should carry out the idea and appear to have a special reference to it. In the first place, had they any information as to what Wren's wishes would have been upon this subject? So far as they had them, they went to show that Wren would have discarded that division of the peristyle. He had gone to refresh his memory with a sight of the model of the original design, which showed the dome coffered symmetrically, with no special reference to any division of the peristyle, beyond the ribs of the coffering going over each pilaster. Then there was a floating rumour, the truth of which he had not been able to ascertain,—that the dome was coffered before Thornhill painted it. His attention was drawn to that by Mr. Stannus at a meeting of the St. Paul's Ecclesiological Society, when he was told that this had been stated in the *Builder*. The statement was, however, only made in a letter printed in that journal, referring to an engraving by Emmett. He had inquired for it at the print-room of the British Museum, where they thought they had seen such an engraving, but could not find it. It was not improbable the dome might have been coffered before Thornhill painted it, and the state of the original model left it probable that Wren contemplated coffering. So that this almost put Wren on one side in regard to the articulating of the dome with the solid pilasters. As to the coffering they might dismiss that from their minds, as on the whole a commonplace and prosaic treatment of a great dome. Then they came to the question whether they should strongly articulate the lines marked by the solid pilasters, by continuing them as ribs. He was inclined to think that to accentuate the ribs strongly was to deteriorate the essential grandeur of the dome. It formed an expanse which had a mystery about it, and to divide it vertically by strong lines was reducing it to so many measurable parts. Letting it then be granted that the dome should not be divided by these strong vertical lines, they came to the second question, what species of decoration should find place there. He (Mr. Statham) had taken great interest in this matter, partly because he had seen Mr. Poynter's great picture in several stages, and thought it one of the finest and most expressive modern works he had seen, but in its present position all its expression was lost. The conclusion this led him to was that it was a mistake to put, in such a position as that, pictures the point of which depended upon expression and differentiation of countenance. And this brought him to the idea with which he wished to close his remarks,—the suggestion that there was one idea in the decoration of domes, which had not been fairly carried out. What he would suggest might be called the Coreggio idea reduced to decorative form, not putting up a series of pictures which could not be examined because of the distance, and the danger of dislocating one's neck, but something which was a grand and simple idea, easily grasped, and not depending upon play of countenance. This sort of treatment should have a meaning which could be easily grasped, and which would be a magnificent culmination for whatever decoration might be applied to thelower parts. Browning's old Renaissance bishop, who "ordered his tomb in St. Praxed's Church," pleased himself with thinking how from his tomb he would

> "Look up into the airy dome, where dwell
> The angels, and a sunbeam's sure to lurk."

He did not want any series of pictures, but just the one idea of angelic glory carried out over the dome, without divisions, and ribs, and lines destroying its grand unity,—a treatment giving a pervading glory to the whole surface, without in any way disturbing or lessening the proper architectural effect of the dome.

Mr. J. P. Seddon seconded the vote of thanks, and agreed in most points with Mr. Statham. The dome of St. Paul's was left by its architect one vast, unbroken, and sublime vault, and its only decoration should be by the subsidiary art of painting or mosaic. Whatever emphasis might be desirable, and some little was desirable, should be supplied by the painter's craft alone. The dome, spreading above the altar with a baldachino, placed in the centre of the crux, should symbolise heaven, and be painted as such. The dome was quite out of sight of the nave, and could only be seen from underneath, and its decoration should be carried out in proper decorative art. Thornhill's interesting paintings disturbed little of the serenity of the dome's surface, and their translation into colour would deprive them of their principal claim to existence. There was in the National Gallery a design by Botticelli, which gave all that was desirable for the decoration of the dome; but the number of saintly figures would require to be fewer, so that each should stand out distinctly.

Mr. Edward Armitage, R.A., deprecated the architectural division to be seen in Stevens's design. Where there were figures there was this difficulty, that they must be made of different sizes to fill up, with large figures for the large panels and small figures for the small panels, otherwise the latter would be overcrowded. The different sized figures gave an impression from below of the section of a exhibition gallery, with a lot of pictures a placed higgeldy-piggeldy on the wall, and som of the smaller ones "skied" at the top. Ther fore whatever was done he would always depr cate the ribs on that account. His suggestio he believed, would form a much grander trea ment for the dome, and it might be united wi Mr. Burges's design, without having Archaic, Romanesque, or Byzantine figures. A friend his had made a small design which he understoo would appear in this week's *Builder*,* for whic he (Mr. Armitage) had sketched some figure and he believed it would be very much bett than the principle of having eight sections. In his mind there was an insuperable difficulty painting elaborate figure subjects, such in the designs they had seen. The dom was extremely dark, and only in brig summer weather could anything up there seen; therefore whatever was done shou be of the very simplest kind, laid in with fl tints, and no modelling. The eye would follo much better if the tint was perfectly flat, a that was the kind of decoration most suitab for the dome. If other portions of the chur were decorated appropriately, they would th feel what was really required for the dom They would feel that they did not want gres solid Michelangelesque figures, but small group or even single figures, with flat tints and gra outlines. The outlines would be seen, while t modelling of the figures would be quite lost.

Mr. J. D. Crace said that the reason why many domes had been treated in mosaic a with ribs, was that it was the only way in whi the vertical section could be explained. T earliest known dome,—that at Ravenna,—w divided by ribs, with the unbroken surface fill by mosaic. He heartily endorsed what M Armitage had said with regard to the figu treatment, which should be of extreme si plicity of form. At the same time, the treatment had not had a complete trial. they took St. Peter's or other domes, and divid them by ribs, they would invariably find th the main vertical line was undisturbed by bei interlaced with anything. Wherever M Stannus's circles touched the ribs there w a pinched-in form.

Mr. W. White, F.S.A., felt strongly that the ar culation of the vertical lines of the dome was the greatest consequence. At the same time, th should not be treated in too strong a manne and zonal treatment ought not to be altogeth disregarded. Near to the eye a plane surfa is minified, and by painting in chiaro-oscuro is enlarged; the contrary being the effect at distance. In any case a distinct picture the simplest flat surface painting would be mu larger in effect than one painted up to t highest pitch.

On the motion of Mr. G. Aitchison, A.R.A seconded by Mr. Woodthorpe, the discussi was adjourned, a vote of thanks being pass to Mr. Stannus.

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## THE MANOR OF CULLINGES OR TONG OTHERWISE THEBAUDES, TIBBOLD OR THEOBALDS.†

In the year A.D. 1441, the Manor of Thebaud being then vested in the Crown, was grant by Henry VI. to John Carpenter, Master St. Anthony's Hospital in London; Jo Somerset, Chancellor of the Exchequer; a John Carpenter, jun., to be held of the Crow by the annual rendering of a bow, value 2 and a barbed arrow, value 3d.

The next account we have of this manor is the eleventh year of King Henry VIII., wh it was conveyed by Cecilia Bedyl, widow, wi its appurtenances in Cheshunt and Waltha Cross, to the use of such persons as she shou by her will appoint, and afterwards, in th same year she settled it upon Thomas Burba (described as her son) upon his marriage wi Agnes, daughter of James Monkaster, mercha tailor, of London, from whom it descended their son Robert, who, on the 3rd of April, *an* 3 Elizabeth, conveyed it to John Ellyott, London, mercer; and he on the 10th of Jun *anno* 5 Elizabeth, in conjunction with Elean his wife, sold it to the Right Honourable S William Cecil.

This Sir William Cecil was the son of Richa Cecil, esq., Principal Officer of the Robes

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* See p. 689.

† A paper read by Mr. F. D. Rees Copestick, at the le annual meeting of the Incorporated Church Buildi Society, at Cheshunt Great House.

King Henry III., and his advancement in life is said to have resulted from the following circumstance :—

"Coming to court to see his father, he there met with two chaplains of O'Neil, the famous Irish chief, with whom he entered into a warm discussion in Latin, and acquitted himself with such dexterity and address as highly exasperated his opponents. The king, hearing of this circumstance, sent for young Cecil, and was pleased so with his address and conversation that he appointed him 'Custos-Brevium' of the Court of Common Pleas. In 1541 he married his first wife Mary, daughter of Sir John Cheeke, who shortly after died; and in 1545 he married his second wife, Mildred, daughter of Sir Anthony Cooke, of Geddy Hall, Essex, and received from the Duke of Somerset the appointment of Master of Requests; and in that year he accompanied the duke into Scotland, was present, and nearly killed by a cannon shot, on the battlefield of Musselborough. Upon his return to court he was appointed to the post of Secretary of State by Edward VI. On the 12th October, 1549, he, with other adherents of the Duke of Somerset, was arrested and committed to the Tower, but was in a short time liberated. Upon the accession of Queen Elizabeth he was re-appointed Secretary of State, and sworn of her Privy Council, and shortly after he built a seat upon his manor and estate of Theobalds, which, says he in a letter dated the 5th of August, 1585, 'was begun by me with a mean measure, but increased on occasion of her Majesty's often comying'" (*sic*).

The following description of Theobalds is taken from Lysons's "Environs of London," p. 33 :—

"It consisted [*temp.* James I.] of two principal quadrangles, besides the Dial-court, the Buttery-court, and the Dovehouse-court, in which the offices were situated. The Fountain-court,—so called from a fountain of black and white marble in the centre,—was a quadrangle of 86 feet square, on the east side of which was a cloister, 8 ft. wide, with seven arches. On the ground-floor of this quadrangle was a spacious hall, paved with Purbeck marble; the roof arched over the top with carved timber of curious workmanship. On the same floor were chambers for the Lords Holland and Hamilton, and the king's waiters. On the second floor was the Presence-chamber, wainscoated with good oak, and richly gilded with antique pictures over the same; the ceiling full of gilded pendants hanging down, setting forth the room with great splendour; also with very large windows, and several coats of arms set in the same. These windows opened south on the walk in the large garden leading to the green gates going into the park, where was an avenue a mile long, between a double row of trees. On the same floor were also the privy chamber, the withdrawing chamber, the king's bedchamber, and a gallery, 123 ft. by 21 ft., wainscoated, with oak and paintings over the same of divers cities [*sic*], *rarely painted*, and set forth with a fret ceiling, with divers pendants, roses, fleurs-de-lis, painted and gilded with gold, also divers large '*stagges' heades sett*' round the same. The windows of this gallery looked north into the park, and so to Cheshunt. On the upper floor were the Lord Chamberlain's lodgings, and other apartments. Near the Chamberlain's lodgings, on the east side, was a leaded walk, 62 ft., by 11 ft. wide, with an arch of freestone over it. On the west of the Lord Chamberlain's lodgings was another walk of the same dimensions looking westward into the *Fountain-court*. At each corner of these walks stood four high large towers, covered with blue slate, with a lion and vaines on the top of each, and in the walk over the Hall one faire and large *turret* in the fashion of a *lanthorne*, wherin hung twelve bells for chiming and a clock with chimes of sundrie work. The walk from the lower gate to the middle of Fountain-court was arranged so that the figures of Cupid and Venus might easily be seen from the highway when the gates were open. The middle court was a quadrangle of 110 ft. square,—on the south of which were the queen's chapel (stained glass windows), her presence, bed, and coffee-chambers. The prince's lodgings were on the north side; on the east side a cloister, over which was the green gallery 109 ft. by 12 ft., well painted round with the several counties of England. On the west of the quadrangle was another cloister on five arches, over which were the duke's lodgings, and over them the queen's gallery, 109 ft. by 14 ft. On the south side stood 'a large open cloister, built upon pillars of stone, arched over with seven arches well painted with the kings and queens of England, and paintings of many castles and battles and divers descriptions on the walls.'"

Queen Elizabeth visited "Theobalds" in 1566, 1571, 1572, 1578, 1583, 1587, 1591, 1593, 1598, and in the latter year held court here after the death of the great Lord Burghley, who was succeeded in the manor of Theobalds by his second son, Sir Robert Cecil, who soon after the death of Elizabeth had the honour of entertaining King James here on his way from Scotland. In the year 1606 he entertained James I. and Frederick III., king of Denmark. The king, having become enamoured of the place, prevailed upon his minister to exchange it with him for his Palace of Hatfield, which was accordingly done by deed dated the 14th of May, anno 5 James I.

King Charles I. resided occasionally at this palace, and it remained in the possession of the Crown until the thirteenth year of the reign of Charles II.,* when it was granted by letters patent to George Monk, Duke of Albermarle, upon whose death it became vested in his only son Christopher, and by divers conveyances afterwards became vested in Ralph, Duke of Montague, who married the Duke of Albermarle's widow, who sold the estate in 1736 to Letitia Thornhill, and which upon the trusts of the will of her father, Sir Robt. Thornhill, and in consequence of the deaths of his children without issue, descended to Sarah, wife of Richard Cromwell, esq., one of the sons of Major Henry Cromwell, and to Eleanor Hinde, her sister, who were the daughters and co-heiresses of Eleanor Gatten, the wife of Ebenezer Gatten, esq., the surviving sister of the above Sir Robert Thornhill, from which Sarah Cromwell, her moiety, and that of Mrs. Hinde's under the limitations of her will, it descended finally to Sarah Cromwell's three daughters, Elizabeth, Anne, and Letitia, who by their wills devised it to Oliver Cromwell, esq., their cousin, the last male descendant of the Cromwell line, who, in the year 1795, built a mansion in Brantyngshay, otherwise Cheshunt Park, which property had descended in the same manner as the manor of Theobalds, and which, after his death, became the property of the Earl of Portland, whose son was by George I., created Duke of that name. About the middle of the last century the property was sold to a member of the Prescott family, under whose direction the remains of the old palace were pulled down, and a new house, said to be somewhat similar to St. James's Palace, was erected. A considerable addition and improvement was made to it by the late Sir Henry Meux, who held it for several years, under Sir George Prescott.†

The property now called Theobald's Park was bought by Sir Henry Meux in 1882.

Sir Thos. Abney had a house here; and here Dr. Watts lived for some time before his removal to Stoke Newington.

Lord William Lennox wrote the following *jeu d'esprit* on the name of Meux, some of the family pronouncing their name as if spelt Mews :—

"There's Meux entire, called Mews the swells among,
Though *mieux* is *better* in a foreign tongue;
*Tant mieux*, why change the sounds? 'Tis no myth,
Tayleur was Taylor once, and Smythe was Smith."

* Theobalds was dismantled by order of Parliament during the Commonwealth, and the commissioners estimated the value of the materials at 8,275*l.* 11*s.*

† *Vide* Walford's "Greater London," vol. i., p. 384.

## THE DECORATION OF ST. PAUL'S.

SIR,—I should be much obliged if you could kindly allow yet another scheme for the decoration of the cupola of St. Paul's to appear in your valued review.

The architectural framework adopted in Mr. Poynter and Sir Frederick Leighton's design follows, in its main lines, the sketch left by the late Mr. Alfred Stevens (see the *Builder*, 5th July, p. 11), and in the different design exhibited by Mr. Stannus (see the *Builder*, Sept. 6, p. 331) the space is divided in a somewhat similar manner.



*Mr. Wild's Suggestion for the Decoration of the Dome of St. Paul's.*

Whether a painted architectural framework dividing the smooth surface of the cupola be advisable is a matter upon which different opinions may be held, but this, at least, must now be clearly seen, that by the division into eight parts by eight broad bands, or ribs, again sub-divided into variously-shaped panels, the spaces left for the figures become so small that they cannot be properly seen or understood by the spectator on the floor of the cathedral.

In the scheme that I now venture to suggest, the space would be divided into four main compartments, respectively opposite to the nave, the choir, and the north and south transepts, where only you can get far enough back to see them in comfort, without throwing the head painfully backward. These four divisions would be filled with figures on a gold ground, and bounded by nimbi bearing inscriptions. The spaces between them would be of a greyish blue, powdered with stars, and bearing the emblems of the four evangelists. Above would be a circle of angels, and the whole would be crowned by golden rays proceeding from the vertex.

The figures shown on the design were kindly sketched in for me by my friend Mr. Edward Armitage, R.A., who suggested that the four subjects should illustrate the "Te Deum Laudamus" from our morning service :—1. "The glorious company of the Apostles praise Thee." 2. "The goodly fellowship of the Prophets praise Thee." 3. "The noble army of martyrs praise Thee." 4. "The Holy Church throughout the world doth acknowledge Thee." The circle of angels above illustrates the verse, "To Thee all angels cry aloud."

J. W. WILD.

*Sir John Soane's Museum*, Nov. 10.

## Illustrations.

### READING-DESK: ANCIENT ARABIC.

THIS, and the bas-relief and lamp figured in another illustration, constitute a further selection from photographs of articles in the Museum of the Mosque El-Hakem at Cairo, forwarded to us early in the present year by H. E. Franz Bey, chief architect to the Egyptian Government; other examples of which have been already published (see *Builder* of July 19 and August 16 of this year).

This illustration shows the side and back of a reading-desk (used for reading the Koran), which formerly stood in the Gismas-el-Ishagi Mosque in the "Derb-el-Ahmar" quarter. It was made in the fifteenth century. The constructive parts are rather coarsely made, but the panelling (greatly damaged), which is inlaid with ivory, and ebony, and shells, is of exquisite finish.

### BAS-RELIEF AND LAMP: ANCIENT ARABIC.

THE sculptures in bas-relief are on light grey marble. The two heraldic eagles may probably be ascribed to the Transition period. Their origin is not known. They were found on the floor of the baths at Derb-el-Gamanus.

The centre piece, representing the symbol of Islam illuminating the world, viz., a candlestick and two candles, was found immured in the Kiblah of the Bedredin el Agami Mosque.

The chandelier or lamp of the Sultan el Barkuk Mosque is shown below. Its total height is 37 centimètres, made in greenish glass; the edges and the larger leaves are scarlet; the smaller leaves, the background of the inscription, and the frieze around the handles are cobalt blue. The inscription and the medallions are gilt. This is one of the five lanterns still extant, as to the origin of which connoisseurs remain in doubt. They are attributed by some to Venetian, by others to Assyrian, makers. If this lamp was really made to Barkuk's order, then its date would be the end of the fourteenth century. There are only inscriptions on the upper part of the neck, and they are in the Sallus character. The general ornamentation, and the enamel are of the most perfect finish.

### THE HENRY WILSON MEMORIAL CHURCH.

ST. BARTHOLOMEW'S, CARBROOK, SHEFFIELD.

THIS church is about to be erected as a memorial to the late Mr. Henry Wilson, of Westbrook, Sheffield, whose benefactions to church work in all ways and many countries are well known.

The plan, as will be seen, consists of nave, north and south aisles, north and south transepts, chancel, clergy vestry, and organ-chamber, also choir vestry and large parish-room beneath the chancel. The tower at the south-west corner of the nave is 100 ft. to the top of the parapet. Huddersfield stone will be used for the dressings and Oughtibridge stone for the walling. The inside face of the chancel will be of dressed stone. The woodwork generally will be of deal and pitch-pine, and the chancel fittings of oak.

### THURLOW TOWERS, KNOLLYS-ROAD, STREATHAM.

THIS house, the residence of Mr. Michael Pope, lately erected from the designs of Messrs. Batterbury & Huxley, architects, of 29, John-street, Bedford-row, and Berkhamsted, is situated on part of land formerly of Edward Thurlow, Lord High Chancellor of Great Britain, who was Lord of the Manor of Leigham Court, and probably of the adjoining manor of Gillians, now called Julians, or St. Julian's. He held other property, and resided at Knight's Hill, Norwood.

The manor of Leigham, or Leigham's Court, in fact, belonged to Bermondsey Abbey till the Suppression, when it was given by Henry VIII. to Henry Dowes, clerk. It was several times transferred, and at length passed by marriage, in 1752, to George, fifth Duke of St. Albans, who, in 1785, sold a portion, and, in 1789, the remainder, to Lord Thurlow.

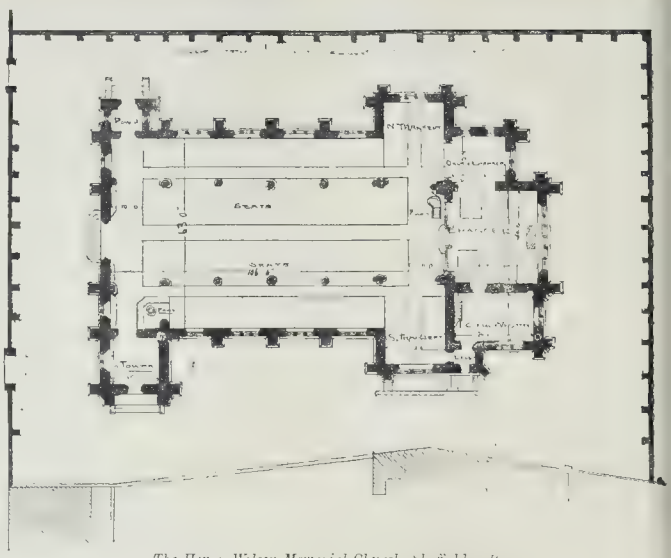
The staircase window has painted glass portraits of Lord Thurlow, with his arms and motto, "Justitiæ soror Fides"; also of Homer, Chaucer, Camden, Dante, Scott, &c. In the dining-room the upper lights exhibit St. Paul's, Westminster, Harrow, and Windsor, indicating the direction whence they can be viewed. The painted glass in the drawing-room illustrates music in the portraits of Beethoven, Mozart, Rossini, Handel, and others.

From the tower can be observed the greater part of Surrey and Berks, Middlesex, and Essex. The north view gives quite a panorama of London and the West End.

The site, which has a very considerable fall, made it necessary that the house should be placed at the highest part of the ground.

The materials used for the exterior are red Ditchling bricks and Box-ground stone. The interior is treated with due regard to the style adopted; the roof over the hall is panelled in wood, and has curved principal rafters with traceried spandrels; the ceilings under galleries around the hall of the tower and entrance lobby are also panelled in wood. The ceilings of the dining and drawing rooms have moulded panels in plaster, the enrichments being modelled by Mr. H. Pain, of 47, Highgate-road. The painted glass already referred to was executed by Mr. E. H. Walden, of 87, Albert-street, Regent's Park. The owner's crest and the enriched panels, &c., over the tower entrance, were carved by Mr. George Frampton, a medallist of the Royal Academy.

The contract for the foundations and the concrete walls, to the plinth level, was intrusted to Mr. H. Potter, of Redwald-road, Lower Clapton. The superstructure was erected by Messrs. J. & C. Bowyer, builders, of Westow-street, Upper Norwood, the foreman of the works being Mr. H. Allen. The view of the house here given is drawn by Mr. A. B. Pite.



*The Henry Wilson Memorial Church, Sheffield. Plan.*

**Projected Improvements at Westminster.**—Application is intended to be made in the ensuing session of Parliament for leave to bring in a Bill empowering certain persons, or a company to be incorporated, to make and maintain the following works:—To widen Parliament-street on its western side, between Charles-street on the north and Parliament-square on the south; to widen Charles-street on its southern side, between Parliament-street on the east, and Delahay-street on the west; to widen Delahay-street street on its eastern side, between Charles-street on the north and No. 4, Delahay-street on the south; and to construct a new street from Parliament-street to Delahay-street. Powers are asked for the compulsory purchase of lands for the works and additional lands between Parliament-street and Delahay-street, and Charles-street and Great George-street, and the Bill will contain clauses as to agreements with her Majesty, the Commissioners of Woods and Forests, the First Commissioner of Works, the Metropolitan Board of Works, and the Westminster District Board of Works.

### ARCHITECTURAL SOCIETIES.

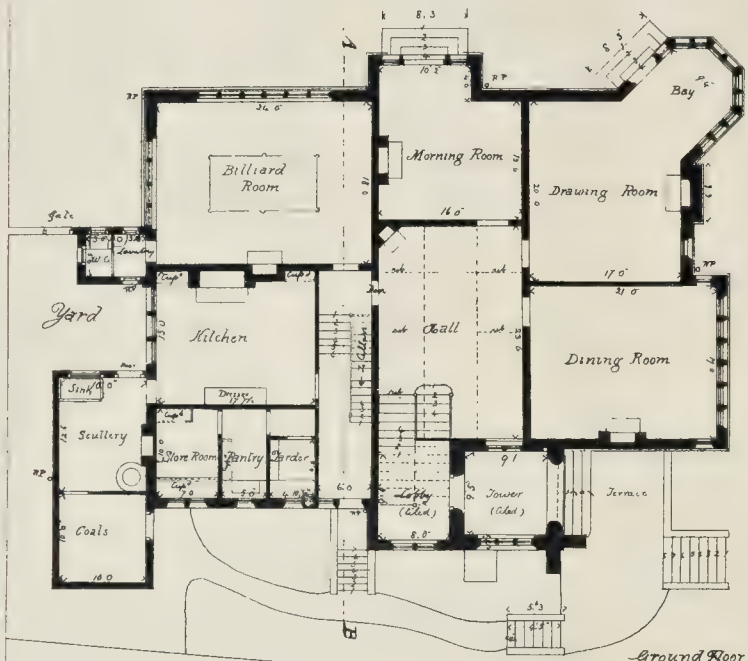
*Edinburgh Architectural Association.* At a meeting of this Association, held on Monday night,—Mr. G. W. Watson, president, in the chair,—Mr. James Gowans read a paper on "The Laying-out of Feuing Ground and Planning of Houses."

*Manchester Architectural Association.*—The first ordinary meeting of the above Association took place in the old Town-hall, King-street, on the evening of Tuesday, November 11th. The Vice-President, Mr. A. H. Davies-Colley, in the absence of the President, Mr. J. Medland Taylor, addressed the meeting. Mr. Colley was of opinion that architects of late years were receiving more public attention, and that people were gradually becoming convinced how necessary the profession was for their daily wants and comforts. The demands on the architect had of late years greatly increased, and he thought that division of labour was very desirable for the production of good work. He was further of opinion that a young man would in the future succeed best if, having mastered the ground work of his profession, he devoted his time to one special branch of his calling. He next referred to a proposal that the Liverpool Society and the Manchester Association should combine together in the publication of a sketch-book. The prizes for the session 1883-1884 were awarded as follow:—Elementary Class of Design. 1st prize, Mr. P. E. Barker; 2nd Prize, Mr. T. R. Wrigley.—Elementary Class of Construction. 1st prize, Mr. T. L. Worthington; 2nd prize, withheld. Mr. T. Chadwick supported the suggestion concerning the sketch-book. Mr. J. S. Hodgeson supported the proposal concerning the joint sketch-book. Mr. F. W. Mee and Mr. J. H. Woodhouse also addressed the meeting. Mr. T. L. Worthington suggested that steps should be taken to bring the Manchester Society of Architects and the Association in more direct connexion, more especially as regarded the prizes offered annually to students. Mr. J. Brooke opposed such a suggestion, and thought that the two bodies had different motives and interests. He also considered specialism in the case of the architect was almost a practical impossibility.

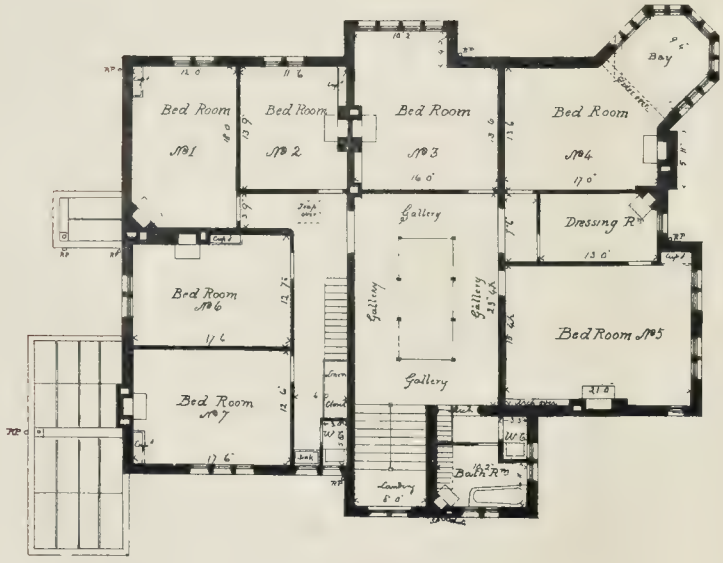
**Post Office Extension.**—The *City Press* says that it is proposed to make an entire clearance of the buildings between the northern end of the new Post Office and the Money Order Office, thus absorbing nearly, if not quite, the whole of Bull and Mouth-street, with its private business houses and railway booking-offices, with some half-dozen houses also in King Edward-street, while two other large buildings, one of a sacred and the other of a secular character, are also included in the general sweep. These are the French Protestant Church and the Queen's Hotel.

# THURLOW TOWERS Knollys Road Streatham

for M. Pope Esq. Messrs Batterbury and Huxley Architects




Ground Floor Plan.



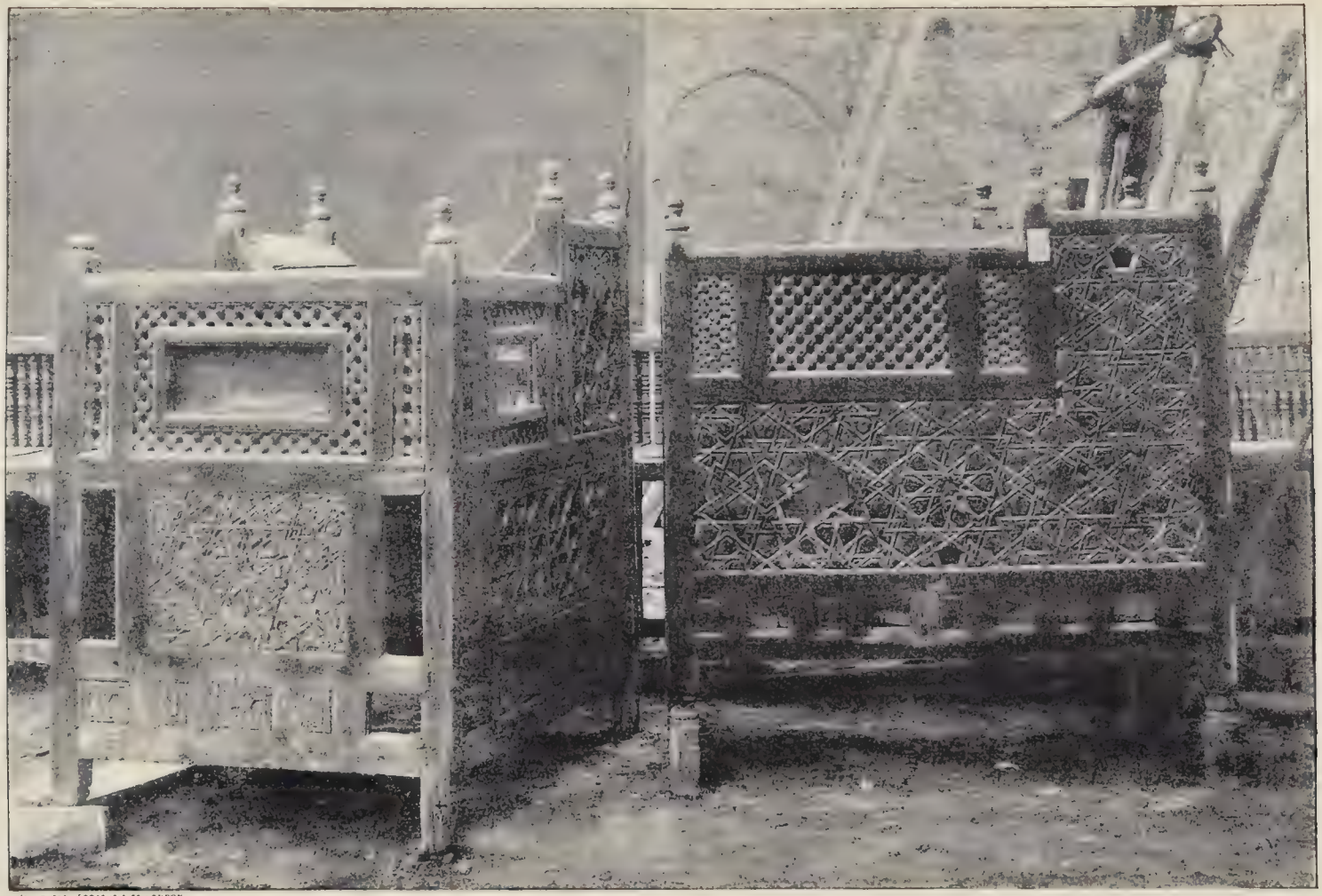

Upper Floor Plan

Scale of Feet

Neil Photo Lith & Printers

8 Castle St Holborn London E.C.





INK PHOTO SPRAGUE & Co LONDON

READING DESK: EARLY ARABIC





THE HENRY WILSON MEMORIAL CHURCH

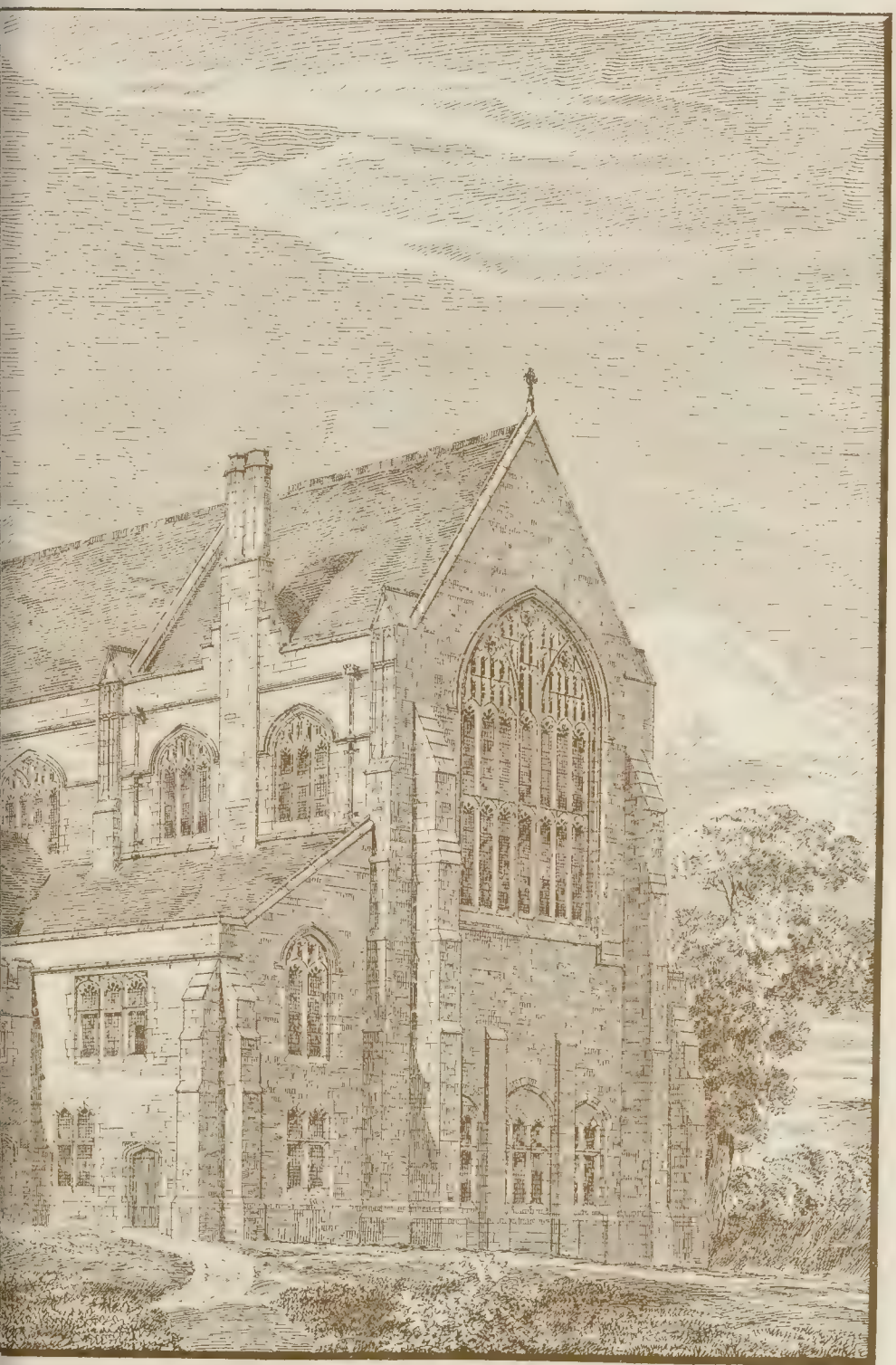
ST. BARTHOLOMEW'S, CARBROOK, SHEFFIELD.

J. D. WEBB, F.R.I.B.A. ARCHITECT

F. Reid Photo Lith & Printer



THE HENRY WILSON MEMORIAL CHURCH



S^T BARTHOLOMEW'S . CARBROOK . SHEFFIELD.

J D WEBSTER FRIBA
ARCHITECT.



INK-PHOTO. SPRAGUE & CY. LONDON

BAS-RELIEF & LAMP: EARLY ARABIC



Thurlow Towers - Streatham.

Messrs Batterbury & Huxley
Architects
1884

## THE LANDING OF ST. AUGUSTINE ON THANET.

To an Englishman, and not, as might be expected, to any Roman writer, are we indebted for what has been happily described as the earliest of "Canterbury Tales." Our Anglican Church must ever hold in cherished remembrance its story of the meeting, in the Forum which Apollodorus built for Trajan, of a patrician monk of the great St. Andrew's monastery which crowned the Caelian Hill and three fair slaves from the far-away kingdom of the Northumbrian Ælla. Every incident of the fascinating tale had been carefully preserved in St. Augustine's monastery at Canterbury. Together with other, perhaps less authentic, traditions of the ancient Kentish church, it was related to Bede, for his "Ecclesiastical History," by Albinus, abbot of that convent. So momentous have proved the results of the interview that it were not amiss to briefly recall who formed its chief actors, as well as what was the episode that immediately ensued,—an event about to be commemorated by the dedication of a monument at the landing-place of Augustine in England. We should picture to ourselves one who subsequently played so prominent a part in European history as to almost earn for himself the title of founder of Western Christendom. At that juncture Gregory was but a monk in the monastery which from its high pre-eminence amongst the pines still looks down, across St. Gregory's Church, upon Vespasian's Colosseum. Yet already had he become distinguished for a tenderness and a benevolence which neither knew nor made difference between the Pagan and those of his own new faith. To this day we are shown the marble table whereat from his own resources he used to feed twelve beggars each day. His active courage during one of the terrible plagues that attacked the Eternal City is commemorated in the modern name of Hadrian's Mausoleum. For it was on the summit of the Castle of St. Angelo that whilst chanting a solemn office for deliverance, by the Ælian Bridge he saw the Destroying Angel alight and sheathe his sword. Still it is with Gregory's tender regard for the young, and his lifelong efforts for the conversion of the heathen, that our tale is more concerned. The same solicitude that bade him pray for his beloved Trajan prompted the first question which arose to his lips on suddenly confronting the beautiful children from Deira. Are they Pagans or Christians? asked Gregory, who probably had never seen a Briton before. He listened, we are told, with a deep compassionate sigh to the slave-dealer's reply. Thereupon followed the well-known colloquy, during which, inspired doubtless by thoughts of a grand novel project, he played, as was his wont, upon strange words, with the half-prophetic half-dreaming mystification of the visionary and enthusiast. Obtaining leave from the Pope to attempt an object dearest to his heart, he set out from Rome with a few companions, their departure being made in secret, lest the great love of his people should forbid so hazardous an enterprise. Barely three days have passed when an express messenger overtakes them at a spot whose name of Locusta he construes into a portent of evil omen against the continuation of their journey. His presence was urgently demanded nearer to home; the populace had attacked the Pope in St. Peter's; they are loudly clamouring for Gregory's recall.

More than ten years elapse, and his purpose is neither forgotten nor fulfilled. But he had not long occupied the Papal chair when he hears of circumstances which offer fair promise of success, or at any rate of a friendly reception to his mission. He learns that Æthelberht, king of Kent, an Æscing or descendant of Hengest, is married to Berchta, daughter of the Frankish Chariberht, king of the city and county of Paris. The queen, like to her own great ancestor Hlodwig, whom his wife Hlotildba had converted, was a Christian, and had taken the Bishop Luidhard to her new home. There was appropriated for their use a little chapel which stood close to her husband's palace at Longport, overlooking the main road (Watling-street) from Rutupiæ, along which Plautius had led his conquering legions. This chapel, seat of a departed Christian worship, she dedicated to the saint most popular in her country, St. Martin of Tours; and there on the hill without Canterbury stands its successor, embodying in its walls remain of Berchta's church. Taking his opportunity, Gregory sends forth Augustine, prior of his former convent on the Caelian Hill, together with forty associates, to confirm and extend the influence for good of the English queen. A deaf ear was turned to the remonstrances which the chosen band sent back in alarm to Rome at various stages of their voyage. Reinforced by some choristers and interpreters engaged in passing through Gaul they at length reached the coast of what they deemed to be the end or corner of the world,—the *angulus* of *Anglia*, as Gregory liked to call it. They touched ground in the customary parts; being the same locality whither Horsa and Hengest had come some 100 years before to the overthrow of Vortigern. The precise spot of landing is open to some debate. However, a generally-received tradition,—though the arguments for its acceptance are too complex for rehearsal here,—points to Ebbe's Fleet, by the estuary of the then broad Wensum or Stour, whose wide waters covered most of the now marsh land that lies between Pegwell Bay and Reculver. The Kentish king had stipulated at the outset not only that a river should flow between him and the missionaries, but, with his superstitious dread of enchantment, that no tree should throw its shadow across the ground. So, advancing from their bivouac in the field which is yet pointed out northwards of Ebbe's Fleet farm-house, the monks take station on an elevation in Minster marsh. From that promontory, then extending into the river's mouth, are now dimly visible the distant towers of Canterbury. Æthelberht and his court come forward in turn. The monks are seen to bear before them a big silver cross,—for as yet crucifixes, even as a device, are scarcely known,—with a picture of Christ painted and gilded. They are heard to chant a Litany to a strain which Gregory himself had composed. From their midst stands conspicuous the tall stature of Augustine: by his side are Lawrence, afterwards his first successor in the later metropolitical see, and Peter, first abbot of St. Augustine's in the Minster city. Neither party could understand the ordinary tongue employed by the other. When the interpreters have discharged their office, the king with native candour and in words whose genuineness,—that is to say, as to their having been actually used,—is undeniable, makes response as follows: "Your words are fair, and so are your promises, yet since they are novel and doubtful I cannot give them assent, and leave the customs I have so long observed with the whole of my Saxon race. But as you are come hither strangers from a long distance, and as I seem to myself to see clearly that what you yourselves believe to be true and good you wish to impart to us, we do not wish to molest you. Nay, rather, we are anxious to show you hospitality, and to give you all that is needed for your support; nor do we hinder you from joining all whom you can to the faith of your religion." Encouraged by this tolerant, albeit dignified and politic utterance, the monks cross the river at the old Roman stronghold of Rutupiæ, which survives in the ruins of Richborough Castle. Having been accorded another audience by the sovereign they proceed to his Kentish capital. On coming into sight of St. Martin's Church they break forth into a supplicating Litany which Gregory had harmonised during the plague at Rome that killed his predecessor, Pelagius. "We beseech thee, O Lord, in all thy mercy, that thy wrath and thine anger may be removed from this city and from thy holy house." Ever and anon they send up the jubilant cry of the older Hebrew worship which Gregory had wrested from the name of the Northumbrian king,—Alleluia! For a first abiding-place Æthelberht gave them Stable Gate, by a heathen temple close to the existing St. Ælphage's Church; and within a few months, on Whitsun-day, June 2nd, A.D. 597, he received the sacrament of baptism at the venerable font in his consort's church of St. Martin.

Transferred from their original grave at Reculver, the remains of the first Christian Brehtwalda were deposited next to those of his first wife, at the southern end of St. Martin's altar in Augustine's Abbey of St. Peter and St. Paul. There in A.D. 613 the bodies of the great missionary, together with those of Berchta and Luidhard, had also been laid. The several names we have mentioned still live in the sees for which Augustine summoned additional helpmates from Rome,—Justus to found that of St. Andrew at Rochester, Paulinus that of St Peter at York, Mellitus that of St. Paul in London, whence proceeded another St. Peter's,—our Great Western Minster on Thorney Island. It is surely fitting that the abbey which he dedicated to St. Peter and St. Paul should at this day be represented by that monastery, known by his name, which a recent benefactor has rescued from decay and re-established as a college of missionaries to the Colonial Church. It is as fitting that Lanfranc's vast cathedral, standing aloft over the ruins of St. Augustine's pristine foundation of Christ Church, should bear proud and lasting testimony to the establishment of Christian worship in this country. Nor is it less seemly that some material evidence should be supplied to mark the spot where Augustine first set foot on our island. By Lord Granville's care the stone cross is there being erected of which we gave an account in a recent number.* It does not appear, however, that the sculptured figures will include, as they certainly should, a figure of Pope Gregory the Great.

## "NEW HOUSE," PAKENHAM, SUFFOLK.

THE following information in regard to this house and its family connexions and associations has been communicated to us, in relation to the references to the house, and to the Spring tomb at Lavenham, in some recent articles on the Architectural Association excursion:—

New House, Pakenham, Bury St. Edmund's, was originally a large brick mansion erected in an elaborate style of architecture by Robert Bright, of Netherhall, Pakenham;† "but some portion of the rear having been taken down many years ago, it is now considerably reduced in size." The date of 1622 over the front entrance refers probably to the year when the house was completed, it having been commenced two years before. Robert Bright willed it in 1630 to his son Henry, who sold it in 1653 to Sir William Spring, bart., M.P. for Bury and High Sheriff of Suffolk. The Springs at this time owned Pakenham Hall, a stone mansion surrounded by a moat which was pulled down at the beginning of the present century, and New House was purchased by this Sir William as a dower house for his lady, Elizabeth, daughter of Sir Hamon L'Estrange, of Hunstanton Park.

The family of the Springs‡ (of whom three were made knights and one a baronet) derived originally from Houghton, a village in the bishopric of Durham, which has always been called Houghton-le-Spring. They seem to have settled at Pakenham about the middle of the sixteenth century, but the first of the family who made any figure in Suffolk was Thomas Spring,§ of Lavenham, whose monument in Lavenham Church gives the date of his death Sept. 7th, 1486. His son, the wealthy Thomas Spring, had issue Sir John Spring, who was knighted by Henry VII. Sir John had issue Sir William Spring, knight, twice high sheriff of Suffolk. Sir William, by Susan, daughter of Sir Ambrose Jermyn, of Rushbrooke, knight, had issue John Spring, who married a sister of Sir John Trelawney, of Devonshire. John Spring's son Sir William Spring, high sheriff of the county, was knighted at Theobald's 1610-11. By Elizabeth, daughter of Sir William Smith, of Mount Hall, Essex, Sir William had a son William, who was created a baronet 1641. The first baronet had issue Sir William Spring, bart., who, by marriage with Sarah, daughter of Sir Robert Cordell, begat Sir Thomas Spring. Sir Thomas, the third baronet, by marriage with Merelina,‖ daughter and co-heir of Thomas, Lord Jermyn, had issue Sir William Spring, fourth baronet, who dying *s.p.*, divided his estate between his two sisters Merelina and Mary. The latter married John Symonds, D.D., of The Mount, Bury St. Edmunds, whose daughter De La Riviere became the wife of the Rev. John Casborne, of Drinkstone, the father of the late Rev. Walter John Spring-Casborne, J.P., who married Anne¶ (died June 9, 1884, aged

* See p. 342, *ante*.

† His descendants were living in 1860 in Massachusetts, U.S.A. *Vide* "The Brights of Suffolk," a rare and interesting book.

‡ For pedigree of Spring family, see "Visitation of Suffolk," pp. 166—206. Edited by J. J. Howard, LL.D. 1866.

§ The pew of the Springs, a highly-finished Gothic work, still remains, though decayed; and their armorial bearings are in many parts of the building.

‖ Through her grandmother, Mary Merry, descended from the Gages and Kytsons of Hengrave, and from Thomas d'Arcy, Earl Rivers.

¶ See *East Anglian Daily Times*, No. 4,835, for July, 1884, where an account of the Lofft family is given.

96), daughter of the well-known *littérateur* Mr. Capel Lofft, J.P., of Troston Hall, Suffolk, by Anne, the daughter of Mr. Henry Emlyn, F.S.A., the restorer of St. George's Chapel, Windsor, in the time of George III., and inventor of the so-called "British" style of architecture.

In 1578, when Queen Elizabeth visited Suffolk, "there were," says Churchyard, "200 young gentlemen clad all in white velvet, and 300 of the graver sorte apparelled in black velvet coates and fayre chaynes, all ready at one instant and place, with 1,500 serving men more, on horseback, well and bravely mounted, in good order, ready to receive the Queen's Highness into Suffolk, which surely was a comely troope and a noble sight to behold, and all these waited on the sheriffe, Sir William Spring, during the Queen Majestie's abode in those partes and to the very confines of Suffolke, but before her Highness passed into Norfolke there was in Suffolke such sumptuous feasting and bankets as seldom in any part of the world hath been seen before. . . . . The sheriffe, Sir William Spring, and divers others of worship kept great houses, and sundry either at the queen's coming or return, solemnly feasted her Highness, yea, and defrayed the whole charges, for a day or twayne, presented gifts, made such triumphes and devices as indede was most noble to beholde and very thankfully accepted." In the hall were many interesting portraits of members of the Spring, Jermyn, Firebrace, Barrett, Symonds, Blagge, and other families. In the early part of this century, however, no fewer than sixteen were maliciously destroyed, amongst them one of Dame Elizabeth Spring, *née* L'Estrange, in her weeds. There was also a portrait of Queen Elizabeth, said to have been presented by her Majesty to Sir William Spring when he entertained her in her "progress" through Suffolk, and also a likeness of Charles II.

At the death of the Rev. Walter John Spring-Casborne, s.p., New House was sold, and has now passed out of the hands of the family.

Pakenham Church, which contains many memorials of this family, was originally a Norman structure. It was appropriated by Edward I. to the Abbey of Bury, and was granted at the Dissolution to the Spring family.

## SEWAGE DISPOSAL AND ENSILAGE.

One of the papers read at the recent Sanitary Congress at Dublin was on "Sewage Disposal," by Professor Henry Robinson, who observed that experience during the past year or two has proved the feasibility of preserving green crops in a succulent state by compressing them in Silos, so that they can be utilised for cattle fodder in the winter. This system deserves notice in connexion with sewage farming, as it is likely to prove a valuable means of getting over the well-known practical difficulty which is experienced of finding a market for the large amount of green crop which is produced by sewage irrigation. In speaking of this system the term "Silo" is applied to the artificial chamber or receptacle for green crops (such as grass, vetches, clover, &c.). The term "Silage" is applied to the crop thus treated, and the term "Ensilage" is applied to the process of making "Silage." The details of the construction of Silos cannot be referred to here, beyond stating that what is required is to construct a pit or chamber either in the form of an excavation in the ground, with a brick or other lining, or by building it above the ground. The object is to enable the green crop to be deposited in an air-and-water-tight chamber, in which pressure can be applied to the crop to compress it. This is effected in some cases by well treading the crop after it is laid in the Silo, and then spreading layers of earth to about a couple of feet and pressing the covering well down. Another way is to construct the Silo with a movable covering of the exact size and shape of its interior. This cover is raised and lowered by suitable chains and rollers. After the crop is placed in the Silo the cover is lowered and weighted, so that a thorough compressing is effected, the weight applied giving about 200 lb. or so per square foot of surface. Salt is sometimes added as the crop is placed in the Silo. A crop thus dealt with is stored for months; when the Silo is opened the fodder is found preserved, and in a state readily taken to by cattle. It is desirable to choose the site for the Silos so that the fodder is preserved somewhere near the place of consumption; also to lay out the works so that as little handling as possible is required. For instance, the Silo should be on sidelong ground, so that the crop can be carted and tipped at a high level, and the silage taken out for use at a lower level.

The conclusions arrived at by Professor Robinson on the general question of sewage disposal are,—

1. That chemical precipitation is not so necessary now as it was considered to be a few years ago in cases where land for irrigation is not procurable.
2. That the efforts to profitably remove the manurial elements from sewage by chemicals not having been successful, the system should be adopted *per se* only where a filtration area cannot be obtained.
3. That the success which has attended the construction of filtration areas where the land is clayey, and the successful results which have been obtained from a combined straining of sewage and of subsequent filtration through small areas of artificial filters, point to the adoption of one or other of these systems in many cases where chemical treatment would previously have been advised.
4. That the injurious effects of passing untreated sewage into a river depend upon not merely the relative volumes of the sewage and the river, but chiefly upon the power of the river to oxidise the sewage, which power is in proportion to the extent of oxidisation of the river itself.

## NOTES FROM BIRMINGHAM.

Three new schools, to accommodate 1,000 children each, are now being built for the Birmingham School Board in Cowper-street, Ada-street, and Stratford-road, and additional class-room accommodation is also being provided to eight schools already built; and it is understood that other land is being sought on which to build more schools until provision is made in efficient schools for all children in the borough of school age.

Attention has been paid in the principal school in the town,—King Edward's School in New-street,—to the requirements of physical education, as well as that of mental education, and the governing body have recently expended a very considerable sum of money in erecting and equipping a large gymnasium for pupils of both sexes. The building is erected on land at the back of the school, and a regular professor of gymnastics has been engaged. It is intended to extend the advantages of this physical education to the branch schools in Camp Hill and Aston.

Some time ago a wave of opinion passed over the town, that in spite of all the efforts which have been made during recent years to pull down and repair and drain the worst of the habitations of the working classes, there yet remained a great deal of property of that class which ought to be removed. Occasionally, a coroner's inquest disclosed conditions of life incompatible with decency, or healthfulness, or morality, and public indignation compelled recognition of the subject in the Town Council, who appointed a committee of their own body, under the presidency of the Mayor, to sit and take evidence from whoever chose to tender it. A general overhauling of the town took place by members of the Town Council other than the committee, and these amongst the rest gave evidence of what they had observed. This evidence showed beyond doubt that the Health Committee and their inspectors had been very lax in putting into force the powers they undoubtedly possess, and that a great deal of insanitary property was occupied by the working classes. The forefathers of this generation absolutely neglected both public and private improvements, they were so busy making money, and a great legacy of old tumble-down insanitary property has been left for this generation and its successors to remove and replace with decent and convenient dwellings and other buildings; and although much has been done in that direction in providing public buildings, it is worse than useless to shut the eyes to the fact that a great deal remains to be done yet in providing decent dwellings for working people. A proposal was made to the Committee to provide large blocks of artisans' dwellings similar to those in London and elsewhere, but it was shown that the general feeling here is against them, and that Birmingham artisans much prefer small self-contained cottages, which they can occupy entirely with their own families. A further proposition arising out of this discussion was that the new tramways, which will shortly connect the centre of the town with the suburbs, in all directions, should take passengers at penny fares the whole distance morning and evening, somewhat as the workmen's trains on the metropolitan lines do in London, and an effort to secure this arrangement is now being made. Besides the old tramways connecting the centre of the town with Bournbrook and Hockley, three new lines are already laid to Villa-cross, Birchfield, and Perry Bar, to Moseley village, and to Nechells. These are ready for use, and several others are being contracted for.

The old extensive premises in Fazeley-street, which were formerly used as gas works, have lately been undergoing transformation to fit them for an ice manufactory. There is a large and deep artesian well there which will be utilised for the water supply. It is said that Messrs. Fellows and Morton, the proprietors, are expending 10,000*l.* in fitting up these works, and one wonders whether they contemplate a long succession of such hot summers as we have recently experienced to recoup them for their outlay.

The suburban village of King's Heath, which lies on the Midland line towards Bromsgrove, has lately had a very important building erected in its midst, in extension of a nucleus begun by Mr. Nettlefold. This consists of a public hall to accommodate 600 persons, with stage arrangements for dramatic performances, library, coffee and reading room, rooms for working men's club, &c. It is now being decorated, and is a very effective building, and has been erected from the designs of Mr. R. F. Matthews, architect, Birmingham.

Twelve months ago, as was reported in the *Builder* at the time, the Messrs. Tangye, Limited, engineers, of Smethwick, near Birmingham, who employ several thousand men, determined to reward their workmen to a greater extent than was represented by wages. They then issued bonds for 100*l.* each to about one in forty of their men, such bonds to bear dividend the same as their other stock or shares, but to give no voting power in the management of the works. In the case of the death of the bondholder, his wife or children might receive the value of the bond in cash, or in other ways, for their benefit. At the annual meeting of the Company, just held, the chairman, Mr. Richard Tangye, announced that they had determined to issue further bonds, so as to increase the bondholders to one in twenty-five. The accident fund, initiated at the same time, had also been successful; no fatal accident had occurred, and less than fifty accidents of any kind, more than nine-tenths of which would not come under the Employers' Liability Act.

The hoarding has now been removed from the pediment over the principal entrance to the new Art Gallery, disclosing the sculpture therein. The central figure represents Fame seated, with a wreath in the left hand resting on the knee, the right hand held out as addressing a female figure, representing Painting on the one side, and a male figure kneeling on the other, and having a sculptured figure resting on the arm, as representing Sculpture, while two very chubby children, engaged in painting and sculpture, fill up each of the two lower angles of the pediment respectively. Mr. Roddis, of Aston, is the sculptor.

St. Philip's Church has recently been reopened, having had its chancel taken down and lengthened. The works have been carried out under Mr. Chatwin, architect. E. G.

**Hydraulic Door-spring.**—Messrs. Archibald Smith & Stevens send us particulars and drawings of Stevens & Major's patent hydraulic spring and check for swing doors, and for regulating the closing of doors so as to prevent banging. This spring is made to fix flush with the floor, and can be even covered with a carpet, and acts as a hinge also. If it does efficiently what it professes, it ought to prove very useful. The patentees give the following general description of the principle of action:—"The spring is placed within a small pump barrel. On opening the door, a charge of oil is drawn from the containing-box into the pump. The spring, while closing the door, has to expel this charge of oil through a small aperture, the size of which is adjustable, and the rate of closing is controlled by the speed at which the oil is allowed to escape. All parts are of metal, and, as oil is constantly passed through, every part is always perfectly lubricated." Simple means of regulating the action for faster or slower closing are provided.

## LONDON AND MIDDLESEX ARCHÆOLOGICAL SOCIETY.

THE recently-announced *conversazione* of this Society took place on the 12th inst. at Skinners' Hall, Dowgate-hill, by permission of the Master, Wardens, and Court of Assistants of the Company, when upwards of 300 ladies and gentlemen, members and friends of the Society, attended. Among the many objects of interest exhibited in the hall were specimens of Roman sculpture excavated in Bevis Marks, and models of some found in Camomile-street.

The proceedings of the evening were commenced by a paper read by Mr. G. Lawrence Gomme, F.S.A., "On the Early Municipal History of London."

"Reminiscences of the Church and Parish of St. John the Baptist-upon-Walbrook" was the title of the next paper, and this was read by Mr. Henry Mathews, architect, who said that for more than five centuries the Skinners' Company had been identified with this parish. The ancient Wall-Brook, as was well known, was navigable for small craft from the Thames to Barge-yard, Bucklersbury, and was crossed by several bridges; one in Cloak-lane was named "Horse Shoe Bridge." Afterwards the Brook was arched over in brick and became a common sewer. This old sewer has for many years been disused, but the relics of it were still to be found in the garden of the Skinners' Hall. In the old church were two monuments of note, one to the memory of John Stone Taylor, sheriff in 1464, and the other to William Comberton. Under an order of James I. in 1610, "that all churches should be repaired and made fit for the service of God," the vestrymen resolved that the mason's work of the church be repaired "from top to bottom," and all things necessary thereto. The first church was probably built not later than *temp.* Edward III., as the excavations for the District Railway works had disclosed the immense thickness of the rubble work, and particularly the foundation of the original tower. The church was partly destroyed by the Great Fire, though the Tabernacle, as it was termed, was repaired and used as a place of worship till the church of St. Antholin was built, and the two churches united. The remaining materials were then removed or buried, and the site laid out as a place of interment. Since then it has been laid out as a garden, and so continued till the ruthless hand of the railway contractor would have obliterated every trace of its sacred purpose had not a provision been made by the Act of Parliament that every vestige of human remains should have a receptacle in a new vault 20 ft. below the surface, which has been provided, and the whole hermetically sealed. In a few months, a monument will be erected over the crown of the arch as a memorial of the dead and the ancient church of St. John the Baptist-upon-Walbrook.

A third paper read was "On the recent Discoveries made on the Line of the Inner Circle Railway and at Bevis Marks," by Mr. John E. Price, F.S.A., the hon. sec. of the Society. Mr. Price said that in making the necessary excavations for the Inner Circle Railway, the contractors came upon the remains of one of the bastions which formed part of the old London wall. This contained several sculptured stones of much interest. Fortunately, the contractors at once put a stop to the excavations, erected supports under the gas and other pipes which had been placed above it, and allowed the Society to make sketches, *in situ*, and afterwards took means for the protection of the stones. Eight years ago, a gentleman had called upon Mr. W. H. Overall, the librarian at the Guildhall, and told him he had found some extraordinarily large stones whilst making excavations in St. Mary Axe, which appeared to be the remains of tombs, temples, and other Roman buildings. These were preserved and placed in the Guildhall Library. On reference to Aggas's map, it would be found that four bastions were shown, each with a tower at the top, so that at that time (*temp.* Elizabeth) they were still standing. During the last six years portions of the Roman wall with these four bastions had been excavated. These bastions seemed to have been built in Mediæval times for the purpose of strengthening the wall, and that was probably the reason why these large Roman stones were used for their bases. They would have to take whatever material they could find, and these were of such a size that they would not have been brought from any great distance. The first bastion was discovered in Camomile-street, the second also was near there, the third being in John-street, Minories, and the fourth in Castle-street, Bevis Marks. The Society had now examined each of the four bastions. Amongst the objects discovered at Bevis Marks was a sarcophagus, 8 ft. long, and some Roman inscriptions.

## COMPETITIONS.

*Board Schools, Eglam.*—We have received the following letter:—

Sir,—The Egham School Board, after long and careful examination of the fifty-four designs forwarded to them in the above competition, assisted by competent advisers and the Education Department, to whom a limited number of the designs were sent for approval, have decided to adopt the plans submitted to them under the motto "Four les Enfants," prepared by Edward Harnor, esq., A.R.I.B.A., of 8, John-street, Adelphi. The second premium of 16*l.* has been awarded to J. Sargeant, esq., of Grosvenor-gardens, London, author of design forwarded under the motto of "Measure for Measure." The rejected designs (with the exception of one, on nine large frames, sent under the motto of "Light and Air," without address) have been returned, carriage paid, to their respective owners.—
Yours faithfully, BENJAMIN TICE,
Hon. Clerk to the Board.

*Beaconsfield Club, Nottingham.*—In a limited competition, the plans of Mr. William Graham Lees, architect, of Nottingham, have been selected for the Beaconsfield Club in that town.

## BAD MORTAR.

### DEMOLITION OF BUILDINGS.

ON the 16th of August, 1882, Simeon Murray, a builder, of Hackney, was summoned under section 17 of 41 & 42 Vict., c. 32, by the District Surveyor for East Hackney, for using mortar in two buildings not composed of fresh-burned lime and clean sharp sand or grit without earthy matter, in two houses at Shepscott-road, Hackney, as required by the Board's By-law No. 2, made under the above Act, and was fined 3*l.*, and 2*s.* costs. No alteration having been made in the buildings, the Metropolitan Board of Works took proceedings under the second part of section 17 of the above Act, for an order to demolish the buildings in question, and on the 21st day of December, 1882, Mr. Bushby, sitting at the Worship-street Police-court, made the order.

Immediately upon the order being made, the defendant, who had in the meanwhile mortgaged the premises, instituted an action in the High Court to restrain the Board from putting in force the order; but upon the hearing, the plaintiff did not appear, and the verdict was entered for the Board with costs.

The Board have now proceeded to put in force the order, and have taken down the walls of one house, and the demolition of the other house, which is at present tenanted, will be also at once proceeded with.

The above action on the part of the Board involves a serious loss to the mortgagees, as practically now their security for advances to the mortgagor has vanished.

## CASE UNDER THE METROPOLITAN BUILDING ACT.

### WHAT IS A PUBLIC BUILDING?

THE Manager of the Metropolitan Asylums Board was summoned to Worship-street Police Court on Wednesday by Mr. Meeson, surveyor of East Hackney (North), for not giving notice of certain public buildings in Brooksby's-walk, Homerton, and for not depositing plans of the same.

A solicitor represented the Board, and the question turned on whether the building in question was a public building within the meaning of the Act.

It was admitted that the building,—an extensive range,—adjoined the already-erected fever hospital. Its purposes were for the storage of the ambulances, stabling for the horses, and rooms for the coachmen and nurses of the ambulance service. It was contended that as the public would not be admitted to any part of the building, and as the building was not attached to the hospital, it was not public.

Mr. Meeson contended that the buildings were part of the hospital under the direction of the Board, and were paid for by public funds.

Mr. Hannay (the magistrate) said the Act was difficult to construe, but he came to the conclusion that the building was a public building, therefore he fined the Board 2*s.* A case would be granted for the High Court if desired.

**Paperhangings at the Health Exhibition.** Messrs. William Woollams & Co. write to point out that their name was incorrectly inserted in our list of awards at the Health Exhibition as "Woollams, Williams, & Co." It should be "Woollams, Wm., & Co." The error if uncorrected is likely to lead to confusion, since there is not only another "Woollams," but also a "Williams" in the trade.

## THE NEW NATIONAL LIBERAL CLUB.

SIR,—I am glad to see you have taken "note," as many have done, of the controversy in the *Pall Mall Gazette* over Mr. Waterhouse's design for this important building. You sum up the matter at issue exactly, as it seems to me, in your concluding words, "The most important point is the statement that Mr. Waterhouse had designed something much better and after his own heart, and was prevented from carrying it out by the intervention of bumbledom," and Mr. Waterhouse has never yet denied this. I was about to write to the *Pall Mall* when I noticed they had closed the correspondence; but what I wished to draw attention to is this, that judging from a view of "Whitehall-court" which has recently been published, it seems manifest "Bumbledom" has interfered to some purpose. I have no desire to say anything about the design of Whitehall-court as such, except that it does not promise much relief from "the general harmony of the district," but it must be apparent to everybody who looks at the view that the club has been made a mere cat's-paw of to enhance the size and "grandure" (*sic*) of the court. The spectacle of their clubhouse, tacked on in this fashion to the end of the company's residential chambers, and made to play second fiddle to assist the company's dividends, must be a humbling reflection for the members, if, in point of fact, this is all they are allowed to get for their 120,000*l.* of outlay.

Another question, also, is being pretty freely asked, What is the use of the Institute if it cannot protect one of its most distinguished members,—one of its own vice-presidents,—from being sat upon in this manner? It is always claiming to be the representative of the profession. If what we are told is true, here is a professional grievance. Will the Council take it up on professional grounds, and make a remonstrance against such high-handed procedure? If not, one can hardly wonder why its members are snubbed with impunity by the so-called "Crown authorities." If not, what is the use of being a member? F. S. A.

*** The Institute could hardly take up the matter unless Mr. Waterhouse requested them to do so. That gentleman has not, so far, we believe, made any positive public statement of having been architecturally aggrieved in the matter; he has only allowed such a statement to pass uncontradicted. We may, of course, draw our own conclusions, but the Institute could hardly act on "conclusions."

## WESTMINSTER HALL AND MODERN ARCHITECTURE.

SIR,—Mr. Tarver's definition of modern architecture, in your issue of the 8th inst. [p. 641], is certainly an ideal one; but I fear it is open to serious question. There are certain developments of our architecture to which the epithet "modern" is unfortunately specially applicable. As types of these, take some of our new big hotels, and what I would call generally our "street-corner" architecture, or, as another phase, our shoddy suburban builders' houses. Now all such buildings are very distinctly characteristic of the age we live in; but while certainly "left free to express themselves" (a great misfortune), they can hardly be said to do so either "honestly" or "beautifully," but rather very hideously, and, considering our present opportunities of study and enlightenment, it seems not extravagant to say that they constitute a national disgrace.

Reaching thus a sadly less ideal, but certainly more practical definition of "modern architecture," it is surely a matter of congratulation that the "Great Hall of William Rufus" is not about to be improved by erections "as modern in style as possible;" albeit Mr. Tarver does suggest a limit to their lack of harmony.

As a precedent for this limit we are referred to sixteenth-century prebendal buildings around our cathedrals. But is this to the point? We must remember that at Westminster Hall we have only monumental architecture to consider (although the *D. T.* would beautify it with a covering of ivy), and prebendal buildings are not monumental. Again, they are but parasites to the buildings they surround, while the proposed additions to the Hall form part and parcel of itself. In such case, in seeking for a precedent for harmony between old and new work, we must look for one which bears accurately upon the question, and we have not far to seek.

Who but an expert can tell that the nave of Westminster Abbey is of three distinct dates? And who have succeeded best? Its builders, who have not scorned to "imitate a past style," or the builders

of the western towers, who have refused to be "hampered by mere imitations"?

The precedent is good, and applicable, and fully justifies (if justification were needed) the architect's choice of style in his proposed *completion* of the exterior of Westminster Hall.

I use the word *completion* advisedly, for I believe this view of the question has been entirely overlooked, and is the only right one; and I say this after a most careful examination of the drawings, the site, and all that has been written on the subject.

Mr. Tarver admits he has not seen the drawings, but, if before writing he had taken pains to study the subject as I have, he would have found that the first of his excellent generalities, "that restoration for its own sake is a fatal mistake," never applied less than to this case, and that the remaining two as to "preservation" and "use" testify most strongly in favour of the proposals.

There is more than one way in which generalities are applicable to special cases.

A MEMBER OF THE ARCHITECTURAL ASSOCIATION.

## SMELL FROM KITCHENER.

SIR,—I should feel greatly obliged if any of your readers could give me any suggestion as to an effectual remedy for above. My kitchener, of about 6 t. frontage, is in the basement, and when any cooking is going on at all times (but I notice it particularly in the morning), the smell comes up the stairs and all over the house, and is most objectionable. I have enclosed the landing from the basement, and tried to shut it in, but immediately the door is opened it escapes all over the house. I have tried some other means, but unsuccessfully. It is not a question of cost. If any one could inform me how it could be effectually altered, so that there should not be any doubt of its success, I should be extremely obliged. It has been suggested to me that a hood over the fireplace, projecting into the kitchen, with a pipe from the top into the chimney, might be successful. Have any of your readers tried anything like this, and if so, would they kindly give me their experience of it? KITCHENER.

## CHURCH BUILDING NEWS.

*Oddington.*—The parish church here has just been reopened, after restoration. On Saturday, the 1st inst., the church was visited by the Oxford Architectural and Historical Society, who chose it as the first of their term's excursions. Mr. Bruton, the architect, from whose designs the church has been restored, met the members and delivered a lecture, from which the following particulars have been abstracted: "This is a most interesting example of a very simple church, built very early in the fourteenth century, and consists of nave, chancel, and north aisle, to which has now been added a small vestry on the north side. The only internal evidence of a north aisle having ever existed was to be seen on the north side of the chancel arch, where there was a semi-arch of stone springing from the north wall up to, and apparently intended to support, the plaster chancel arch. The external walls undoubtedly led to the suggestion that the arcade of the north aisle had been removed. Admitting this hypothesis, the symmetry of the church becomes apparent. Investigation proved that the north wall had been raised, and a common queen-post roof made to span the entire width. This wall being of less substance than that on the south, had in several places given way, and modern buttresses had been built against it to withstand the thrust. The roof had become very unsound and the ceiling dangerous, and many of the timbers decayed. Above the flat ceiling, and under the roof, was discovered the original water tabling, now to be seen on the tower above the restored roof. The lines of this water tabling conclusively proved the original existence of a north aisle, the centre line of the original roof being central with the tower. When the roof was removed there appeared above the ceiling line at the east end remains of an earlier chancel arch, but further investigation proved that this was not original. In removing the upper part of the north wall, to bring it to the level necessary for the roof, it was hoped that further remains would be discovered. None of the stones, however, which were found could be said to belong to it; but several of an ornamental character clearly belonged to a twelfth-century arch, which was probably removed when the before-mentioned one was built. This, of course, was done to get a wider opening between the nave and chancel. Mature consideration convinced one that this arch and the shafts were part of the north arcade, and, in fact, the before-mentioned shaft and respond have been replaced at the west end of the restored arcade, where, it is believed, they originally belonged. The stones of the arch and of the shaft have been re-used without any disturbance of the original surface, and several of the stones bear upon their face painted scroll work belonging to the period. There is similar work to be seen at Charlton-on-Otmoor. The bases and capitals were too much mutilated to be re-used, the mouldings having been cut away to receive the framing of the plaster sham arch. These mouldings have been carefully reproduced in all the capitals and bases of the arcade; the new arches are also facsimiles of the discovered one. The windows of the south side of the north aisle had been much mutilated, with the exception of the western window of the north aisle, which is original; the mullions and heads had been removed, and the jambs cut away, and the space covered with a single arch. The new roof has tie-beams, with moulded king-posts, with framed rafters belonging to the period of Edward II., which has been adopted, although belonging to a slightly later period than the walls; because the walls are slightly out of upright, and this kind of roof has no thrust. The original pulpit, upon which the date 1617 can be seen, has been re-used, and new oak benches, facsimiles of some fifteenth-century originals, replace high close pews of the last century. The roof of the chancel is of a similar character to that on the nave, replacing a bracketted plastered ceiling, elliptical in section." The work has been executed by Messrs. Silver, Sons, & Filewood, builders, Maidenhead, at a cost of about 1 200*l.*, from the designs and under the direction of Mr. Edward G. Bruton, architect, of Oxford, and surveyor for the diocese.

*London.*—After having been closed for two months for internal decorations and repairs the ancient church of St. Nicholas Cole Abbey, in Queen Victoria-street and Knightrider-street, has just been re-opened. The original church, erected in 1377, was one of those destroyed by the Great Fire in 1666, and the present church was erected in 1677 from the designs of Sir Christopher Wren. Some twelve years ago the interior underwent a restoration which consisted, amongst other things, of cutting down the high pews and repaving the flooring with tiles of a Mediæval pattern. Amongst the work which has now just been carried out is the decoration of the flat plaster ceiling, which is divided into fifteen panels; and also the painting and decoration of the walls. The decorations of the ceiling have been carried out in turquoise blue, cream colour, and light reds, interspersed with gilding. The prevailing tones of the colouring on the walls are dull reds and dead gold. The ceiling colours have been partly brought down into the cornice and toned off into the dull reds of the walls and pilasters. By this means the extreme flatness of the ceiling has been overcome. The windows on the north side and at the east end, from which only the church is lighted, have been filled in with stained glass, the upper portion of the windows on the north side having canopy work, with arches, wreaths, and pediments, together with heraldic shields. The three east windows are filled entirely with stained glass, the central window representing our Lord in glory, that on the north side St. Mary and St. Peter, and the one on the south side St. Nicholas and St. Benedict. The old oak reredos, with its fine carvings, either from the hand of Grinling Gibbons or one of his pupils, has been slightly touched here and there with gold. The Tables of the Law have been placed on either side within the chancel rails, whilst the central portion has a square panel, which is intended to contain the Adoration of the Lamb, in mosaic. Above, on each side of the windows, the wall is marked out in panels, each panel containing representations of scriptural figures and characters. Clergy and choir stalls have also been constructed on each side of the chancel. The decorative works have been carried out from the drawings of the architect, Mr. George H. Birch, the designer of the Old London Street at the Health Exhibition, the general decorative contractors being Messrs. Campbell, Smith, & Campbell, of Newman-street, Oxford-street, whilst the internal alterations have been effected by Mr. Spencer, of Knightrider-street. The cost of the decorations of the east windows and the reredos has been defrayed by the new rector (the Rev. H. C. Shuttleworth) and his friends.

*Goathurst.*—The parish church of Goathurst, near Bridgwater, has lately undergone an internal as well as external restoration. Dedicated to St. Edward, it consists of nave, western tower, chancel, south porch, south transept, and north chancel aisle, and belongs to the Decorated period of architecture. Considerable alterations were made in the fifteenth century, when the walls were raised, larger windows inserted, and the existing roof placed on the nave. In the course of the execution of the present restoration all the plaster was removed both from the internal and external faces of the walls, and many interesting features were brought to light. The original north doorway, with a portion of the wood and the iron hinges of the door, were brought into view; also the doorways at the foot and at the head of the staircase to the rood-loft. The whole of the walls have now been pointed externally, while internally they have been re-plastered and finished with stucco of the colour of Ham stone, and all the features of the ancient building preserved. The parapet of the tower and staircase, which was in an unsafe condition, has been entirely rebuilt with rag stone and Ham stone dressings, and the roof covered with new lead. The windows of the belfry have been fitted with pierced Ham stone panels. The dressed stonework generally has been repaired and in some cases entirely renewed. The nave has been re-seated, the old oak of the former seats with carved ends having been worked in again. The Tynte monuments in the nave have been taken down and re-arranged, so as not to interfere with the architectural features of the interior. One of these, that to Sir Charles Tynte, is by Nollekens. All the windows in the chancel have been filled with painted glass by Messrs. Lavers, Barraud, & Westlake, of Endell-street, Bloomsbury. The hot-water pipes for warming have been fixed by Messrs. Culverwell, of Bridgwater. The work has been carried out by Mr. Henry W. Pollard, the general contractor; and Mr. Chas. Green, stonemason, both of Bridgwater, from the plans and under the direction of Mr. Houghton Spencer, of Taunton, architect.

# The Student's Column.

## ON THE CONSTRUCTION OF ROOFS.

IV.

QUEEN-POST ROOFS are employed in preference to the king-post roofs, described in the last article, where the span is considerable. In this form of roof the heads of the principals are framed into two vertical pieces called *queen-posts*, as Q (fig. 10)

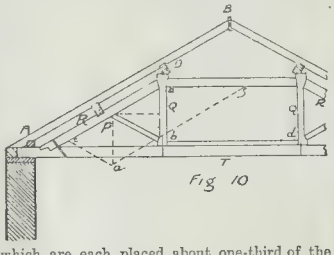


Fig 10

which are each placed about one-third of the span from the feet of the principals. The reaction of the principals is counteracted by means of a horizontal *straining-beam*, S, framed into the heads of the *queens*, which, by this means, are enabled to support the weight of the tie-beam. In roofs of from 30 ft. to 40 ft. span two purlins will suffice on each side of the roof, one being supported on the top of the queen, as D, and the other, P, half way between D and A, as in the king-post roof. The strut, P *b*, supports the middle of the principal, and its horizontal thrust on the foot of the *queen* is counterbalanced by a corresponding thrust from the other strut at *d*, which is conveyed along a *straining-sill*, *b d*, laid on the top of the tie-beam, and bolted to it, without which there would be danger of displacing or overstraining the joint of the queen-posts with the tie-beam. Where the span does not exceed 40 ft., the heads of the rafters at B do not require any support beyond that which they afford each other by being spiked to the *ridge-piece*, and the purlin, D, has to support half the load on the rafters, A B, or one-fourth of W, which we

put for the whole weight on each truss. The purlin, P, will sustain one-third of the load on the rafters, or one-sixth of W; and one-twelfth of W rests on the *pole-plate*, A.

The strains on the parts of a queen-post roof are similar in character to those of a king-post roof, but different in magnitude. Each queen has to sustain one-third of the load on the tie-beam, while the vertical strain arising from the thrust of the strut is only half that which a king-post sustains. If we represent the vertical load at P by the line P*a*, and draw *a b* and *a c* parallel to A B and P *b* respectively, P *b* will be the thrust down the strut, and the horizontal line P Q will be the thrust along the straining-sill *b d*, while Q *b* will represent the vertical strain down the queen. The purlin D presses on the head of the queen, and produces a thrust down the principal, and a compression along the straining-beam S. Let the length *b e* represent the vertical load at D, and the part of the weight of tie-beam which the queen sustains: draw S *b* parallel to A B, then S *e* will represent the compression along the straining-beam, and *e c* will represent the thrust down the principal, R, arising from this force; in addition to which R has to sustain the thrust, P *c*, arising from the load at P.

For spans exceeding 40 ft., it is necessary to sustain the ridge, B, by means of a king-post truss, of which the straining-beam, S, will form the tie-beam, which is thereby prevented from sagging; or struts from *b* and *d* to the centre of S can be introduced for the latter purpose, and the straining-sill, *b d*, omitted.

Cast-iron heads and shoes, and wrought-iron rods, can be substituted for the timber queen-posts, as before described for king-post roofs.

All framed roofs, with tie-beams, are made upon the principle of either the king or queen truss, or a combination of the two, which may be employed for roofs up to a span of 90 ft.

The scantlings of the timbers for a queen-post roof for a span of 40 ft. should be at least as follows:—Tie-beam 9 in. by 5 in., principals 6 in. by 5 in., straining-beam 8 in. by 5 in., struts 5 in. by 3 in., queens 5 in. by 3 in. at the smallest part, purlins 8 in. by 5 in. For 50 ft. span, tie-beam 11 in. by 6 in., principals 7 in. by 6 in., straining-beam 10 in. by 6 in., struts 6 in. by 5 in., queens 6 in. by 5 in., purlins 9 in. by 6 in. if there are only two on each side, or 8 in. by 5 in. if there are three to a side.

*Hammer-beam roofs* are frequently found over buildings erected in the fifteenth century, and the form of framing is a modification of the *collar-roof* described in the last article; only, instead of each pair of rafters being framed, trusses are formed of heavier timber, and the common rafters supported upon them by means of purlins.

The principle of their construction is shown by fig. 11, in which R R are the principal

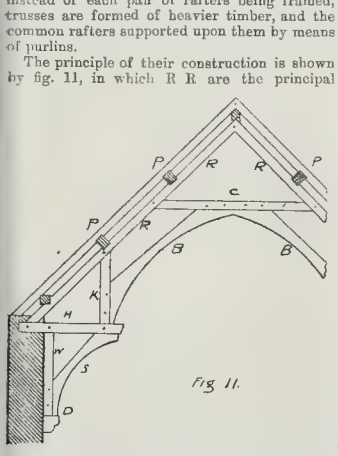



*Fig.* 11.

rafters which are framed into a horizontal beam, H, called the *hammer-beam*, which projects some distance from the wall, in some cases as much as one-fourth of the span. The hammer-beam is supported by the *waling-piece*, W, fixed upright against the wall and resting on a stone corbel, D; also by a strut, S, fixed between the corbel and the outer end of the hammer-beam. From the outer end of the hammer-beam rises the vertical strut, K, which is framed into the principal R. A collar-beam, C, is placed across from one principal to the other, and a pair of braces, B B, connect the ends of the hammer-beams with the centre of the collar, thereby tying the two hammer-beams together. The rafters are carried by the purlins, P, which are often deeply moulded. If there was no shrinkage of the wood, such a piece of framing ought to be perfectly rigid, and produce no thrust on the walls, as it consists of a number of triangles whose forms cannot be altered without a lengthening or shortening of the pieces which form the sides of the triangles. Practically, however, there is a considerable thrust on the walls which require to be made much stronger than for a tie-beam roof, or else to have buttresses built against them opposite each principal.

In this piece of framing, the hammer-beams are subjected to tensile strain in the direction of their length, and a compression where the struts abut against it; the waling-piece, W, is compressed, and also the struts, S and K; the collar, C, and the braces, B, are subjected to a tensile strain; the principals, R, have to bear a compressive strain down their length, and also a cross strain.

The timbers in these old roofs were generally of large scantling, as compared with those employed in modern tie-beam roofs of the same span; thus we find that in the roof of a small village church in Suffolk, where the span is only 18 ft., the principals, hammer-beams, and collars, are 10 in. by 8 in., and the common rafters, 6 in. by 3 in.; while in another of 20 ft. span, the principals and hammer-beams are 13 in. by 10 in. In modern roofs, constructed after this fashion, it has generally been found necessary to connect the outer ends of the hammer-beams by means of iron tie-rods, so as really to convert them into tie-beam roofs.

The roof of Westminster Hall, which has a span of 68 ft., is the finest specimen of hammer-beam roof now in existence, and is constructed on the same principle as shown by fig. 11, with the addition of a curved rib, springing from the corbel, D, and passing between the strut, S, and the waling, W, between the strut, K, and the principal, R, and meeting the braces, B, at the centre of the collar; all the triangular spaces between the timbers are filled up with open arcading of timber, which adds greatly to the rigidity of the framework.

The strains on the several pieces of a hammer-beam truss can be ascertained by the "resolution of forces," as shown in king and queen post roofs, and the scantlings of the timbers should be rather more than was found necessary for tie-beam roofs.

Another method of building roofs without a horizontal tie-beam, so as to carry the room up into the roof, is by the use of semi-circular ribs, formed of two or more thicknesses of short pieces of plank bolted together so as to break joint. The ends of these ribs rest upon a plate of timber or shoes of iron, and the weight of the roof covering is supported by means of

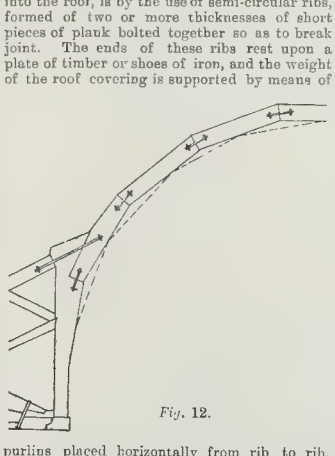


*Fig.* 12.

purlins placed horizontally from rib to rib. The roof of the central hall of the Pantheon in Oxford-street is constructed in this manner, and a portion of it is shown by fig. 12 (from Tredgold's "Carpentry"). The span of this roof is 38 ft., and the ribs are placed 11 ft. 6 in. apart, each rib consisting of a central plank of teak, 5 in. thick, with a 2½ plank of fir on each side, as shown by the dotted line. The depth of the ribs is 16 in., and they rest at the foot in cast-iron shoes, which also receive the tie-beam of a half-truss forming the roof over the side galleries, which serve as a buttress to prevent the feet of the ribs from spreading laterally.

A large semi-circular roof of wood was erected over the Great Northern Railway station in London, having a span of 105 ft. The ribs were formed of 1¼-in. deal planks, laid with their broad side horizontal, and bent to the required curve, the planks being prevented from straightening out by crossing the grain of the wood. The wood ribs were firmly fixed in a cast-iron spandrel built into the wall, and rising to a height of 40 ft. Purlins were laid across from rib to rib, and the roof covering of slate and glass fixed thereto. Details of this roof will be found in the *Builder*, 1852.

The scantling of the ribs for roofs constructed as shown by fig. 12, when the purlins rest immediately on the ribs, should be as follows:—For a span of 30 ft., the breadth should be 10 in. and the depth 17½ in.; for 40 ft., breadth 12 in. and depth 18 in.; for 50 ft., breadth 14 in., depth 19 in.; for 60 ft. span, breadth 15 in., and depth 20 in. Fir is supposed to be the material used in these cases, and the ribs placed 10 ft. apart. These scantlings are obtained from the following rule, which may be considered sufficiently correct for practical purposes. Divide 200 times the radius of the rib (in feet) taken at the middle of the depth, by the breadth in inches, the square root of the quotient will be the depth in inches. The horizontal thrust of the rib at the springing, when the load on the roof is 50 lb. on every square foot, may be approximately found by multiplying the radius in feet by 375, and the result will be the thrust in pounds.

In order to prevent the ends of tie-beams from rotting through contact with the damp of a wall, cast-iron *shoes* or *plates* are laid on the walls for the timbers to rest in, and secured with bolts passed through the iron and wood. Wrought-iron straps are valuable to secure joints wherever there is a tensile strain on the beams, as at the junction of a collar-beam with the principals where horizontal straps should be used and bolted to the collar, the back of the principals being notched out to give the straps a firm hold.

## LEAN-TO ROOFS.

SIR,—In the "Student's Column" in the *Builder* for Nov. 8, in treating of lean-to roofs, the subject of inclined beams is dealt with, but not, I think, with sufficient detail. If the writer would oblige by replying to the following questions I think he would confer a benefit upon many students:—

1. What is the effect of the inclined beam and its load upon the higher support?

2. Is there not a horizontal thrust acting there equal and opposite to that on the lower support, tending, in fact, to separate the supports by thrusting them apart?

3. What proportion of entire vertical load is carried upon each of the supports?

In the article referred to, it is stated that the horizontal thrust of a span roof of a given angle is double that of a lean-to roof of the same angle. If a lean-to roof *simply abutted against* a wall at the top the outward thrust would be equal to that of a span roof, because such abutment would be equivalent to that of an opposite rafter. I take it, therefore, that if the statement be correct that the lean-to roof has a thrust of only one-half that of the span roof; the fact is only true when the lean-to has support from *beneath* at its higher end.

Can such theories be proved to ocular demonstration, say, by means of cords and weights passing over pulleys? INVESTIGATOR.

*** The effect of the inclined rafter of a shed-roof, as shown on figs. 2 and 3, upon the higher support, is simply that of a vertical pressure, and there is no horizontal thrust against the upper wall, the rafter *resting* upon the plate and not leaning against it. If, however, the lower support should yield at all, the rafter will tend to *pull* the upper wall over. The vertical pressures on each wall will be equal, which can be demonstrated experimentally by suspending each end of a beam by a cord passing over a pulley, and having a weight equal to half that of the beam hung therefrom; the beam will be found to balance in any position whether level or inclined at any angle.

In the article referred to it is *not* "stated that the horizontal thrust of a span-roof of a given angle is double that of a lean-to roof of the same angle." We have purposely avoided using all mathematical symbols in the articles for the "Student's Column," but to any one who is acquainted with trigonometry the following investigations will be easily understood. If $\theta$ is the angle of pitch, then, by the resolution of forces, the thrust down the rafter of the shed-roof (fig. 2) is $bc$ = W. sin $\theta$, and

the horizontal thrust is $bd = bc \times \cos\theta = W.\sin\theta\cos\theta = \frac{1}{2}W.\sin 2\theta$; which is greatest when $\theta = 45°$, the horizontal thrust being $\frac{1}{2}W$ in that case; it is least when $\theta$ is 0° or 90°, for in either case there is no thrust.

In the span-roof (fig. 5) the horizontal thrust is $Bb = \frac{1}{2}W.\cos\theta$, which diminishes as the angle of pitch increases, becoming nothing when $\theta$ is 90°, but getting greater and greater as $\theta$ diminishes. When $\theta = 45°$ the horizontal thrust will be $\frac{1}{2}$ W in both the shed and span roofs.

If the rafter of the shed-roof merely leans against the upper wall, and does not rest upon it in the manner described, then the thrust on the lower wall will, of course, be the same as in the span-roof having the same pitch and length of rafter, and there will also be an equal thrust against the higher wall. In practice, however, shed-roofs are not constructed in this manner.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

790, Improvements in Water-waste Preventers. G. Homewood.

In order to facilitate the rapid filling and discharge of the cistern a new description of valve and syphon is here used, the two being connected, and allowing, upon raising the valve from its seat, an immediate flow of water, which exhausts the air in the syphon. This exhaust causes a continuous flow through the syphon, until the cistern is emptied. A provision is made for admitting air by means of a small hole, and also by a notch in the short leg of the syphon, by the action of which the water is cut off, and prevented from flowing through the syphon till the valve connected with the said syphon is again raised.

12,118, Improved Flooring Clamp. R. & R. W. Booth.

The object here is cheapness in construction and effectiveness in action. The flooring clamp has a vertical worm actuated by a lever handle, which together act on a rack or toothed bar. A washer of a peculiarly serrated pattern is used so as to prevent the return or springing of the clamp.

9,450, Improved System of Ventilation. M. Tobin.

Several modifications of the well-known system of ventilation introduced by Mr. Tobin are here protected. They consist of arrangements for allowing fresh air to be admitted without draught by window sashes, doors, or orifices in the walls of the apartment. In the form best known where ventilation is arranged by tubes in the room if the current of air is strong outside, it would, being admitted vertically, strike, and be deflected from a low ceiling, and produce a downward draught. In the present improvement air is admitted by circular orifices arranged in groups or lines. Immediately in front of the group of lines or holes a vertical baffle is arranged, against which the currents of air strike, and are deflected in a series of vertical eddies. Fresh air is thus imperceptibly introduced throughout the apartment without possibility of draught, direct or deflected outlets for the foul air being provided.

### APPLICATIONS FOR LETTERS PATENT.

*Nov.* 7.—14,697, G. Messenger and S. T. Messenger, Ventilators and Chimney Cowls.—14,711, A. Mackie, Machinery for Grinding and Shaping Bricks.—14,712, J. M. Morrath, Sanitary Constructions of Fire and Earthquake Proof Houses.—14,715, W. Nicholls, Painting or Cleaning Window-sashes without risk.—14,721, H. E. Devaux, Manufacture of Cement.

*Nov.* 8.—14,755, J. Halley, Improved System of Laying Wood Pavements.—14,778, H. C. Webb, Improvements in Door Knobs.

*Nov.* 10.—14,787, W. Lindsay, Improvements in Roller Blinds.—14,797, C. Spratt and A. Churchman, Universal Cycle Clamp.—14,805, A. De Bourbon and C. De Bourbon, Embossed Wood Grained Paper, to imitate carved wood and stone.—14,816, F. R. Strickland, Opening and Closing of Sliding Sashes and Doors.

*Nov.* 11.—14,830, J. Westley, Ventilating Heating Gas Stove.—14,839, J. Shaw, Preventing Smoke in Open Firegrates.—14,861, W. G. Stuart, Water Meters.—14,863, A. Spencer, Holding Sliding Windows in closed or open positions.—14,877, S. W. Worssam, Horizontal Sawing Machines.

*Nov.* 12.—14,882, S. Moorhouse, Heating Buildings.—14,888, F. Willcox, Ventilators.—14,892, J. Winfield and H. G. Evered, Combined Cooking and Ornamental Over-mantel Register.—14,896, T. Walter, Flushing Apparatus for Water-closets, &c.—14,904, J. Adams, Balancing Window-sashes.—14,909, H. Sykes, Improvements in Planes.—14,909, P. Bowden, Manufacture of Bricks and Tiles.—14,917, R. Stoffert, Improvements in Girders.—14,918, R. Lawrence, Apparatus for Polishing Granite.—14,919, T. C. March, Protecting Screens for Horticultural Buildings, &c.

*Nov.* 13.—14,943, I. T. Taylor, Washing Sand or other Materials.—14,957, W. C. Morton, Improvements in Window-blinds.—14,984, W. Edwards, Improvements in Bolts.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

132, J. S. Sweet, Ventilating Houses.—13,017, F. Willcox, Improvements in Ventilators.—13,095, W. Brock, Construction of Sanitary Houses and Bungalows.—13,350, J. C. Webb, Kilns and Stoves.—13,412, F. West, an Adjustable Crane, specially applicable to Concrete Building.—13,497, S. Chinn, Exhaust Ventilators.—13,525, W. Paulson, Ventilating Rooms and Preventing Smoke.—13,719, T. W. Helliwell, Securing and Fixing to Roofs, Flats, or Sides of Buildings sheets of Zinc, Copper, Corrugated Metal, or other material.—13,924, A. M. Clark, Excavators.—13,990, T. Thorley, Chimney-breast Ventilators.—14,087, J. Farthing and J. Lorrimer, Artificial Asphalte.—14,141, R. Haywards, Fixing Door-handles to their Spindles.—14,308, C. Leech, T. Neal, O. Lilly, and H. J. Staples, Manufacture of Indian Red, Venetian Red, and other Oxide of Iron Pigments.—386, J. B. Shaw, Artificial Marbles, Granites, &c.—7,089, W. Moyes, sen., G. Moyes, and W. Moyes, jun., Urinals and Water-closets.—12,805, W. L. Wise, Grinding or Shaping Cutting Tools.—13,390, W. Crowder, Automatic Bolt or Fastener.—13,646, F. Howcroft, Automatic Sash-lock.—13,761, M. Dennstedt, Manufacture and Preservation of Articles of Gypsum, Stucco, or the like.—13,909, J. Caink, Sewer Ventilation.—14,094, W. Perry, Stop for Mortising Machine.—14,120, J. Walker, Roses and Barrels for Mace's Door Furniture.—14,567, G. Connell, Dormer Windows.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

2,585, D. Wande, Door Knockers and Bells.—132, J. Sweet, Ventilating Houses.—386, J. B. Shaw and W. S. Shaw, Artificial Marbles, Granites, &c.—402, E. Norcombe, Sash Fasteners.—475, H. Knowles, Construction of Kilns.—494, T. Harrison, Joint for Sanitary or other Pipes.—703, J. McCallum, Water-closets, &c.—727, J. Kay, Manufacture of White Lead.—1,224, G. Bratt, Combined Lock and Lifting Latch for Doors.—1,374, E. Howard, Water-waste Preventer for Water-closets, &c.—1,512, F. Bosshardt, Tile-making Machinery.—1,514, W. Wade, Self-adjusting Sash Fastener.—1,526, C. Kite, Automatic Exhaust Ventilator.—1,597, W. Duncan, Transportable Buildings.—1,636, H. Hart, Improved Method of Laying Bricks.—1,699, P. Laurence, Parallel Screw or Bench Vice.—1,795, H. Phillips, Chimney Tops and Ventilating Cowl.—1,903, F. Smith, Tall-boys for Preventing Downdraughts.—1,986, A. Thomson, Chimney Cowls.—2,320, E. Brewer, Pipe Joints.—2,499, W. Edwards, Self-closing Doors and Gates.—2,539, F. Wirth, Paints.—3,254, W. R. Lester, Astragals for Holding and Securing Glass for Roof Lights and Windows.—5,211, J. Bothams, Construction of Walls, with Louvre Openings, and Bricks for the purpose.—9,903, A. Boult, Construction of Portable Buildings.—12,935, A. M. Clark, Auger Bits.

## RECENT SALES OF PROPERTY.

NOVEMBER 13.

By RAYNBIRD & SONS.

| | |
|---|---|
| Basingstoke—Five freehold cottages in Longcroft.. | £560 |
| Three freehold cottages in Bunnian-place..... | 335 |
| Wote-street—freehold house and workshop..... | 800 |
| Goat-lane—Two freehold cottages ..... | 335 |
| Bedford-place—Freehold cottage ..... | 165 |
| Thirteen freehold cottages in Flaxfield..... | 1,800 |
| A plot of land near the above ..... | 155 |
| Victoria-street—Four freehold cottages ..... | 435 |

NOVEMBER 14.

By FRANK LEWIS & CO.

| | |
|---|---|
| Peckham—63, Arthur-street, freehold ..... | 320 |

NOVEMBER 17.

By TOPLIS & HARDING.

| | |
|---|---|
| Kennington-lane—No. 202, freehold ..... | 1,200 |

By OETZMANN & CO.

| | |
|---|---|
| Green-lanes—12, Florence-villas, 75 years, ground-rent 8*l*..... | 250 |

By ROBINSON & FISHER.

| | |
|---|---|
| The reversion to a sum of 4,000*l*., invested in Railway Stocks, life aged 61 years ..... | 1,950 |

By W. J. NEWELL.

| | |
|---|---|
| Bermondsey—300 & 302, Roll's road, 60 years, ground-rent 10*l* ..... | 515 |
| Rotherhithe—35 & 37, Barkworth-road, 13 years, ground-rent 10*l*. ..... | 545 |

By DOWSETT & WOODS.

| | |
|---|---|
| Tottenham—5 & 7, Catharine-road, 85 years, ground-rent 13*l*. ..... | 300 |
| Kensington square—No. 18, freehold ..... | 4,000 |

NOVEMBER 18.

By E. P. NEWMAN.

| | |
|---|---|
| Isleworth—The residence, Park View, and fruit garden, 4a. 0r. 10p., copyhold ..... | 2,570 |
| Mogden House and fruit gardens, 6a. 2r. 18p., freehold ..... | 3,000 |

By — HAXELL.

| | |
|---|---|
| Tottenham-court-road—Nos. 30 & 31, term 13 years, ground-rent 80*l*. ..... | 1,350 |

By ROGERS, CHAPMAN, & THOMAS.

| | |
|---|---|
| Belgravia—33, Eaton-place, with stabling, 27 years, ground-rent 40*l*. ..... | 5,280 |

By FULLER & FULLER.

| | |
|---|---|
| Oxford-street—No. 94, a profit-rental of 220*l*. a year, term 16 years ..... | 1,980 |
| Clerkenwell—9, Myddleton-square, 28 years, ground-rent 6*l*. 11s. 3d. ..... | 470 |
| Hampstead—Ground-rent of 5*l*. 5s., reversion in 31 years ..... | 205 |

NOVEMBER 19.

By MESSRS. ELGOOD.

| | |
|---|---|
| Portman Estate—51 & 53, York-street, 23 years, ground-rent 21*l*. ..... | £1,180 |
| Portland Estate—114, Great Titchfield-street, 12 years, ground-rent 25*l*. ..... | 535 |

By HARMAN & MATTHEWS.

| | |
|---|---|
| Stoke Newington—2 to 10 even, and 11, Kenilworth-terrace, 91 years, ground-rent 45*l*..... | 2,465 |
| Holloway—70 & 78, Seven Sisters-road, 21 years, ground-rent 14*l*. ..... | 1,110 |

NOVEMBER 20.

By FURBER, PAICE, & FURBER.

| | |
|---|---|
| Palmer's-green—Nos. 13 & 14, Palmer's-green Villas, freehold..... | 1,120 |
| 16 & 17, Palmer's-green Villas, freehold ..... | 1,200 |
| The life interest in properties valued at 2,700*l*., and a policy for 500*l*., life aged 24 years, reversionary as to part ..... | 500 |

## MEETINGS.

MONDAY, NOVEMBER 24.

*Surveyors' Institution.*—Mr. John Shaw on "Farm Tenancy Agreements and the Agricultural Holdings Act." 8 p.m.

*Inventors' Institute.*—8 p.m.

TUESDAY, NOVEMBER 25.

*Institution of Civil Engineers.*—Continued discussion on Mr. Jamieson's paper on "Electric Lighting for Steamships." 8 p.m.

*St Paul's Ecclesiological Society.*—Mr. T. F. Bumpus on "London Churches, Ancient and Modern." 7.30 p.m.

*Anthropological Institute.*—Four papers to be read. 8 p.m.

WEDNESDAY, NOVEMBER 26.

*Society of Arts.*—Mr. Ernest Hart on "The International Health Exhibition." 8 p.m.

*Royal Society of Literature.*—Mr. C. H. E. Carmichael on "The Border-Land of the Middle Ages and of the Renaissance." 8 p.m.

THURSDAY, NOVEMBER 27.

*Parkes Museum.*—Dr Alfred Carpenter on "Progress and Co operation in Sanitary Work." 8 p.m.

*Builders' Benevolent Institution.*—Election of pensioners. Poll open from 2 to 4 p.m., at Willis's Rooms, St. James's.

*Society of Antiquaries.*—8.30 p.m.

*Society of Arts.*—Mr. W. Anderson on "The Conversion of Heat into Useful Work." (Howard Lectures.) I. 8 p.m.

*Society of Telegraph-Engineers.*—Adjourned discussion on "Alternating Currents." 8 p.m.

## Miscellanea.

**Re-Opening of the Brixton Public Hall.** After undergoing an extensive enlargement, together with the construction of a new minor hall, a Masonic lodge-room, a club-room, and several other additional apartments, the Brixton Public Hall, in Acre-lane, was re-opened on Tuesday last. The hall was originally erected in 1880 for Mr. Chard, its present proprietor, and the extensions just completed, consequent upon the accommodation not being adequate to the public demands, consist of the lengthening of the large hall, and the erection of a gallery at the south end, by which the hall will now seat an audience of 1,000 persons, as compared with 600 before the enlargement. The platform for the orchestra has been reconstructed and enlarged, and a large organ is now in course of erection by Messrs. Gray & Davison. The floors of both halls are laid in pitch pine, specially prepared and polished for dancing purposes. Attention has been given to the ventilation of the halls and apartments, and provision is made for the inflow of fresh air by Tobin's tubes, the sun-burners in the ceiling assisting in the extraction of the vitiated air at night. The windows on each side of the hall are made to open at the top when necessary. The whole of the work has been designed and carried out under the immediate superintendence of Mr. Francis H. Fowler, architect. The contract was obtained in competition by Mr. William Downs, of Walworth, at a sum of about 6,000*l*. The fire mains and appliances are by Messrs. Merryweather & Son. Messrs. Strode & Co. have re-arranged the whole system of lighting. Messrs. Rosser & Russell have fitted the warming apparatus in the several apartments. The plastic ornamentation in both halls has been executed by Mr. J. M. Boekbinder, of Thornhill-road, Barnsbury Park, who has also been entrusted with the coloured decoration. The acoustic properties of the large hall are very satisfactory.

**The New Police Court for West Ham.**—The first stone of the West Ham Police Court, Stratford, E., was laid on the 12th inst. by Mr. G. Rivett, Chairman of the Local Board. Mr. Lewis Angell, F.R.I.B.A., is the architect, and Messrs. M. A. Palmer & Sons are the builders.

**Norwich.**—Mr. E. Preston Willins, architect, has in the press a book of fifty plates, illustrating and entitled "Quaint Old Norwich." Only 500 copies are to be issued, of which half the number is already subscribed for.

**Capital Entertaining Labour.**—One of those interesting instances of capital entertaining labour, that are not so numerous that they should be overlooked, occurred last week at No. 1, Bolton Gardens, South Kensington, the residence of Herbert Clifford Saunders, esq., Q.C. The learned gentleman having lately bought the house, has had considerable additions made to it. Upon the completion of the works his pleasure was, as a "house-warming," entertain at a dinner all those men who had to assisted in the works, whether as skilled hands or otherwise. And as a further compliment to them the Rev. Dr. Forrest, the Vicar of the district, besides several of Mr. Saunders's personal friends, were invited. The architect under whom the work has been carried out, Mr. Henry Godwin; Messrs. Toten & Sons, of South Kensington, the contractors; and Mr. Litchfield, of Bruton-street, were also present. Mr. Saunders, in a few graceful and well-chosen sentences, welcomed the men; expressed his pleasure at seeing them, and his high appreciation of the manner in which they one and all had conducted themselves during the prosecution of the works. Some excellent music, vocal and instrumental, was subsequently provided.

**The Hospitals Association.**—The programme of papers to be read at the general meetings of the Association, to be held during the winter, has been prepared. The following subjects, amongst others, will be discussed:—"On Hospital-Ships," paper by Mr. P. Murray Braidwood, M.D.; "A Re-discussion of the Out-patients Question," paper by Mr. J. S. Bristowe, M.D., F.R.S.; "On House Ambulances in connexion with Hospitals," paper by Captain William Joynes, chairman of the Northern Hospital, Liverpool; "The Relation of the Provident Dispensary to the Hospital," paper by Mr. C. J. Radley. The opening meeting will be on the 6th of December, but it will take the form of a *soirée*, and will be held at the rooms of the Medical Society of London, No. 11, Chandos-street, Cavendish-square. We are asked to state that Mr. J. S. Wood, secretary of the Chelsea Hospital for Women, and hon. sec. of the Bolingbroke House Pay Hospital, has been elected a member of the Council of the Hospitals Association, and that he has also joined Mr. J. L. Clifford-Smith as hon. sec. of the Association.

**Social Science Association.**—A largely-attended meeting of the Council of the Association was held last week under the presidency of Mr. Hastings, M.P. The names of representatives of Departments on the Council for 1884-5 were reported, and a complete list of the Council for the ensuing year was laid on the table. The executive committee was also elected. An invitation from the Corporation of Portsmouth to hold the congress for 1885 in that borough was considered, and its acceptance by the committee of Council confirmed. The following among other resolutions relating to the successful termination of the Health Exhibition was unanimously carried:—"That in the opinion of the Council of this Association, the opportunity is a favourable one for establishing closer relations between the various organisations which at present exist for the diffusion of sanitary knowledge and the application of sanitary science."

**Floorcloth Designs Competition.**—Messrs. Bainbridge & Co., of Newcastle-on-Tyne, are offering four prizes of amounts ranging from 100*l.* to 10*l.*, for the best artistic designs for floorcloth, to be sent in on or before March 1st of next year; which certainly allows plenty of time for maturing designs.

**Royal Asiatic Society.**—At the meeting of this society on Monday last, Sir William Muir, K.C.S.I., president, in the chair, a paper was read "On Recent Archæological Researches on the Buddhist Remains near Sambhar, in Rajputana," by Surgeon-Major Hendley, M.R.A.S.

**Buildings for Poor-law Administration.** Messrs. A. & C. Harston have been appointed, by the Guardians of Bethnal Green, architects for proposed school building extension at Leytonstone and new infirmary at Bethnal-green.

**Mossend.**—A new Catholic church was opened at Mossend, near Glasgow, on Sunday last, by the Archbishop of Glasgow. The architects are Messrs. Pugin & Pugin, of Westminster. Mr. John Devlin, of Glasgow, was the contractor.

**Zinc in Modern Buildings.**—Those who are interested in the free use of zinc in modern buildings should inspect the now nearly completed Hôtel Métropole at Northumberland Avenue. Messrs. F. Braby & Co. (Limited), Euston-road, are carrying out an extensive contract in that metal, the exterior decoration of the two top stories of the immense pile of buildings, as well as the mansard roofs, being entirely in that material.

**Antiquary's Library.**—The second series of the "Antiquary's Library" is nearly ready for issue to subscribers. The volumes consist of the "Life of Harold," translated and edited by Mr. W. de Grey Birch; "Bones and Medals, their place in History and Art," edited by Mr. Stanley Lane Poole; and "Gleanings from the Natural History of the Ancients," by Mr. M. G. Watkins.

**The Proposed Electric Railway beneath the Thames.**—It is stated that the promoters of the Charing-cross and Waterloo Electric Railway, which was sanctioned by Parliament in 1882 for the purpose of constructing an electric railway from Waterloo Station, passing under the River Thames to Northumberland Avenue, have decided to abandon the authorised railway and to dissolve the company.

**Her Majesty's Theatre.**—A summons, returnable on the 24th inst. at Marlborough-street, has been taken out by the Metropolitan Board of Works, under 41 and 42 Vic. c. 32, against the owners of the above theatre for not executing the necessary works required by the Board to be done pursuant to their notice served on the 27th day of February, 1883.

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Plans for Erection of a Hospital | Newbury District Hospital Trustees... | ..... | Not stated ... | ii. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Making up Roads | Wandsworth B. of Wks. | *Official* | Nov. 25th | ii. |
| Fire Appliances | St. Pancras Guardians | ..... | Nov. 27th | xx. |
| Engine and Boiler Houses, &c. | St. Helen's Corporatn | D. M. F. Gaskin, C.E. | Nov. 28th | ii. |
| Erection of Infants' School, &c. | St. Ives School Board... | E. W. Robb | Nov. 29th | ii. |
| Enlargement of Sub-Dist. Post-Office, Peckhm | Commissnrs. of Works | *Official* | do. | ii. |
| Compressed Asphalte Pavement | Liverpool Corporation | City Engineer | Dec. 1st | ii. |
| Sewerage Works | Holborn Board of Wks. | L. H. Isaacs | do. | ii. |
| Engineering Works | Chelsea Guardians | A. & C. Harston | Dec. 3rd | ii. |
| Erection of Police Station | Receiver, Met. Police... | *Official* | do. | ii. |
| Paving Works | St. George-in-the-East Vestry | ..... | Dec. 4th | xx. |
| Kerbing, Channelling, and Brick Paving | Enfield Local Board | W. Kitteringham | do. | ii. |
| Stores | Great Northern Ry. Co. | ..... | Dec. 6th | ii. |
| Stores | Crystal Palace Co. | ..... | Dec. 8th | ii. |
| Completion of New Infirmary | Paddington Guardians | A. & C. Harston | Dec. 10th | ii. |
| Well-Sinking and Pumping | Croydon Town Council | Borough Engineer | Dec. 11th | ii. |
| Crushed Granite | Bishop Stortford L. B. | ..... | do. | ii. |
| Construction of Concrete Pier at Newlyn | Newlyn Pier & Harbour Commissioners | J. C. Inglis | Dec. 13th | ii. |
| Baths and Washouses | City of Newcastle-on-Tyne | Gibson & Allan | Dec. 15th | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Building and Drainage Inspector | Croydon Town Council | 42s. per week | Nov. 27th | xviii. |
| Architectural Draughtsman | Civil Service Com. | Not stated | Dec. 24th | xviii. |

## TENDERS.

For new roof, and other alterations to warehouse, Buck's-row, Whitechapel, for Messrs. S. Schneiders & Son. Mr. John Hudson, architect, 80, Leman-street:—

| | |
|---|---|
| A. Eaton, Whitechapel | £971 0 0 |
| T. Little, Whitechapel | 924 0 0 |
| B. Hosegood, Brixton | 813 0 0 |
| Coulsell Bros.,* Bethnal-green | 654 0 0 |

* Accepted.

For the construction of pipe-sewers in Penton-place and Eagle-court, Clerkenwell. Mr. W. Iron, surveyor:—

| | |
|---|---|
| Hirst | £1,250 0 0 |
| Linzell | 1,100 0 0 |
| Neave & Son | 1,029 0 0 |
| A. Walker | 917 0 0 |
| Wilkinson | 847 0 0 |
| Pizzey | 743 0 0 |
| Mowlem & Co. | 725 0 0 |
| T. Adams | 716 0 0 |
| C. Killingback (accepted) | 700 0 0 |

Accepted for additions and alterations to ten homesteads, at Ryther and Cawood, Yorkshire, on the estate of Mr. R. A. Morritt, of Rokeby-grove, Barnard Castle. Messrs. William Lewis & Son, architects and surveyors, Stonegate, York:—
Chas. Horner & Son, Appleton Roebuck.
[By measure and value.]

Accepted for new front and additions to the *Yorkshire Gazette* office, High Ousegate, York, for the North and East Yorkshire Conservative Newspaper and Printing Company, Limited. Messrs. William Lewis & Son, architects and surveyors, York:—
G. Simpson & Son, Heworth, York.
[By measure and value.]

For office fittings to Ingram House, Fenchurch-street, for Messrs. Appleton, Machin, & Co. Mr. Herbert D. Appleton, architect, 167, Wool Exchange:—

| | |
|---|---|
| A. & J. Sutton | £1,664 0 0 |
| Carter & Co. | 1,231 0 0 |
| Drew & Cadman* | 1,150 0 0 |

[* Accepted at 1,125*l.*]

For alterations to windows, at Ingram House, Fenchurch-street, for Messrs. Appleton, Machin, & Co. Mr. Herbert D. Appleton, architect, 167, Wool Exchange, Coleman-street:—

| | |
|---|---|
| Robinson (accepted) | £229 17 6 |

For the Accrington sewerage works. Contract No. 5, Mr. E. Knowles, borough engineer:—

| | |
|---|---|
| Richard Lomax, Eccles | £4,638 0 0 |
| James Parkinson, Blackburn | 4,0 0 0 0 |
| Frank Dawson, Bury | 3,697 0 0 |
| Robert Lomax, Eccles | 3,543 17 8 |
| W. Ramsbottom & Son, Accrington | 3,240 0 0 |
| Fawkes Bros., Southport | 3,276 12 11 |
| John Sharples, Accrington | 2,946 5 11 |
| J. Orrel & Sons, Darwen (accepted) | 2,616 6 9 |

For the erection of new stables, provender stores, &c., for the Borough of King's Lynn, from plans by Mr. E. G. Mawbey, borough surveyor. Quantities by Mr. E. G. Mawbey:—

| | |
|---|---|
| W. H. Brown | £1,291 12 3 |
| Lofts & Son | 1,229 7 4 |
| Bennett Bros. | 1,114 8 9 |
| R. W. Fayers | 1,110 18 7 |
| Leach, jun. | 1,108 13 7 |
| Thring & Spragg | 1,059 7 8 |
| R. Foreman | 1,049 0 0 |
| R. Dye | 1,045 16 1 |
| P. H. Dawes | 1,015 0 0 |
| Bardell Bros. (accepted) | 995 0 0 |

[Architect's estimate, £997.]

For the erection of warehouse, Clifton-mews, Wandsworth-road, for Mr. J. Broomfield. Mr. H. Wakeford, architect:—

| | |
|---|---|
| Stephens | £520 0 0 |
| Hunt | 468 0 9 |
| Curnick | 425 0 0 |
| Tinsley | 390 0 0 |
| Rice | 381 0 0 |
| Lathey | 377 0 0 |
| Bawden (accepted) | 333 0 0 |

Accepted for the enlargement of the East Grinstead Dispensary. Mr. S. W. Haughton, architect:—
W. Pledge, East Grinstead ..... £117 1 0

Accepted for the erection of a villa residence at Tonbridge. Mr. S. W. Haughton, architect, East Grinstead:—
Geo. Punnett & Sons ..... £780 0 0

Accepted for alterations and additions to 22, The Chase, Clapham-common, for Mr. Arthur Colman. Mr. R. W. Price, architect:—
E. Triggs ..... £325 0 0
[No competition.]

For building new factory, stores, cellar, &c., at Bond-street, Vauxhall, for Barrett's Screw Stopper Bottling Company, Limited. Mr. E. Rawlings, architect, 3, Victoria-street, Westminster. Quantities by Mr. Morris Evans, 7, John-street, Adelphi:—

| | |
|---|---|
| P. Duplock, Wandsworth-road | £29,550 0 0 |
| W. Whiteley, Westbourne-grove | 27,140 0 0 |
| D. McGregor, Acre Wharf, Belvedere-road | 26,924 0 0 |
| W. Scrivener & Co., Fitzroy-road, Regent's Park | 26,787 0 0 |
| T. L. Green, Eagle-street, Holborn | 26,662 0 0 |
| J. Allen & Sons, Palmerston-road, Kilburn | 25,790 0 0 |
| Fish, Prestige, & Co., Cambridge Wharf, Pimlico | 25,740 0 0 |
| W. & H. Castle, Redcross-street, Borough | 25,419 0 0 |
| J. Greenwood, Mansfield, Notts | 25,328 0 0 |
| J. T. Chappell, Lupus-street, Pimlico | 25,236 0 0 |
| R. & E. Evans, Lisford-street, Peckham | 24,670 0 0 |
| G. Stephenson, Belsize-avenue | 23,777 0 0 |
| F. Higgs, Loughborough Junction | 23,350 0 0 |
| Webb & Rosser, Beardow-road, Hammersmith | 23,175 0 0 |
| H. & E. Lea, Warwick-street, Regent-street | 23,100 0 0 |
| C. Dickinson, Loughborough Junction (accepted) | 22,777 0 0 |

For police buildings, at Newport, for the Magistrates of the County of Monmouth. Mr. William Tanner, County Surveyor, architect. Quantities supplied by the architect:—

| | |
|---|---|
| King, Gloucester | £4,995 0 0 |
| Jones & Co., Gloucester | 4,570 0 0 |
| Hilton & Sons, Newport | 4,354 0 0 |
| Martin, Newport | 4,280 0 0 |
| Williams, Newport | 4,250 0 0 |
| Braid, Newport | 4,232 0 0 |
| Burgoyne, Blaenavon | 4,200 0 0 |
| Forse, Bristol | 4,200 0 0 |
| Church, Bristol | 4,179 0 0 |
| Wilkins, Newport | 4,140 0 0 |
| Blackburn, Newport | 4,139 0 0 |
| Davies, Cardiff | 4,100 0 0 |
| Prosser, Newport | 4,070 0 0 |
| Miles, Newport | 3,993 0 0 |
| Linton, Newport (accepted) | 3,990 0 0 |

[Architect's estimate, £4,200.]

For alteration and additions to stable and coachhouse, 9, Seamore-place, Mayfair, for the Hon. A. De Tatton Egerton, M.P. Mr. C. Crosse, architect. Quantities by Mr. J. S. Matthews:—

| | |
|---|---|
| R. Elwin, Mount-street | £1,300 0 0 |
| W. Downs, Walworth | 1,198 0 0 |
| W. A. Rhodes, Marble Arch | 1,189 0 0 |
| J. & J. Greenwood, Bermondsey | 1,136 0 0 |
| J. Horne & Son, Blackfriars-road | 1,121 0 0 |
| Higgs & Hill, South Lambeth | 1,098 0 6 |
| F. Higgs, Brixton (accepted) | 1,050 0 0 |

For additional story and alteration to work-shops, Great Windmill-street, Golden-square, for Mr. J. Batson. Mr. D. C. Nicholls, architect. No quantities:—

| | |
|---|---|
| Burridge, Crawford street | £84) 0 0 |
| W. A. Rhodes, Marble Arch | 715 0 0 |
| H. & C. Lea | 675 0 0 |
| Love, Soho | 595 0 0 |

For sh p fittings and sanitary work, &c., 318, Oxford-street, for Mr. D. H. Evans. Mr. Owen Lewis, architect. No quantities:—

| | |
|---|---|
| W. A. Rhodes, Marble Arch | £150 0 0 |
| Street Bros., Camden-town | 142 0 0 |
| Salter, New-cut | 127 10 0 |

For alterations at the Black Bull public house, Lewisham, for Mr. G. Shaw. Mr. H. J. Bonner, architect —

| | |
|---|---|
| H. L. Holloway (accepted) | £975 0 0 |

For alterations and additions to 126, Whitecross street, St. Luke's, for Mr. E. Orgill. Mr. C. R. Winter, architect:—

| | |
|---|---|
| J. R. Hunt | £442 0 0 |
| H. Dye | 380 0 0 |
| J. Webb | 335 10 0 |
| Steel Bros. | 325 0 0 |

For alteration of shop, for Mr. Gilbert, saddler, Newmarket. Mr. John Flatman, architect, Newmarket:—

| | |
|---|---|
| Kerridge & Shaw | £599 0 0 |
| Simpson & Son | 545 0 0 |
| Saint & Son | 530 0 0 |
| Denson | 450 0 0 |
| Kent & Savage (accepted) | 356 0 0 |

For completing the drill-hall, armoury, drill instructor's house and offices, Stalybridge, for the 4th C.R. Volunteers (Stalybridge Detachment). Messrs. Gregory Gill & Son, architects and surveyors. Quantities by the architects:—

| | |
|---|---|
| Shaw, Curner, & Co., Stalybridge | £1,040 0 0 |
| Joseph Grayson, Stalybridge | 972 0 0 |
| Napoleon Ives, Stalybridge | 966 15 0 |
| Garside, Barns, & Co.,* Stalybridge | 960 0 0 |
| Hague France, Stalybridge | 957 17 1½ |
| Castle Hall Saw Mills Company, Stalybridge | 955 0 0 |

* Accepted.

*Heating Apparatus for the above (Hot-water low pressure).*

| | |
|---|---|
| John Swain, Hyde | £75 0 0 |
| J. G. Wagstaff, Dukinfield (accepted) | 70 0 0 |
| R. Dawson & Co., Stalybridge | 68 10 0 |

For rebuilding 35 and 37, Church-street, Greenwich, for Mr. W. B. Blackmur. Mr. R. W. Crawley, architect, 12, Trinity-square, Tower-hill. Quantities by Messrs. Hills & Fletcher, 149, Bow-road:—

| | |
|---|---|
| Forrest | £1,994 0 0 |
| Jerrard | 1,980 0 0 |
| Hall | 1,875 0 0 |
| Redman | 1,825 0 0 |
| A. & F. Smith | 1,754 0 0 |
| Hubble & Trott | 1,749 0 0 |
| H. L. Holloway (accepted) | 1,747 0 0 |

For the erection of aërated water manufactory, at East Grinstead. Mr. S. W. Haughton, architect, East Grinstead:—

| | |
|---|---|
| J. H. Godly, East Grinstead | £203 0 0 |
| G. Quickenden, East Grinstead | 180 0 0 |
| W. Pledge, East Grinstead | 175 10 0 |
| Charlwood Bros., East Grinstead | 165 0 0 |
| J. Morris, Ashurst Wood | 160 0 0 |
| G. Beard, East Grinstead (accepted) | 146 0 0 |

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# The Builder.

VOL. XLVII. No 2182

SATURDAY, NOVEMBER 29, 1884.


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### *The Westminster Hall Question.*

THE committee for considering the treatment of the west side of Westminster Hall has now held two sittings, on Tuesday last, and on the Wednesday of the week previous; and as persons not members of the committee were admitted to the committee-room to hear the proceedings, we presume that they may be regarded as open to public comment. The names of the members appointed to serve on the committee we gave in a note (p. 650, *ante*), with some indication of the surprise which we imagine most people conversant with architecture must have felt at the list, which includes only two persons out of a total of twelve, who are generally known to have any acquaintance with the class of subject to be dealt with; namely, Mr. Peddie, the well-known architect, and Mr. Beresford-Hope. Both in the selection of the committee and in the general tenour of the proceedings there seems evident not so much a desire to examine the whole subject dispassionately, as a wish to carry a scheme which the outgoing First Commissioner of Works has taken under his special protection. For this reason we attach much importance to the part taken in the examination by Mr. Peddie, who is really the only member of the committee possessing both theoretical and practical knowledge of architecture; and who, it must be remembered, has during his long professional career held a place and estimation north of the Tweed quite equal to that which Mr. Pearson so deservedly holds in this part of the kingdom. It is desirable to call attention to this, inasmuch as the *Times* report of the first committee meeting omitted all but the barest reference to his name, and gave not the slightest idea of the part he took in the examination, or of the very significant admissions which he elicited.

We have before devoted some space to describing the propositions of Mr. Pearson,* and the admirable and most interesting plans which he prepared showing the actual condition of the work, and the various dates of building which are incorporated in it. These plans, and the facts collected in his report, are in themselves of great interest and worthy of the reputation which Mr. Pearson enjoys as what may be termed a specially archæological architect. So far there will be, we imagine, no two opinions. It is when we come to the use to be made of these investigations that we and many others feel compelled to protest.

To recapitulate the position briefly: the Law Courts have been removed and the west wall and buttresses of the Hall left uncovered. The west wall thus brought to view is found to present much of historical interest. Portions of the Norman wall of Rufus are uncovered, bearing still the Norman masons' marks, and upon this wall are to be seen the traces of a double series of arches, *appliqués*, as one may express it, to the wall between the shallow Norman buttresses, and evidently at the same time as the construction of the large buttresses and flying buttresses built when Richard II. caused the present roof to be added to the Hall. The Norman stonework is of historic interest undoubtedly, though as it is mere masonry, and contains no architectural detail, its value has, perhaps, been a little exaggerated. It is in a condition in which it will not long stand exposure to the weather. The double tier of arches, as well as other indications, leave little doubt of the former existence of a double cloister or range of buildings between the buttresses, either open or closed. Let us then, it is said, restore this double cloister and we shall have the building as it was in Richard II.'s time, and at the same time screen the Norman wall from further injury.

This will, however, cost 21,000*l.* and upwards, and the question must evidently have presented itself at an early stage of the proceedings whether this would not be regarded as rather a costly contrivance for preserving a piece of old wall, of whatever interest. An architectural and practical reason must therefore be found for it beyond this initial one. The architectural justification suggested is that it is an actual restoration of Westminster Hall as it was, and will, moreover, add greatly to the effect of the building; the practical justification, which the whole evidence shows, however, to be palpably an afterthought, is that the lower story of the new cloister can be used as a *porte-cochère*, and the upper story can be divided into committee-rooms, which everybody agrees are wanted.

Taking the architectural question first, we may observe that the style and title of the committee begs the question to begin with, inasmuch as it is entitled "Select Committee on Westminster Hall *Restoration*"; whereas one of the very things which the committee was appointed to consider was whether there should be a restoration at all, and whether the design suggested by Mr. Pearson amounted to what could be properly called a "restoration." Now, of course, if one or two bays of the double cloister existed complete, even in a dilapidated condition, we could then complete all the destroyed portions on the same design, and that would be a restoration in the proper sense of the term. But the case is by no means so. Not a single portion of the original design of the double cloister or double gallery is in existence. The marks of the wall arches and a portion of one or two of the arches are in existence. The foundation of the walls is visible, and the height of the parapet is indicated by the returns on one or two of the buttresses. There is a plan, by Wren, of the walls as they existed in his time, showing some windows rather irregularly spaced, some of them two lights, and some one-light, but hence it is assumed that there were two-light windows. We may observe in passing that the value of this plan as evidence in matter of detail is somewhat impaired by the fact that it shows the building once existing under the name of Queen Elizabeth's bedchamber as having three-light windows, while Capon's evidently carefully-executed view of the exterior shows the same windows as four-light, with two orders of mullions, a centre principal mullion and two subordinate ones; and no draughtsman could have made such a mistake with the windows before his eyes, if they had really been three-light ones. So that in the only point in which we can compare Wren's plan with an undoubted testimony from another hand it is proved to be inaccurate. Then Mr. Pearson says the parapet was battlemented, *teste* a print of Hollar's, "New Palace Yard in 1647." The actual cloister is not shown in Hollar's plate, but a building which must have been in close neighbourhood with it is seen over the tops of the houses as battlemented, and the roof of Westminster Hall itself, on the east side, is battlemented in the plate. As we have before said, faith in Hollar must not be pushed too far, but we have little doubt, nevertheless, that the parapet was battlemented when it existed. All Mr. Pearson's general presumptions we believe to be perfectly correct or probable. What we wish to point out is that, for all that, he has not a single bit of the old *design* to restore. The views taken by restoring architects on this point are most extraordinary. Mr. Pearson says in his report that in fact little or nothing of the restoration is conjectural. Why, it is *nearly all* conjectural. It is only certain, as Mr. Peddie's questions pointedly elicited (and this part of the evidence should be carefully read when it is published), in regard to the section of the moulding of the parapet, the height of the wall, the thickness of the wall, and the fact that Wren's plan, which, as we have seen, is manifestly not to be trusted for accuracy, shows two-light windows in certain positions. Mr. Pearson, by the way, while admitting that

* See *Builder*, July 26 of this year.

Wren's plan leads to the supposition of one window in each bay, prefers to have two. We have no objection; all we say that it is nonsense to talk about restoring the original design. All that the evidence gives is that something *of that sort* was there; but that what Mr. Pearson has drawn is really what existed no one can possibly say, and therefore to call it the restoration of the cloister is quite a misnomer: it is pretending to do what there is really no means of doing now at all.

Whether the addition will be one of architectural value as increasing the effectiveness of Westminster Hall is another question entirely, to be considered on quite other grounds. If it be so, then it is to be upheld, on the principle on which true architects in all ages have acted, of doing their very best to better the work of their predecessors. It is on this principle that we entirely uphold the raising of the towers at the north end of Westminster Hall; that is a distinctly architectural attempt to bring the façade more into harmony with its surroundings and to give increased dignity to it, on architectural grounds. But we are quite unable to see that the proposed cloister will have any architectural effect in the least proportionate to the amount to be expended on it. In the first place, do what you will with it, it will appear as sunk in a hole. Secondly, the two ranges of low stories, with their low arches and small windows, would not, we think, add by any means to the effect of the Hall, nor were the original cloisters built with that object. The question as to architectural effect is, of course, matter of opinion; the question as to the original meaning and value of the erection which it is proposed to "restore" can hardly be so. There can hardly be a doubt that at no time was the west side of the Hall standing free as it is at present. The known practice in Mediæval plan, to surround the great hall with subsidiary buildings, is confirmed by all the plans or views of the site which are obtainable now, and which, though none of them go back to the Mediæval period, convey the idea that the site west of the Hall must have been long regarded as a place for subsidiary buildings. The First Commissioner told the Committee on Tuesday that Mr. Brewer had informed him that he had "no authority" for the buildings represented to the west of the Hall in the restoration of Westminster, which we published on the 8th. This, we have ascertained from Mr. Brewer, is, as we knew it must be, a misapprehension. What he said was that there is no authority for the architectural style of those buildings.

Then if the original cloister or gallery was probably not seen, or very little seen, from the westward of the Hall, why was it erected? The answer which we believe to be the true one is very significant as suggesting the sharp contrast between the notion of architecture entertained by Richard II. and by the modern Office of Works. The erection was a purely practical one. For reasons of architectural splendour and dignity, Richard II. had put a grand new roof on the Norman hall. For what may be called engineering reasons, it was considered necessary to add large outstanding buttresses and fliers to resist the thrust of the hammer-beam roof, which is by no means in itself a very scientific form of timber construction. The large space between these buttresses was not to be thrown away. Two sets of rooms, or one set of rooms and a covered passage, for practical use, were to be made between the buttresses. The wall of the Hall, having a great additional weight to carry already, was not to be cut into, and the two tiers of wall arches were applied to it between the Norman buttresses, in order to afford a bearing for the ends of the beams, without cutting into the wall. The whole illustrates remarkably that practical spirit which was so far more prevalent in Mediæval building than we moderns, looking back at it through the mist of centuries, are apt to realise. Even the cutting of the curve of the flying buttresses by the upper roof, done here as frequently elsewhere, is an example of that. If architectural appearance had been the main object, it would certainly have been felt that there was an incompleteness in cutting off part of the flying arch in that way. No Greek architect would have done anything analogous to that; it would have vexed his æsthetic sense. But the flying buttresses were the engineering part of Mediæval building, and we imagine were so regarded by those who made them. Looking at the matter now, we should unhesitatingly say that the buttresses and flying buttresses, when repaired and made good where they are dilapidated, which must be done, would present a finer and more interesting appearance to the eye, and tend more to the architectural dignity of the Hall, if this portion were left visible, than the erection proposed to be placed between them. But what we want to emphasise is the radical difference between the motive of the former erection and the motive for the reconstruction of it. In Richard II.'s building the whole motive was obviously a practical one, to utilise space and to combine satisfactory construction with utility. In comparing Mr. Pearson's report and the evidence given before the committee, it is obvious that practical utility was the very last consideration. Mr. Pearson himself makes only a kind of feint of considering it in his original report. In the evidence given before the committee he stated (which ought to be noted) that it was not the case that any pressure had been put upon him by the First Commissioner to adopt this special plan; so that statement, to which we referred the other day as having been publicly made and not contradicted, must be regarded as disposed of. But, then, on the basis of that, Mr. Peddie very pertinently asked what the architect's instructions were, and received the reply "to examine the walls and buttresses with a view to the restoration of them"; and the continuation of this portion of the examination conclusively shows that there was no idea of studying any practical question of convenient additions to the House, until it was found that it would be difficult to carry the matter on antiquarian grounds alone. Mr. Peddie asked further on "if an architect is asked to make additions to a building where utility is to be considered, is it not usual that he should be told what the requirements are, and to provide for them as well as he can consistently with artistic effect?"—a theory which Mr. Pearson, of course, admitted as correct; he could hardly do otherwise without stultifying the architectural profession. "You do not first of all make additions and then find out what the use of them is to be?" continued Mr. Peddie, and equally, of course, received the answer, "No." Yet we say, and we think a perusal of the report and the evidence will satisfy any one who has the requisite knowledge to judge of the matter, that that is precisely the course which has been pursued in this case. And then we come to the question, Of what real utility will these rooms be after all? What is wanted, and what is proposed to be provided?

In regard to this point the evidence of Mr. Charles Barry, given on Tuesday, is very valuable. After stating that Sir Charles Barry had always been of opinion that Westminster Hall had been enclosed, and that the space recently occupied by the old Law Courts had been formerly occupied by the inferior offices of the Palace, he went on to say that his father's plans for the completion of the new Westminster Palace by enclosing the Hall were embodied in a Parliamentary paper which was returned to the House of Commons on May 10, 1855, in a report to the then First Commissioner, Sir William Molesworth. He was thoroughly conversant with his father's views for the enlargement, or what he regarded as the completion, of the Westminster Palace. The scheme was to start with a façade from St. Stephen's Porch, following a line fronting St. Margaret's-lane to the corner where Bridge-street, Great George-street, and Parliament-street intersect each other; to construct at that corner a grand gateway, and to carry another new façade from that point to the Clock Tower. "The idea had been to give the whole buildings as much dignity and unity as possible, to conceal the difference of level between Bridge-street and the entrance to Westminster Hall, and, in possible times of tumult, to give an effective protection to Palace Yard, Westminster Hall, the Speaker's House, and the House of Commons. Sir Charles Barry had attached great importance to having Palace Yard enclosed." Mr. Barry subsequently went on to offer some further evidence of a still more practical character. He said the carrying out of his father's plans was not only the best thing that could be done architecturally, but financially, as it had been officially stated in 1864 that 37,000*l.* per annum was being paid by the Government as rental of various private properties used as offices by Government Departments and Commissions. That sum capitalised at three per cent. would give a million and a quarter of money, and the additions on Sir Charles Barry's scheme could be carried out for half a million. "We hope here be truths" enough.

Such a scheme would provide room for all the functions of the House within its walls. Against this the Office of Works proposition amounts practically to this. We propose to erect some small buildings in imitation Gothic, somewhat like what we believe to have been once there, certainly on the old foundations. They are built mainly to enclose a piece of old Norman wall, which is of interest, but which we are afraid will decay if left exposed. But as 21,000*l.* is a good deal of money to spend on that, we propose that you should have a carriage porch below, with a width barely sufficient to allow two carriages to pass, and height probably not quite sufficient to clear the driver's hat, and we propose that you shall use the rooms over as committee-rooms. True, they are very small in area, and only half the height of the present committee-rooms, but still you can squeeze into them somehow, and it will be such a gratification to think we are in rooms just like those that were there 500 years ago. And the Norman walls, what about them? Oh, they will be left bare, just as they are; it is an uncomfortable finish to a modern room, of course, but then think of the satisfaction of seeing the Norman masonry!

That is what it amounts to, and that is a kind of thing that has never been done in times when architecture was a genuine thing. It is not what Richard II. did. He did what he wanted then; but what he wanted is not what we want now. No people in their senses will be content with low, small, and comfortless committee-rooms, because a use has to be found for a costly piece of archæological trifling. They will not be content with a "grand committee-room" over a horse-stand, because the foundations of a building which once stood in that position have been found. Is it not pitiful, this kind of solemn triviality? Here is the greatest English building of modern times, the home of the Government, still incomplete, and the necessities of the case demanding a large extension of accommodation: and there is the Office of Works and its architect poking about on the ground, finding a bit of foundation here, and a bit of foundation there, and making plans for building up rooms that are totally inadequate for practical usages, and which, architecturally, are to be nothing but antiquarian shams, because rooms of that size were there once. Contrast this sort of spirit with that which is hinted at in one portion of Mr. Barry's evidence:—"His father had altered the east front of Westminster Hall, and he would not have hesitated in altering the west front if he thought he could have improved it." Precisely so. Sir Charles Barry was the last really great architect we had, and, like all true architects, he worked in the spirit of the present, not of the past, and had confidence in his own genius, and did not want merely to imitate what some one had done, or the traces of what some one did under different conditions centuries before. We are not saying one word in derogation of Mr. Pearson's acquirements as an architect and artist in the Mediæval style. If a Mediæval restoration is to be made, we know of no one who will do it better. If Westminster Abbey is to be conserved, we are sure the fabric cannot be in better hands. If a modern cathedral is to be built as like a Mediæval one as possible, we

do not believe any one now living can do it as well as Mr. Pearson. Our own opinion is that such a building is a complete anachronism, and we believe in a generation or two that will be the general opinion. As long as that kind of revivifying of Mediævalism is to be carried out, let it be done by those who have thoroughly studied it. But we deny that that is architecture, in any sense in which architecture is worth anything; and after saying so for years, there seems some little indication that a public opinion in that direction is in course of formation; and we hope such opinion will be brought to bear on the present case. If the proposed so-called "restoration" is carried out, money will be thrown away on buildings which are not even archæologically what they profess to be, which are (one may almost say) worse than useless for any practical purpose, and which will, at the same time, stop the way for real and more important improvements for a long time to come. The one point in Mr. Pearson's propositions which we can endorse, the raising of the towers and the modification of the north end of the Hall, which is really a work of architecture and not of antiquarianism, is contradicted by his proposed north-west building at right angles to the Hall. The raising of the towers seems in itself like the commencement of a grand completion of Barry's scheme, by rendering the front of the Hall at least in harmony with such a scheme. But then, just to gratify an archæological sentiment, we are to drop down upon this poor and weak-looking building at the prominent angle of the site, the existence of which would be an effectual bar to the continuation of Barry's design. And it is, perhaps, our duty to say openly, as exponents of professional opinion, what we know many people think, that this scheme is being pushed through to satisfy the *amour-propre* of the outgoing First Commissioner of Works. Now, we like to see any one thoroughly believe in himself;

> "For thoroughly to believe in one's own self,
> So one's own self were thorough, were to do
> Great things,"

as our Poet-laureate happily puts it. But the Chairman of the Committee believes in himself without being thorough, so far as architectural subjects are concerned. He obviously does not understand what "architecture" in its true sense really means. He has got an *idée fixe* which he is determined to push, and his personal feeling in the matter was obvious enough in his cross-examination of the witness who was most decidedly opposed to him, Mr. Somers Clarke. But, as we also thoroughly believe in ourselves, and are convinced that something foolish and unmeaning is proposed to be done at a considerable expenditure of public money, we must be outspoken in opposing it. That we are not animated by any general desire of opposition must, we should hope, be evident from our support to the proposition for remodelling the north end of the Hall. That a genuine architectural work: but as to the best the Office of Works has got entirely on a wrong tack. They have made a sham antique to the Tower, and now they want to make a sham antique of the side of Westminster Hall.

## RAILWAY RATES: A NEW PHASE.

IT has been a matter of considerable surprise to many that the railway companies should have apparently taken so little notice of the agitation which has been going on for a revision of their powers. Mr. Chamberlain's ill-fated attempt to deal with the difficulty did not commend itself either to the companies or the traders. Certain clauses were admitted by both parties to fairly meet the case in particular points, but others were threatened with the strongest opposition, and the Bill, as a whole, was looked upon with disfavour by both. After being printed and circulated and criticised by all parties interested, it fell to the ground, there being but little encouragement for proceeding with it, and but little time at the disposal of the Government for discussing it. But the attention which has been directed to the subject, together with the general depression in trade which exists, has made it a burning question.

The traders have been advised to adopt aggressive tactics by extending the canal systems, and making them, by the use of steam haulage, powerful competitors of the railways. The complaints of the traders, who consider that they can see in excessive and unequal rates an encouragement to foreign competition, and, consequently, a reason for home depression, have been many and loud. Still, the companies (until very recently), made no sign. But those who wondered at their silence have now been still more astonished to find that they were all the while preparing for and considering their next move, and it may be fairly said that they have made a bold one. They have taken the initiative for a fresh encounter by giving notice of their intention to apply for fresh Parliamentary powers next Session, and have thereby quite taken their opponents,—or, their customers, we should perhaps say,—by surprise. The *Times* of the 17th inst., in an able article on the subject, gives an outline of the course which, it is believed, the companies intend to adopt. To put it briefly, they offer to surrender certain powers with regard to maximum rates which they possess, but seldom use, and, in return, ask for sanction to certain charges which they are in the habit of making for terminal services, but which they have not legal powers to enforce. Other minor matters will also be introduced. The maximum rates authorised by the Acts relating to the various companies stand for little or nothing in practice, but have proved very serviceable when complaints have been laid against excessive freight charges; for the companies have frequently been able to show that they have not enforced their full powers, even in cases where the rates have pressed so heavily upon trade as to almost cripple it. The incomplete and inadequate nature of the clauses affecting the rates is well known, and no provision is made in the majority of them for terminal charges; but the companies are generally able to provide for a proportion of the rate charged being put aside for these services, the total charge being still within the statutary limit.

This is the explanation of the remark sometimes made by railway managers, that the terminals question is one which affects them only, and not the public. The latter, naturally, do not see that they have no interest in the matter. They think that they ought to know how the rates they have to pay are arrived at; while the railway companies,—when the rates charged do not exceed the authorised maximum,—do not see that any one else has any interest in their apportionment. Reform is desired by both parties to the controversy. The traders, finding the high rates defended and allowed by the statutes, seek to have the latter revised; while the companies, finding terminals disallowed by courts of law on account of their not being authorised by the Acts, are endeavouring to have these charges legalised. The remarks just made as to the statutory rates being high enough to allow of a portion going for terminal services, only applies to traffic conveyed for long distances, as they barely cover cost of haulage in the case of short journeys, and it is in these latter instances that the companies feel the necessity for legal power to charge for terminals. It was very soon seen when Mr. Chamberlain's Bill was published that one effect of it would be to confer a certain amount of power upon the companies with regard to terminals; and the traders resolved to oppose the Bill. They seem to have entertained a feeling of mistrust of Parliamentary interference, and this will explain why the recommendation to seek for relief by fresh competition was so favourably received. In answer to this the companies have made this unexpected move, and may be said to have given "check."

The other side having abandoned Parliamentary tactics, the companies have resolved to try them for themselves, and by introducing a number of private Bills, to force the question upon the attention of the legislators. The traders, from past experience of railway legislation in which the companies take the initiative, are naturally under grave apprehensions as to the result, and have already decided to oppose the Bills. It remains to be seen whether the concessions offered by the companies with regard to their maximum rates for unenumerated goods is a practical one, but as the enforcement of such rates would frequently be ruinous to their customers (and consequently to themselves), it does not appear that they would be sacrificing much. Some alternative classification would have to be adopted it the antiquated and useless ones found in the Acts should be superseded, and it is understood that some, at least, of the railway companies propose to embody such a classification in the proposed Bills. This is a matter which should be carefully watched, as it is highly desirable that any changes in the law on the subject should have the effect of making it clearer and less open to dispute, as well as equitable and comprehensive. With regard to the terminals question there is much to be said on both sides, and it depends upon the extent of the demands made by the companies as to whether uncompromising hostility would be justifiable; for it has been frequently shown that the expenses connected with the handling of goods traffic,—independently of haulage,—are very considerable. When the matter comes before Parliament for discussion there will be plenty of evidence bearing upon it to be found in the reports of the Commissions which have been appointed to consider the subject, and, like every other public question, it will be found to possess two sides. The railway interest is very strongly represented in Parliament, and could carry anything that was not strongly opposed, so that there will probably be a somewhat sharp conflict. The questions at issue have been very fairly and impartially stated by the *Times*, and the hope therein expressed that a satisfactory solution may be arrived at will be echoed by all concerned.

## NOTES.

THE deputation which waited on the President of the Board of Trade at the close of last week, to urge a modification in certain important clauses of the Electric Lighting Act, did not succeed (to use a phrase which has been applied "in another place") in drawing the badger. The deputation could not have had a more effective spokesman than Sir Frederick Bramwell, or one better up in the facts of the case; but the main point of the deputation, the repeal of the 27th clause, which gives compulsory power to local authorities to purchase the undertaking at the close of twenty-one years, was not gained They were not, perhaps, sanguine about it, as one of their number candidly admitted that the companies had agreed to ask for the total repeal of the clause in hopes of getting a modification of it. The existence of the clause is a striking indication of the manner in which the public mind, and through it the Governmental mind, has been impressed by the disadvantages arising from the great gas and water monopolies. They have resolved that there shall be no more such, charm they never so wisely. Sir F. Bramwell argued that this was practically a prohibition against investing capital in electric lighting, and Mr. Chamberlain went so far as to promise to give his best consideration to any clause forwarded to him for so far modifying the operation of clause 27 as that it should no longer act as a deterrent to capitalists. But beyond this he would not move. As to the further questions raised by the deputation, in regard to official regulation of the method of supply adopted, and freedom of contract between the companies and the consumers, although the latter demand is one not to be rashly granted, the method of supply should certainly, in the present stage of electric lighting, be left as much as possible to the skilled professional advisers of the companies. We are not yet in a position to dictate by law what is the best and most scientific method to be adopted in the interests of the public. The thing is still a gigantic experiment.

FROM a question asked in the House on Monday evening it appears that Messrs. Leeming have completed certain alterations to their War Offices design which were recommended by the Office of Works, and that the designs have now been approved by the First Commissioner. No work will be commenced, however, until a vote has been taken, and the final drawings will be exhibited to members.

THE Fine Art Society send us an impression of the fine line-engraving by Mr. Lumb Stocks of Sir F. Leighton's "The Sister's Kiss," which will be remembered two or three years ago in the Academy. This, which has occupied the engraver for more than two years, is a fine example of that forcible and masculine style of engraving in pure line, which is a far higher and more artistic method than that pretty and spotty style for which Bartolozzi deserted line, and which recent fashion has brought so much into notice again. Modelling surfaces by contour lines (which line-engraving really is) takes much more draughtsmanship out of a man than modelling by stipple. The excellent qualities of Mr. Stocks's engraving, however, do not reconcile us to what we have always felt to be a defect of composition in the group,—the position of the right arm of the young woman so that at first sight it appears like a continuation of the figure of the child behind her.

AN interesting relic of London before the Great Fire will probably shortly disappear. Staple Inn, Holborn, is said to have been sold to Messrs. Baxendale (Pickford & Co.), for 80,000*l.*, and will be converted into a depôt. The quaint entrance gateway, the picturesque houses in Holborn, and the interesting hall, with its prettily-designed turret, must we very much fear, almost as a matter of necessity, be destroyed in order to adapt the site to its new use. The ancients of the Society have divided the plate belonging to the Society between themselves. The ancients of Barnard's Inn appear to intend to pursue a similar course: they have divided their plate, and propose to let their hall. Barnard's Inn is described by Dickens in "Great Expectations" as "a club for cats," and it was here that Pip took chambers when he first came to London.

THE School Board of Edinburgh have resolved to make certain alterations and additions to the High School buildings. The additions are to consist of a gymnasium and a new janitor's house, the present janitor's house to be converted into a swimming-bath. The gymnasium is to be erected on the playground, to the north-east of the school buildings, and externally will be in keeping therewith. The interior will measure 50 ft. by 28 ft., surmounted by an open-timber roof, 26 ft. high at the apex. The walls, reaching a height of 18 ft., will be lined with pitch-pine. Suitable dressing and retiring rooms form part of the scheme. The new janitor's house will be erected at the western gateway, and will consist of a one-story building, with Greek details conformable to those of the school. The house to be vacated by the janitor, which forms the westernmost of the group of the Grecian buildings, and consists of two floors, is to be gutted and formed into a bath, 32 ft. long by 15 ft. wide, having around it a platform, with dressing-rooms, shower-bath, &c. The High School was the most successful effort of the late Mr. Hamilton, and is considered one of the best adaptations of pure Grecian architecture to modern purposes. The details of the elevations of the new buildings will require careful consideration.

IT is worth noticing, as a sign of the times, the prominence that is being given, in the proceedings of societies dealing with social and financial matters, to the various aspects of the condition of the labouring classes. The programme of the Statistical Society, which we have before us, contains no fewer than five, out of a dozen or so of papers to be read during the session, on working-class questions, viz., by Mr. J. S. Jeans on "English and Foreign Labour compared"; by Mr. G. Phillips Bevan on "Thirty Years' Changes in the Occupations of the People"; by Mr. R. Price-Williams on "Changes in the Trade Population of London"; by Mr. E. W. Brabrook on "Friendly Societies"; by Mr. Ravenstein on "The Laws of Migration." Moreover, a conference will be held some time early in the year, which comes partly within the scope of the Statistical Society, to discuss the wages question and the relations generally between work and pay. The operative classes, whatever may be their grievances, can scarcely complain that their position is not the subject of much anxious thought.

A RECENT number of the *Englishman's Overland Mail* contains an interesting account of the successful working of the "Calcutta Canals." These works were originally proposed by a Major Tolley in 1775, and from small beginnings have progressed so satisfactorily that they are said to be "more eminently productive works than many which are in that category." Like many other improvements in India, they were not allowed to be carried out without much opposition, and curiously enough, the chief opponents were "the Board of Customs, Salt, and Opium," who considered the results were not likely to justify the outlay, and that the whole traffic would not produce a revenue of 5,000*l.* At the present time, however, 55,000*l.* are annually realised. The best proof of the usefulness of these canals is shown by the fact that the goods delivered on the canal banks amount in weight to more than one third of the aggregate deliveries of the three railways which converge on Calcutta, including the great coal traffic of the East Indian Railway, and averaged during the last three years ten million tons annually, valued at five millions sterling.

THE same paper gives, however, a less favourable account of the results of navigable canals in India generally. These works are, for the most part, connected with the great irrigation schemes, in which the primary use of the canals is for agricultural purposes. The revenue derived from the sale of water for irrigation being sufficient to yield a handsome rate of interest, the advantages derivable from navigation are thrown in almost free, and consequently their advantages as means of communication are not to be measured by the amount received from tolls. The following particulars of the traffic are given. In Madras the three principal lines conveyed as follows in 1882-83:—

| | No. of Boats. | Tonnage. | Value. £. | Miles |
|---|---|---|---|---|
| The Buckingham Canal | 57,118... | 574,010.. | 2,925,192.. | 260 |
| The Godavery System ... | 31,307 .. | 268,391... | 1,636,900 .. | 458 |
| The Kistna System ..... | 25,502... | 121,679... | 739,046... | 278 |

For Bengal the figures are,—

| | | | | |
|---|---|---|---|---|
| The Orissa System ..... | 83,424 .. | 636,000... | 2,372,500... | 240 |
| The Calcutta Canals..... | 210,104 .. | 2,691,000... | 5,663,400... | 32 |
| The Sone Delta System. | 7,615... | 78,950... | 379,650... | 218 |

For the N.W. Provinces,—

| | | | | |
|---|---|---|---|---|
| The Ganges Canal..... | 7,134... | 90,924... | 487,300... | 412 |

Except on the Orissa system the ton-mileage is not accurately kept, and, therefore, a comparison with waterways in other countries cannot be usefully made.

THE case of the obstruction in the roadway at Hammersmith, by the barrows of the costermongers, to which we referred lately, came before the Home Secretary on Friday last, in the shape of a deputation of the ratepayers of Hammersmith to protest against the action of the Fulham Board of Works in committing men who were endeavouring to earn their living honestly. Sir W. Harcourt, while sympathising with the costermongers in their troubles, suggested that it was quite possible for them to arrange their barrows so as to leave sufficient space to escape the charge of obstruction, so we hope this solution of the matter will be arrived at. The nuisance and obstruction constantly caused in certain parts of London by the apparatus of street merchandise is so great, and so unlike what is permitted in other cities, that a practical protest must be made against it.

THE question as to the permission to use th Main Drainage embankment as a boulevard to which we before referred, and to which th Board of Works gave no answer except a *no possumus*, has elicited a somewhat more definit explanation from Mr. Russell Talbot, th Medical Officer of Health to the North Popla District, but whether he is speaking officiall or not does not appear in his letter in th *Times* of the 26th. He says that he ha before reported to the Metropolitan Play ground Association that as a playground or promenade the embankment would b a failure, owing to its running through lan at present entirely occupied by factories o a most offensive character. That, however is surely for the consideration of those wh wish to walk there, unless the Board o Works is going to assume the attitude of a anxious parent watching over the welfare o the inhabitants of Poplar, and forbidding them to do what would disagree with them. I seems rather pathetic that people should ask as a favour to be allowed to walk on th covering of a sewer between offensive-smelling manufactories, and be denied even that slende boon. As giving pedestrians a short cut fro Victoria Park to Stratford, it would, Mr Talbot admits, be useful. Let the people hav the short cut, then. They cannot well damag the sewer-arch. The matter was urgently pressed by Lord Cowper in the House of Lord on the 24th.

STATEMENTS which have been made as t the improvement in the punctuality of th Underground trains since their breakdown during the first few weeks of the Inner Circl completion must not be accepted too readily There is still a great deal of most vexatiou delay, not so much on the Inner Circle itself a on the outlying branches, the trains from whic have to get into the Circle at various points On the Putney Bridge line it is quite common t leave out a train on occasions, as a quiet solution of the difficulty arising from overcrowding th system of lines and professing to do more tha is possible. There has been for some reason notable deterioration in the gas supply to many of the trains lately, the carriages being miser ably lighted. We may call attention als to the absurd mismanagement in regard t notice-boards of the destination of trains These are all placed, when placed (trains ar frequently run without), on the usual platform side of the carriage, the left-hand side looking in the direction of travelling. But at Earl Court junction a large number of trains ar necessarily brought up with the right side t the platform, to allow of easily changing t another train, and as the company cannot afford a notice-board on each side, there i constantly to be seen a train standing with th direction on it, "Victoria and Mansion House, which is really travelling in the opposite direc tion. The *habitué*, of course, knows it is not going to Mansion House, but he has no clue to when it is going; and this at a crowded junction where there is particular necessity for clea information. The trouble, and hurry, and th pestering of the officials with questions, which this piece of blundering causes about every ten minutes of every day in the year, is quite annoying to witness. It can all be remedied at once by having reversible direction-boards on *both* sides of the carriages, with the "up" direction painted on one side of the board, and the "down" direction on the other, the board to be turned at the close of each journey. If a company cannot attend to such a simple and obvious matter as this, no wonder they fail in larger requirements.

**A Correction.**—In reference to a foot-note in our issue of May 3rd last (page 604, vol xlvi.), to the effect that we were authorised to say that some extracts from the Annual Report of the Institute, which had been published elsewhere, had been obtained "by dishonest means," we have received information whereby we are satisfied that those words, quoted in good faith from a communication sent to us, were not warranted by the facts, and we regret that we should have given them publicity.

## PROVINCIAL ARCHITECTS AND THE INSTITUTE.

We have received the manuscript of a paper on the Institute of Architects, read before the Leeds and Yorkshire Architectural Society by Mr. J. W. Connon, and which may be described as a kind of "bitter cry" against the Institute, and like some other bitter cries of which we have heard, it contains, with some truth, a good deal which is exaggerated and unfair. Mr. Connon traces the history of the Institute from its foundation, to a considerable extent on the basis of papers furnished him by the Institute; and as he admits their chivalry in furnishing him with the weapons for what he frankly told them was to be an attack upon them, he might very well have considered whether a character for any sort of chivalry was compatible with some of the charges which he brings against them. Among other things, Mr. Connon is exceedingly indignant with the Institute because when in 1858 they discussed the principle of the system which was then suggested and occasionally put in practice, of the competitors deciding architectural competitions by their own votes, they suggested among other drawbacks to such a system the difficulty of preventing any possibility of collusion for the serving of private interests. He says it is "a matter for shame that any one of the leading members of the profession should have made so gross a charge of want of the commonest sense of honour against the bulk of his fellows." It is Mr. Connon who wants the sense of logic. Such a consideration was not a charge against the bulk of professional architects; it is only a recognition of the fact that the profession has, like other large professions, its unscrupulous members. Human nature is unhappily human nature in all places. It would probably be supposed that a committee of dignitaries of a great university, for instance, might above most bodies be trusted to exercise the right of voting among themselves; yet there is a case which was long a by-word in one of our universities, where a man in that position did gain an appointment by a vote given by himself for himself. But when, after this, Mr. Connon goes on to charge the Council of the Institute with having favoured the principle of appointing a professional assessor to decide competitions, because they hoped to receive commissions as assessors themselves, and furthermore that they had supported the principle of prior sketch competitions, in order to have two commissions instead of one on each competition, he does not appear to perceive that he is making a charge still more unwarrantable and defamatory, and one withal so ridiculously improbable and baseless that we hardly suppose any of those to whom his paper was read could have credited it for a moment, or even that Mr. Connon seriously believes it himself. These and other violent and exaggerated charges render a great part of the paper such as it could serve no possible good purpose to print, except to exhibit Mr. Connon's want of temper and moderation in speaking of other people, and to invalidate the force of some of his other charges, which, though expressed with equal violence of language, are not in themselves by any means so unreasonable. That the Institute has throughout its career been very slow, very procrastinating; that it has let pass, over and over again, the opportunities for coming to the front, and initiating good works, for which time and opportunity were crying out, we do think; and we also sympathise with the feeling repeatedly expressed by various provincial Fellows of the Institute, and by provincial societies, in their corporate capacity, that the provincial members have not by any means a sufficiently important part in the work and government of the Institute, and that any steps by which they could be placed in a less disadvantageous position in comparison with the town members would probably be for the good of the whole body, by rendering the Institute more practically a National rather than a Metropolitan body. By way of giving voice, therefore, to what we suppose must be taken to represent the opinion of a certain proportion of the profession in the provinces, we give some of the concluding portions of Mr. Connon's paper:—

"The Council must be held to have, in their own inimitably solemn way, always looked with jealous and praiseworthy care after the credit of the body to which they belong, and to have invariably insisted, as far as possible, upon each member of the Institute holding the honour of his individual conduct with the nicety of conscientious precision. One who with his headlong self-will has done much harm, with much good, to the Institute, Mr. C. Barry, truly said, 'One of the chief objects of its (the Institute's) original foundation was not alone to promote professional study, research, and talent, but to maintain and enforce professional honour.' Such was the declared intention when the first address was issued. 'With the object of gaining at the hands of the public a reliance on those professors, who are *bond fide* architects, one of the principal features will be the maintenance of a high standard of professional character and honourable practice among the members.' The intention, as usual, was good, but the transference of that into deed was always more than the apathy of the Council could attain to. The first of all questions affecting the honour of the members of the Institute was that of the alleged reception of illicit commissions by architects. This charge has been a prominent one for all the fifty years that the Institute has existed; it has been reiterated again and again; yet the utmost notice that could be wrung from the Council was the indifferent one of denying the truth of the accusation, or issuing a feeble manifesto threatening offenders with the rigour of By-Law XXIII. Something more than this is demanded from the national centre of architecture. An efficient Institute should be strong enough to stand up boldly for the honour of the profession and for the open punishment of those who violate the laws which regulate the conduct of gentlemen. Year by year the public complain more bitterly of architects; formulate more clearly their charges, more widely publish around their accusations. Attempt after attempt has been made to arouse the attention of the Institute to the true position of things, but in vain.* The virtuous decision to live down scandal is so much easier than to put on breast-plate and helmet, and smite your enemy hip and thigh. Vile accusations of the acceptance of fiduciary commissions are repeated with recurring monotony, and are simply met by the comfortable assurance that if some vindictive outsider, who would rather make the charge than support it, will, with infinite trouble and considerable risk, substantiate the accusation, the Institute will promptly, with bell, book, and candle, but with the greatest secrecy and politeness, excommunicate the delinquent, and no one will be one penny the worse. Such feeble inanity is not enough. A vigorous and earnest Institute would do one of two things, or both: it would compel the accuser either to withdraw or substantiate his shameful charge, or it would consider it its business to search out and discover the member who had disgraced his fellows, at any cost of trouble or expense, and would deal with him in the most public manner,—would expose the iniquity and baseness of his crime,—would, in short, metaphorically, 'Hang him to encourage the others.' That the Council itself could undertake such a task I do not maintain. I am not so unjust as to expect men who already devote so largely of their own valuable time to unrepaid work to do anything of the kind. But an Institute enjoying the confidence of the profession could easily afford a special and legal Secretary to the Professional Practice Committee, and could then efficiently watch over the moral behaviour of the members so far as those affect their connexion with the Institute. To treat such charges with what is called the contempt they deserve is but the feeble refuge of the idle. "'Tis the voice of the sluggard who would slumber again.' The contempt they deserve falls not on the accuser, but on the indolent accused, who allow judgment to go by default.

When an institute has looked to the honour and to the material interests of its members, it might fairly be expected to give some attention to the claims of those whom unmerited misfortunes have brought them within the need of the aid of their more successful brethren. The members of the Institute recognised this claim; and in 1848 a meeting was called 'to take into consideration a memorial submitted to the Council praying for the formation of a Benevolent Fund for the less fortunate members of the profession.' The reception of this petition was the customary one. For by the light of experience we can now expect confidently the result of any movement submitted to the guidance of the Council. Its suggestion is hailed by them with fervid enthusiasm. They declare their burning desire to see it progress as it deserves, but so serious matter must be dealt with only after reflection and grave consideration, and the members may rely upon their concentrated attention being focussed upon this particular question. Unless pertinacious and objectionably active individuals keep stirring up their sleeping minds, this is all that is ever heard about the matter. If repose is not to be theirs, and they are kept unwillingly awake, in the course of a period varying from two to twenty years, they announce with much pride and satisfaction the appointment of a committee to consider and report. This new body also deliberates for another two or three years, and then duly announces that the matter is one for further consideration. This farce is repeated, until exasperation establishes some other body, who do the work for themselves, and are duly and heartily congratulated by the Institute on the fact, which then proceeds to plume itself on the assistance it has been in the promotion of a movement always dear to the heart of the Council. This procedure is only varied when an immediate mode of quashing the whole thing is discovered. In the case of the proposed Benevolent Fund, this was so, the Council declaring within a month of the appointment of the committee that the idea was inadmissible under the terms of the charter,—a document that has often served to screen the Council from the need of carrying out essential reforms. In 1851 the Architects' Benevolent Society was formed by efforts outside the Institute, and an essential work inaugurated, that it would have been an honour and glory to the Council to have instituted. The claims of charity appealed in vain to the occupants of the Council-chamber, the Architectural Benevolent Institution having to create itself to replace the niggard inactivity of the central authority. When such a fund was established by the engineers, it was taken up, as it should be, by the Council of the Institution of Civil Engineers, the President and two of the Council being, *ex officio*, three out of the seven persons who have control of the invested funds devoted to aiding impoverished members of the Institution. The engineers, while always encroaching on the domain of architects, show also how nearly they come to deserving all they get, by managing their own affairs in all respects better than we do.

The weak place in the management of the Institute has always been the apathy of the Council. We scarcely expect this to be admitted by themselves; yet it is a frequent complaint to be found in the addresses of different presidents. It will be sufficient to quote one, the late Sir Gilbert Scott, who said, 'I also know how our meetings have come, from our lassitude and half-heartedness, to be voted a bore; and how the younger members of the profession fight off from joining us from a feeling that we have allowed our Institute to become too much a perfectly-constructed automaton, and too little a thing of earnest and zealous vitality. It may be worth considering, too, whether the self-elective character of our Council might not be moderated, and a certain number of seats be reserved to be filled by the general assembly.' The recognition of the truth of the last remark has occasionally, at periods of special excitement, when the inaction of the somnolent Council has aroused the patient contempt of the Fellows into active indignation, brought about that some gentleman,—of admitted enthusiasm in his profession, whose vigour of character and earnestness of belief in the future of architecture has drawn around him the well-earned support of those architects whose professional life extends outside their offices and can spare some little interest for the general well-being of the body,—is elected to the select circle of our rulers, and is heard of no more. In some parts of the country are found springs whose dripping waters have the property of depositing a limestone coating over objects placed beneath them, and of petrifying them into a semblance of stone. So when the new member, hot with burning enthusiasm, eager for reform, spurred by the expectations of those who supported him, enters the Council chamber, his ardour is cooled by the perpetual dropping of cold water on all his favourite schemes, his eagerness is damped by the chilly

* Mr. Barry, if we remember right, when President, openly said that if any such charge could be substantiated against a member of the Institute, he would see that such member was expelled from it. Could he have said more? —Ed.

inanimacy of his colleagues; the very life within him is petrified by the effete surroundings, and in due time he takes an equal place with the other fossils round the Council Board.

I have before made allusion to the systematic and continuous neglect of the country members. To that part of the question I will return for the sake of dealing with one or two other points, beyond the grievance mentioned of the lack of representation on the Council. It cannot be alleged that the interests of the country members were neglected because their existence was accidentally forgotten. That lapse of memory only took place when changes were to be made or bonours to be distributed, never when funds were wanted and increase of members was sought after. The records of the Institute repeat one continuous complaint of the lack of provincial members,—of the way in which they held aloof from joining the Society. But the records are silent always as to any means being taken to make it worth their while to join,—of any effort being made to place them on an equality with the London men. They are prolific in promises,—barren in fulfilment of them. That the Institute should, amongst its members, count more than a third of provincial men is marvellous considering the treatment that has been dealt out to them. It is now seven years since the subscriptions of London and provincial members were equalised,—an implied promise being inserted in the President's address that an attempt would be made to increase the influence of the provincial members, and to afford them additional advantages corresponding to the new taxation they were compelled to bear: a promise, it is needless to say, that was promptly forgotten when the financial juggling trick was successfully accomplished. Of flattering we have had enough. We demand a food more substantial than the windy utterances that for years have done duty for the attentions we have a right to call for. With a solitary exception or two, so rare as to need most careful research to discover, no country members have served in the many committees appointed at different times for various purposes. Take the later ones only. The examination committee, which settled on the scheme for compulsory examination of Associates, was composed wholly of London men. The Architectural Competition Committee of twenty-two members did not include one provincial name. At the present moment the provinces are unrepresented in the Professional Practices Committee, the Special Light and Air Committee, the Committee for Conservation of Ancient Monuments and Remains, the Finance Committee, and the Library Committee. The first of these, the Professional Practices Committee, is a dead letter without proper provincial representation. This body makes rules, and the Council proclaims the necessity of discipline amongst members of the Institute, and that all should comply with the regulations made. This is impossible when they are drawn up by one section only of the profession, that, too, the smallest, regardless of the opinions and wishes of the majority. The demand, under present circumstances, is an intolerable one, and cannot but be scouted as unreasonable and absurd. The Institute has too long been a mere clique of London architects, a private club of metropolitan Fellows whose aim is peace and profit for themselves, and who would fain be left to the enjoyment of the prepandial chat round the Council Board, and the agreeable dinner which follows, the enjoyment of which is so much enhanced by the feeling that they have previously satisfactorily disposed of the business of the head organisation of English architecture. The clique must be broken up, the Metropolitan Vestry Board of the profession dispersed, and a Council elected that will be representative of the nation and not of a mere city, however important and cosmopolitan that city may be. An infusion of the robust common sense of the North, with even something of its rude outspokenness that says plainly out the true definition of the vacillation and feebleness that have for fifty years characterised the work of the Institute, would be invaluable, and must be brought about. Its policy of meddling and muddling is inevitable. It cannot be otherwise. It affects to speak for the country, and knows nothing of the practice and feelings of architects outside the cab radius of London. One monotonous recurrence of ill advised advance and inexcusable retreat makes the record of what it has mainly done for architects. The Council of Compromise must make way for the Council of Courage. Of promises and fair words we have had enough, of acts of justice and fairplay none. The hands are the hands of Esau, but the voice is that of Jacob, who stole his brother's birthright.

To conclude remarks, already too long, it may be inquired, What do country members in particular demand? To a great extent an answer has already been given to such a question, but there is one thing in particular which carries within it the possibility of all the others. That is a vote by proxy. Without that all idea of justice to provincial men, of giving them any share in the control of things, is mere nonsense. No influence can be wielded by country members without it. The existing need of the presence of those who vote simply deters any but Londoners from ever troubling their heads about the affairs of the Institute. The vote through which alone they can make their influence felt is too expensive a luxury for any but men of abundant wealth. Let me give an example, my own. Last year I was anxious to exercise my right of franchise in the question of a diploma. Twice I specially journeyed to Town for that purpose, and each time, without notice, the matter was adjourned. Assume, which I have no grounds for doing, that the ballot is taken the next time the question is raised, and that I am foolish enough to try once more to be present as a voting Fellow of the Institute, let us see what that vote will have cost. Three railway journeys to Town at 2*l.* 10*s.*, 7*l.* 10*s.*; three days' hotel expenses at say 15*s.*, 2*l.* 5*s.*; three days' time at 5*l.* 5*s.*, 15*l.* 15*s.*; altogether the sum of 25*l.* 10*s.*, as the cost of exercising the franchise by a country member at the Institute. There is no need to enlarge upon the bare statement of fact, and no need to ask why provincial members take so little interest in an organisation in which they cannot reasonably make their influence felt. The position taken up by the Council has always been that to grant this demand for voting by proxy would be to run counter to the plain directions of the charter. I venture to say that it would not. And I venture to say, too, that the charter has never yet stood in the way of the Council when they wished to break through its clauses. They could stretch their consciences sufficiently to do this when they desired to establish a new class of members under the name of Honorary Associates, in direct defiance of the words 'And our will and pleasure is that we further grant and declare that the Institute of British Architects shall consist of three classes of members, to be respectively called "Fellows," "Associates," and "Honorary Fellows."' They wanted the guineas of a new class, and no charter was allowed to stand in their way to prevent them getting these. The Council in 1877 got, by fair promises, the guineas of the provincial men, but they have no wish to give them the right to vote, lest they should be speedily called on to dance to a tune that would not be of their own selection. In 1858 the then president (Earl de Grey), along with other members, offered to the Institute shares in the Architectural Union Company. To hold these was distinctly illegal, yet the Council had no difficulty again in overreaching the law for the sake of gain, the secretaries being put up as the nominal holders, and to represent the Institute. On another occasion, the Council desired to alter the mode of election of Fellows, so as to require a majority of four-fifths of the votes given to entitle to success,—a proposal so clearly contrary to the letter and the spirit of the charter, that the consulting solicitor at first plainly ruled it to be inadmissible. A second attempt to persuade their solicitor to more obliging manners was victorious, and he decided that the mention of a bare majority in the clause of the charter was only intended to apply to *general* meetings and to Council meetings. Ordinary or sessional meetings, on the other hand, not being mentioned in the charter, were not, therefore, considered subject to the clause. The Council profess to feel acutely the difficulty which prevents their granting to country members the right of voting by proxy. Here is a clear way out of the block. General meetings called for the election of officers are subject to the regulations of the charter; ordinary meetings, by the decision of the Institute's solicitor, by the acquiescence of the Council, are not. Let all matters of importance be decided by ordinary meetings, which are not controlled by the charter; let general meetings for the election of officers, which are so controlled, be preceded by an ordinary meeting, at which votes by proxy will be received, and which will decide in that way what names are to be submitted for formal acceptance by the following general meeting. This plan is simple, is perfectly legal, or else the Council have been acting illegally for years back, and permits of the exercise of voting by proxy, which is the chief demand now made by country members. The proposal is so convenient that it is astonishing the Council should never yet have seen so easy a plan for granting a boon which they claim to have been anxious to give to provincial members. If an ordinary meeting has the right to act contrary to the charter,—and the Council say it has,—there is no reason whatever why an ordinary meeting should not decide what names of officers should be submitted to the general meeting, and the general meeting certainly cannot elect officers against the voice of the ordinary one if only a sufficient number of names to fill vacancies are submitted to it. All other questions of importance outside that of electing officers need never come before any other than ordinary meetings, and, as voting by proxy is admissible at these, they not being under the charter, the whole question rests with the Council. If they still find a way by which to avoid giving this just right to country members, it is because they seek not to grant it, but to discover some plausible excuse for not doing so.

My indictment of the Council is by no means complete, and has omitted mention of innumerable sins of omission and commission. If the list of these is not exhausted, your patience must be, and I have, I think, said enough to sustain my position. It will be urged that I heap up blame too deeply on the Council, and that no amount of zeal or skill could have achieved all that I appear to demand from them. That it is too much to expect that all the reforms in the profession which I have incidentally mentioned should be brought about, I at once freely admit. But so long as none of them have been seriously attempted, I am justified in blaming them for the want of any. The policy of the Institute from the day of its foundation to the present time has been that of shelving all inconvenient questions, of adjourning all serious work, of sbirking every great difficulty. Beyond all other matters, it is deserving of the reprobation of all true architects for the deliberate way in which it has ever permitted itself to remain weak and uninfluential when it might have been strong and powerful; to be despised and neglected when it might have been venerated and courted, by passively allowing itself to be a Vestry when it might have been a Parliament; to remain a private club when it might have been a National Institution.

It may be assumed that I have no right to blame the Institute for the position of architecture to-day. I cannot concede the point. The Council stand as the recognised exponents of our professional position to the public. As such they must accept the blame if the profession loses ground before the outside world, even as they would arrogate to themselves the praise if the reverse had been the result of recent years. Scant respect must be the inevitable result of the contemptible exhibition of feeble vacillation which the Transactions of the Institute disclose. The burning question of competitions, with its intricate difficulties and its corresponding importance, is handed over to be dealt with by a committee outside the Institute, the Council only interfering to insert a mischievous and uncalled-for clause, and so its plain duty is cheaply shelved. The duty of maintaining some show of student education from year to year met with recurring neglect till a new organisation took up the work so shamefully forgotten, and by its vigour and energy struck a success that might have been the Institute's years before, and showed that the profession had within it a life and earnestness wanting only leadership to be animated into concrete activity. The universal demand that our profession should be brought up to the level of others by the institution of some qualification marking the capability of each member of the Institute, was met by a ridiculous half-measure, which closed the doors of the inferior grade of membership and threw wide open those of the superior to every charlatan who assessed the value of the title of Fellow at four guineas per annum. When contemptuous indignation covered with confusion the absurd attempt to

set up a diploma fore-doomed to ridicule by the very action of its promoters, the Council scared themselves, like children, with a legal bogie, built up by their own ingenuity out of an ambiguous phrase in a worthless charter, and shook their ghost of conveyance parchment, inflated with their own fears, as a justification of their failure to fulfil an admitted responsibility.

Vacillation and procrastination. These are the special characteristics of the Council. Questions of the gravest importance have been before them for years, till every conceivable resource of prevarication has become exhausted in the endeavour to adjourn without rejecting them. Such is not the conduct likely to forward the interests of an important profession, and to maintain the dignity of the Institute before architects or in the presence of the public.

Where lies the remedy? Certainly not in inaction or toleration. Whatever its faults or failings, the Institute is and must be the centre of English architecture. To weaken it by secession or abstention is to damage the general interests of the profession. The only course, it seems to me, is to join it in numbers sufficient to make the provincial element strong in proportion to its numbers; thus to make it truly national and representative. Then agitate for the right of voting by proxy until the right is forced from the unwilling Council, and then to 'Shape our ends, rough-hew them as they may.'"

## HEALTH EXHIBITION HANDBOOK ON WATER SUPPLY.

Rather late in the day there made its appearance (just before the closing of the Exhibition) an important contribution to the series of Health Exhibition Handbooks, in the shape of a voluminous report on London Water Supply, by Sir Francis Bolton. It contains a vast amount of information placed before the public in an intelligible form, and divested of much of the technical phraseology so puzzling to the ordinary reader. It describes the various sources from which the water supply is drawn, and the modes in which it is distributed. The consumer will be able to learn from it the exact points from which the water he drinks is taken, the process which it undergoes before being discharged into the pipes which lead it to his own house, in regard to filtration and purification, its degree of hardness or softness, its chemical constituents, and its standard of purity. He will also learn how easily that purity may be interfered with by the ignorance or indifference of the builder and plumber who arranged and fixed the pipes in his house, or by the carelessness of himself and his servants in not looking to the cleanliness of his cistern. A paternal Government in the course of its legislation has also undertaken to teach him what arrangements to make and what to avoid; in fact, if every consumer of water will only condescend to follow out all the precepts which are inculcated in the regulations made under the Metropolis Water Act of 1871, he may rest assured that everything possible has been done to secure him and his family from falling victims to "moving organisms," or "morbific germs." With regard, however, to the vexed question of water purity, Sir Francis Bolton does not profess to pronounce a definite decision, preferring to let the various distinguished experts speak for themselves in the Reports of Dr. Frankland on the one hand, and of the Companies' professional examiners on the other. As these reports have already received considerable attention in the *Builder*, we do not propose to enter on their respective merits again, but merely to point out that in Chapter VI., which is devoted to the quality of water and water analysis, the reader will find the chief points laid down, from which he can form his own deductions as to the meaning of the term "organic impurity." In regard to that term, it is said "that not only is the amount present in filtered Thames water infinitesimal in actual quantity, but the Royal Commission on Water Supply recorded the distinct opinion that the presence of a small quantity of organic matter in drinking-water is not necessarily prejudicial." On filtration as one means of remedying impurities in water, Sir Francis Bolton gives some interesting explanations not generally known. Until lately it has always been supposed that the action of filters was merely mechanical, and simply served to strain off such particles as were held in suspension; but it has been discovered that they play a more important part in the removal of chemical substances, as will be seen from the following description:—

"Decaying organic substances poured with the water into a filter-bed, are not merely arrested, but are rapidly decomposed and resolved into their elementary constituents, which again are promptly recombined in other forms. This chemical change is scientifically explained by the theory that every particle of sand is closely enveloped in a film of condensed air, and that the particles of organic matter being thus brought into close contact with a body of oxygen, undergo rapid decomposition. It is well known that all solid bodies attract about them an atmospheric film, and, therefore, as a bed of sand and gravel is an agglomeration of minute stones, each with its coating of compressed air (or, in other words, compressed oxygen and nitrogen), the water filtering through the interstices has to pass through a concentrated body of oxygen capable of rapidly decomposing it, and forming other compounds. . . . Following out this theory, it has been asserted by chemists that when some of the London companies drew their supplies from the tidal portion of the Thames where it received all the sewage of London, their filter-beds did not clog up nearly so fast as might have been expected. Scientific experiments showed that the filter-beds must have intercepted considerably more impurity than was actually found in them, and the phenomenon was explained by the theory that filtering was not merely a mechanical straining process, but one also of rapid chemical action, by which the polluting matter intercepted was destroyed and converted by oxidation." The process which takes place in the large filter-beds of the water companies goes on of course similarly in the small domestic filter, but just as it becomes necessary to renew the substances comprising the large filters, so is it necessary to cleanse the small ones, a precaution which householders ordinarily are not in the habit of taking, and consequently the very article on which they rely as a safeguard may, and often does, turn out just the opposite. No filter, therefore, can be depended upon *indefinitely* for the purification of water, for it "gets gradually choked up by the pollution which it is continually abstracting from the water passing through it, and the air coating upon which the chemical action depends becomes exhausted, and the oxidising process gradually ceases." It behoves every householder, therefore, to bestow especial attention to two points: first, to the periodical cleansing of his cistern, and next, to the renewal of his filters; as also to give heed to other important matters which are particularised in Chapter IV. The second part of the treatise is occupied with the history and description of the various London waterworks companies, with very complete statistical tables of their financial position. As similar information was embodied in Mr. Alfred Lass's Report, which was lately reviewed in our columns, it is unnecessary to say more than that all who are interested in these particulars, as well as in the legislative enactments under which the several companies raise their revenues, will find them all clearly detailed therein.

The description given in Appendix II. of the Water Pavilion, and of the way in which those marvellous effects were produced in the illuminated fountains, will doubtless be eagerly read and appreciated by thousands of those visitors to whom that part of the Exhibition proved a never-failing source of wonder and pleasure. For the small price of One Shilling they will find themselves initiated into what, until it is explained, appeared a veritable mystery of science, a marvel which led the beholder to imagine for the time being that he was under the spell of the genii whose wonder-working powers of magic formed so favourite a subject of description in Eastern lore.

**East Dereham.**—The parish church of St. Nicholas, East Dereham, is about to be restored, according to plans and specifications which were approved of at a vestry meeting held last week. The scheme of restoration, for which 3,000*l.* is required, includes the removal of the plaster ceiling over the nave, the renewal of this roof to its original state, and the removal of the galleries, which now obstruct some beautiful windows, especially in the north aisle. The architect for the restoration is Mr. E. Preston Willins, of Norwich.

## MR. G. AITCHISON, A.R.A., ON THE PROSPECTS OF ARCHITECTURE.*

As I understand, there are certain conditions without which architecture, as an art, is impossible; there must be the laid-up wealth, much building on a large scale, and a taste,—nay, a passion,—for beauty, for sublimity, and magnificence, amongst the public; and there must be those conditions of law and custom that will not thwart the desires of the owner of the building. There must be the architects, honest, skilful, and inventive. I think we cannot doubt that the laid-up wealth exists, nor the need of buildings, some, at least, of large size, nor a sort of sluggish taste for work good of its kind; but I think we may safely say there is no overmastering passion in the public for architectural beauty or magnificence. There is, of course, discernment enough to know a good building from a bad one, but the inclination is rather to pick holes in the best building than to thank God that anything so beautiful could be made by man.

There are, however, laws and customs that, perhaps, do more than general apathy itself to check the development of the rising taste for beauty, for instance, "leasehold tenure." Who will build magnificently for some one else? Is it credible that any one will secure superb workmanship, the most enduring materials, and all the art that the best architect, sculptor, and painter can supply, if the building is to pass to a stranger at the end of sixty, eighty, or ninety-nine years? Besides, the freeholder will look to see that what his tenant wants to make his house perfectly fitted for himself is also fitted for after-tenants, even when he does not force upon his tenant some of his own views of propriety and beauty.

There is a fashion now for buying pictures, and an excellent fashion too, so far as it goes, but I fear it is not altogether separable from the idea, that if the pictures are skilfully chosen they are better investments than any known on the Stock Exchange: else why are there so few friezes, wall pictures, and mosaics, in buildings that are not leasehold? I merely mention this because it might otherwise seem that architecture had been outstripped in the race by the sister art. I am by no means sure that this is not the case; and if it be so, let us again draw up to the painters, and pass them if we can; no one objects to generous rivalry.

I ask, if painting be truly and honestly admired for its own sake, how it comes about that none of the pæans sung in its praise are sung in praise of our art? And why the architects who build more excellently than their fellows are not run after like the celebrated painters. On the whole we may say that the first half of the last 100 years was a very artless one. We escaped from perhaps a worse fate than once threatened Greece, but no temples rose, and few monuments recorded our thankfulness and our victory. When we had modestly housed the Duke, put up a bronze Achilles to his glory, named Waterloo-place, Waterloo Bridge, Waterloo-road, and Waterloo blue, our thankfulness and our enthusiasm expired.

If we compare the spirit of the Florentines in the thirteenth century, only just emerging from barbarism, and owning but one tiny city, determining that their new cathedral, St. Mary of the Blossoms, should exceed in magnificence any building that Greeks, Romans, or the proudest people of the earth had built, what a contrast they make with us, possessing an empire on which the sun never sets, but doubting whether we have enough courage, energy, and industry to keep what our fathers won for us, and when the supreme aim of the Government is to see if it cannot save three-halfpence off the architect's commission. So much for the public; now for ourselves. It would be as insulting as untrue to doubt the honesty of the generality of architects. I do not doubt that amongst the whole body of them there is much more skill than could have been found for a century or more, and it would be invidious to compare the individual excellence of living architects with the great who have passed away. We have reburnished the rusty armour, and weapons of antiquity and the Middle Ages are fairly skilful at the old fence, but I fear we lack the heart and the inventiveness of the old Paladins. No *coup de Jarnac* seems to be

* From a paper read before the Architectural Association on the 21st inst.

invented now. We bear too much resemblance to the men in armour at the Lord Mayor's show: the armour and weapons may be as good, and as bright as armour or weapons ever were, the men may be bigger and their thews as strong, but their hearts have not the ancient courage, nor their souls the same devotion; and even if the men were our modern Paladins, they would not fight in that armour, nor with those weapons. Do not fancy that I suppose that any man can evolve a style: there must be something to start from, and a multitude striving in the same direction, every one of that multitude anxious to solve the pressing problems of the day, and several generations to bring the new thoughts to anything like completeness; but what we all feel is the absence of the first step. You know Viollet-le-Duc's comparison of the architects to an opera chorus singing "Let us go," though they all stand still.

It may be that the grand gift of architectural invention is only to be found in what we call new races; barbarous races that have suddenly emerged from their homes, who find themselves conquerors, and face to face with a higher civilisation, and in the possession of unheard of wealth, such races as the Arabs and the Normans.

Amongst civilised nations, the Roman was the only one I know that slowly evolved a style. Unless one were a prophet, a necromancer, or whatever he be called, who can depict the probable development of past possibilities, it is impossible to say whether the Romans would have created a style of their own, could they have increased in wealth and civilisation without the subjugation of the known world. All we know is, they did not; they were born constructors, and had cultivated this native gift to great perfection even before they conquered Greece. The artistic excellence of Greek architecture dazzled their eyes and enslaved their minds; like ourselves, they wanted excellence ready-made, and would not wait for its growth, but they were too practical a people to give up their advanced system of construction for the primitive one of Greece. They were not artistic enough to apply at once Greek principles of beauty to their own new forms of construction, —the arch, the vault, and the dome. So apparently the art-architect was created. He stuck vulgarised imitations of Greek work on to Roman construction, and it was not till five or six centuries had elapsed that the Romans possessed a real style, one that ornamented their own native construction with appropriate forms. This style we now call the Byzantine.

The Greeks carried the old style of construction, — the post and lintel, — to the highest artistic perfection, and in a style differing from the Egyptian, Assyrian, or Indian; so a new system of construction is not necessary for a new style. The Romans having new constructive elements gradually learned how to clothe them in forms of beauty that neither hid nor belied constructive truth.

The Arabs,—for we call the conquered people by the name of their conquerors,—somewhat improved on Roman construction, and certainly clothed their construction with forms that were wholly new and original. One of the most striking features of Arab architecture is the stalactite or honeycomb work, and, if Owen Jones's assertion is to be believed, this was gradually evolved from the attempt at copying series of superposed eggs and tongues that took their fancy. Here, to say the least, is the one step forward from which came such wonderful results. Before we have analysed the elements of it, an Arab honeycombed dome does not seem to be the work of man's hand but to be the work of some superior being. Though I hope I may be wrong, I do not see this tendency towards development in modern architecture.

The Normans, with examples of Roman and Byzantine work at home, and with reminiscences of Syriac and Arab work abroad, gradually evolved a wholly new style. They, or some of the people they conquered, and animated with their resistless energy, developed the arch and vault to their uttermost perfection, and I think we may say they evolved and developed tracery.

If you think of the continuous invention implied in passing from columned and arched windows to the fantastic tracery of the Flamboyant, at first sight it seems that there was more invention then than now, perhaps because we can now see the transitions at a glance, though it really took four or five centuries to complete the development. Phases of plant growth, before overlooked or disregarded, took their fancy, and they piled the pyramid on the tower, and so gave what we suppose to be a novel aspect to buildings. At any rate, we know that the Christian cathedral is very different from the Pagan temple. Whether in the babel of architecture that now exists we are slowly evolving a new style, no one who lives in it can say. We must not forget the almost frenzied energy with which the English architects of fifty years ago threw themselves into Gothic, how perfectly they mastered its apparent intricacy, till a Mediæval, revisiting the earth, might believe he had come back to his own time again. This training, with the Roman Classic forms ingrained in the people and revived, points to a new style partaking of both elements.

All I can do is to point out to you what little observations I have made. You have often heard me say that I believe that what taste there is, that is not antiquarian, lies in the direction of simplicity, and as I am sometimes charged with paradox, — that is, saying that which though true is strange,—I will now explain my reasons. The old sailing-ship of my youth was of the uttermost complexity, with masts, yards, booms, and bowsprits, with shrouds, ropes, and dead-eyes, sails, and pennons, a sculptured figure-head, and carved stern, while that modern monster of the deep, —the ironclad,—is as simple, and black as a dolphin, with nothing but a funnel for its back fin. The old dinner-knife, curved like a scimitar, with its blobbed end to prevent stabbing and to eat peas with, its conical handle coloured green, and bossed with silver, has made way for the rectangular blade, in its oblong haft. The many-runged chair, ornamentally turned and fancifully carved, has been supplanted by one of four plain legs with two rounded uprights and a slightly curved top. I am not now speaking of art furniture. Every wheeled carriage that is turned out aims day by day at being more perfectly simple, and harness becomes less and less without a stitch or a rivet that is not for pure use. So much so, that the old wagons we sometimes see, all chamfered curiously, the horses' harness covered with jingling brass plates, pierced and engraved, and with ornamental stitching, remind one of Mediæval days. And what can be of sterner simplicity than the new carriage of our time,—the bicycle,—which, when bestridden, presents us with the centaur of the nineteenth century. Take these observations for what they are worth: to me they point to simplicity of taste. We have two absolutely new materials, —iron and cement concrete,—and both these materials almost force us back to the pure post-and-lintel construction of the early days of our race. The use of iron should, at least, be marked in some way; but hitherto we have adopted the Roman plan. The girders with their vaults are covered up with a false ceiling in imitation of wood framework; and we cannot as yet be said to have turned ironwork to much æsthetic use. Of ornament we have no lack: does it point to anything in the heavens above, the earth beneath, or the waters under the earth, that the cultivated man of the nineteenth century cares for? We have our sacred animals, those devoted to sport,—the fox, the roebuck, the red-deer, the pheasant, the partridge, the grouse, the woodcock, the trout, and the salmon. Do we ever see one of these put on a house because the owner is a hunter, a sportsman, or a fly-fisher? Do we see domestic pets,—a cat, a dog, a canary, or a squirrel,—carved on a house? Though there was one squirrel immortalised by figuring in the centre of each drawing-room frieze of a speculative builder's row of houses. This squirrel would "have cracked his nuts in liberty" had not both been of plaster. Lions' heads we see by scores because the Egyptians, Greeks, and Romans liked them; nay, I have seen bullocks' heads on a Bank, but I took that for the architect's monogram.

There are two emblems that the modern architect has taken under his especial protection, the stone cannon-ball and the flower-pot, and these are now receiving their apotheosis. The flower-pot I think I understand, but why the cannon-ball? Figure sculpture of this century we cannot have; our dress is too ignoble to be represented in any lasting material of one colour, and this is a terrible misfortune, for the bulk of mankind care for nothing but the present. The architect, like the poet, is born, and not made; though when either is born he takes a good deal of making; but in one respect the architect is more like the soldier than the poet; for after he has endured his training, and learned his drill, it is from the teaching of the actual strife that great generals and great architects are formed. Since the incubation of the Renaissance it is curious to note how few great architects there have been who have not measured some of the celebrated ruins of antiquity, at least of those who have succeeded in making fine monumental buildings.

The close communion with antique greatness seems in some measure to impart that greatness to those fitted to receive it. So, few great modern poets have not been classical scholars; those grand exceptions, — Shakspeare and Burns,—were not unconscious of this misfortune, and repaired it by studying the antique master-pieces at second-hand.

Drawing is doubtless a great art; not only does it enable us to show completely and brilliantly what we mean to do, but the training to eye and hand is invaluable, and we can mostly distingnish between the works of the architects who can draw, and those who cannot; and if we cannot, the architect who is a brilliant draughtsman can, for he sees the improvised turns that the mere art of drawing suggests: still this brilliant achievement is being carried in the present day beyond its legitimate end, or rather, I should say, it is made too much of to the exclusion of more important things; though it helps us by forcing us to observe, and reveals to us some of the causes of excellence in buildings, though it enables us to have a useful gallery at hand for our study, though it commands immediate recognition, some flattery, and frequent success. It is scarcely studying architecture, and is too apt to draw us away from more tedious studies, such as measuring fine examples and calculating their proportions, studies more necessary for our education, and which are apt to call down on us the contempt of our friends and the gibes of painters, though the end of these studies is to increase our knowledge, and to enable us to acquire that skill which is the peculiarity of the architect as distinct from the builder, the engineer, the draughtsman, or the designer. Paradox as it may seem, architectural invention is not the one distinguishing characteristic of the architect. His distingnishing characteristic is the knowing how buildings and their details will look at the height and distance at which they are to be seen; and this can only be learned by actual practice, if it be not learned by the measurement of existing buildings. Pheidias was a monumental sculptor, and in the competition for the pediment of the Parthenon his work was judged to be the worst; but he insisted that as the sculpture was to be in a pediment, not on the ground, it must be seen at the proper height, and when this was done, his was seen to be the best.

Mr. Ruskin, after one of his brilliant descriptions of an atmospheric effect on a distant hill, argues *à priori* on the probabilities of what the substance was which produced that effect, whether it was marble, ice, snow, or gold. He then walked up the hill, and found it to be caused by a wood of pine trees, and expatiates on the strangeness of the material chosen by Nature to produce such an effect. This is just our case. We have sketched something in a building which we consider successful, and are surprised when we try to produce a similar effect that our work is a failure. It is so because we have used the ice or gold instead of the pine wood. When you learn to draw freehand learn figure drawing, for not only does the padding out of the ghastly bones with the necessary flesh give lessons of how the purely necessary can be clothed with beauty, but the figure gives the best lessons in form, and the exquisite refinements that Nature resorts to, and it also teaches us the comparatively small difference between the curves that make beauty and those which make ugliness.

One form of wisdom, however, consists in proportioning our efforts to the task we have to do and the time and strength at our disposal, and it is not wise to make our plan so vast that we shall have neither time nor materials to rear the building.

The three great divisions of architecture are: arrangement, construction, and beauty; each division is transcendental, and no man that ever lived could say he had perfectly mastered one of these subjects. Construction alone has of

late years been raised into a profession, and no engineer could say that he had mastered it, and yet we have in that profession men of special, and extraordinary ability, who have devoted their whole time to its study, who have won by it fame, titles, and fortune. And though M. C. Garnier's joke is not quite true that engineers are only architects who have not finished their education; yet to gain the name of architect we must combine in some degree all three. That this combination, with extraordinary excellence in each branch, has not been beyond the powers of some giants who have added to it sculpture, painting, and poetry, is a reason why giants should not despair. All I say is, let us be sure we are good architects before we become painters, sculptors, and poets, and let us not lose the substance for the shadow. To aim at everything and to do nothing well is not, in my opinion, to win self-respect, not even fame.

Some of you may recollect Martial's epigram on Attalus, who did everything prettily:—

> "He that doth nothing well all prettily
> A very idle-busy-man must be."

No country, however, wants the aid of the real architectural sculptor so much as England. And if your taste leads you to abandon architecture, and become an accomplished architectural sculptor, every wise architect will hail you with delight. I may also mention incidentally that France has almost the monopoly of architectural illustration, the whole world is supplied by her, at least when the books are illustrated with fine steel engravings. Here at least is an opportunity for the highly skilled architectural draughtsman, for France only has this monopoly by reason of her superior industry and skill.

We may say that geometry is the mother of architecture, yet how few study it. Read Prof. Willis's paper on "Stonecutting in the Middle Ages," and see the great acquaintance there was then with it.*

In the Arab writings, when a town or a palace is to be built, the king sends for the geometricians and mathematicians, and those mysterious and intricate interlaced patterns, the real arabesques, are founded on pure geometry. Proportion is the soul of architecture, though every style gets some of its flavour from a tendency to some particular proportion.

The Reform Club is, I think, the most perfectly-proportioned building that has been built in Europe since the Italian Renaissance, and the story goes that Sir Charles Barry had the proportions of every celebrated Italian palace taken out, and took a mean for the club.

We know from Vitruvius that the Greeks had established a canon for proportioning their works, which the Roman architects imitated. We try to extract from old buildings the secret of their success, and we can in some cases obtain their proportions; but those proportions must be applied to some definite form, and it is just this definite form that we lack.

Like the fever-tossed patient, we try to get rest and ease by constant turning. We in this century have tried Greek, Egyptian, Italian; every period of English Mediæval from Norman to Tudor; Italian, French, and Flemish Gothic, Elizabethan, and the Dutch Renaissance; but no sooner have we mastered the style, and in some cases long before we have mastered it, than we abandon it for something else. This passion for change prevents us from exercising that power of modification on any style which might make it suit our wants and likings.

Our friendly but grumbling critic, Mr. Fergusson, has written high praise of us in his "Modern Architecture":—"As a body, the architects of this country have never been so numerous, so well instructed, nor so earnest in the exercise of their vocation as at present." Yet he is always insisting on his text that "modern architects do not think, they only copy,"—a saying seized on with pleasure by the ignorant multitude, but *we* know how far it is from being the case. I dare say we think as much as architects ever thought, and copy less. I think that if you compare the buildings of one style that have been done in the last thirty years, and take thirty years either of genuine Gothic or Renaissance, you will see that the modifications of the latter are not much more than the former; although in the former case these buildings of one style have mainly been the production of a small band of architects only, while the latter were of the whole body. I shall show hereafter the absurdity of supposing that a new style perfected in every part, and precisely adapted to present use, can issue from the brain of any one architect like the armed Minerva from Jupiter's. Every architecture we know has gradually proceeded from the small modifications each age has made; and that, too, at times when more attention was paid to architecture than has been the case for the last century, when men's thoughts have been occupied with the discovery of the powers of nature and the invention of machines to utilise those powers. We must, at least, begin by modifying or paraphrasing some known style or by applying the mouldings and parts of something we do not know to the rectangular brick box with holes in it.

If this paraphrasing of by-gone styles were confined to England alone it would not so much matter, because then we should know it resulted from idleness or natural incapacity, but it extends to civilised man. France, Belgium, Switzerland, Italy, Germany, Austria, America, and Australia have nothing absolutely new to offer, so it is clear that neither race, climate, nor language can affect architecture; the defect must lie in the present civilisation.

I am inclined to believe, in spite of Dr. Johnson, that "Poets are but the tailors of other men's thoughts," and that which is true of poets is true of all artists. They are the men pre-eminently gifted with the spirit of their age, and blessed with the power of expression. If, then, the people of their time are heroic, you have heroic poetry; if the passions run riot you have passionate lyrics; if causticity and sarcasm prevail you have satire; but if the people have nothing poetical about them, the poet is driven to old themes. If the people are fat and shapeless they afford no scope for the sculptor; be they ever so beautifully made and in ever so fine a condition they will be useless to the sculptor if they wrap themselves in ugly garments that conceal their shape, and sculptors must revert to antiquity or die out. If the public care not for grace, dignity, or elegance in their habitations or public buildings architecture dies, and dies more completely out than any other art. Poets may sing, painters may paint, and sculptors model, but it is a rare case when an architect could afford to build even the Reform Club House for his sole use and delight.

If the public desires some sort of grace, dignity, or elegance, but does not much care what, and has no particular liking, as we have no style of our own an old style is paraphrased till the public are tired of it, and then another style is paraphrased; in short, architecture, like the other fine arts, closely portrays the spirit of its age.

Some ancient nations called themselves "Autochthones," or sprung from the soil, and if the story of the Doric temple is true, that it was suggested by the native wooden hut of Greece, the Doric temple may be said to have sprung from the soil, and after centuries of gradual perfecting, culminated in the Parthenon. We know that the Romans with building, but as we suppose without architecture, tried to imitate that of the Greeks, and after five, six, or seven centuries created Byzantine; we know that the Normans copied as well as they could Roman and Byzantine buildings, and when touched by Arab art during the course of five or six centuries began and ended Gothic. The wave of Classic feeling that passed over Europe, at first only wetted, as it were, the surface of things: the buildings remained Gothic, but with a savour of Classic, the mouldings, ornaments, and sculpture only were of Classic inspiration. Architecture then became as purely Roman as it could, and gradually losing all vitality, again made way for revived Greek and for revived Gothic. Many variations of Classic and Gothic have been introduced and practised, not to speak of flavours imported from Arabic, Moorish, Hindoo, Indo-Arabic, Chinese, and Japanese sources.

It is the easiest thing possible to imagine the throwing away of all former thoughts, traditions, and knowledge, the arrangement of buildings on purely rational principles with new and splendid effects, the whole clothed in new and beautiful proportions, adorned with new mouldings and ornament absolutely different from the past, and with figure-sculpture and painting animated by a new spirit, and that this combined perfection shall excite the admiration of the multitude, and satisfy the fastidious taste of the cultivated. The only objection to this charming vision is that nothing of the sort has ever yet occurred in the history of our race. We should hear of African savages, who had heard nothing but the tom-tom, writing operas that surpassed those of Rossini or of Wagner; or North American Indians, who had seen nothing but a wigwam, erecting temples that surpassed the Parthenon or Notre Dame de Paris.

This visionary scheme was once put in practice. Brunel and Sir Digby Wyatt agreed to do the interior of the Great Western Railway on this principle. Brunel found the construction, Sir Digby the art; and every moulding was to be brand new, and no ornament was to be used as ornament, but only where necessity demanded it. You have the monument now before you of what one clever man can do.

It is admitted that without the Iliad we should not have had the Æneid, nor the Divina Commedia without the latter: yet each had the flavour of its time.

The Gothic foliated cap is a Mediæval paraphrase of the Corinthian capital; the stellar vaulting is but the outcome of the Roman groin. We adapt our buildings to our present wants, and use the iron construction of to-day to meet our needs; and it is only when we seek to give our buildings the æsthetic flavour of the age that we fail, and I think the solution is that there is no æsthetic flavour in the age to give; the public are just affected with the slight flutterings of taste, and are beginning to think they ought to have something more sightly than the old brick box of their youth, with holes in it for doors and windows.

The twelfth century was the incubating period of Gothic; and it is quite possible that the nineteenth may be that of a new style; we have not only been gathering specimens of architecture, and architectural art from all parts of the world, but different architects, or groups of architects, have more or less assimilated the spirit of each. Let but the people of England, or of Europe, of America, or of Australia have some definite taste and desire, the creative genius arise, and all this apparent chaos may form itself into an organised shape, embodying the sum of all the art and charms that characterise each one, and proceeding to develope itself in as logical a way as Gothic did.

Maybe we have been making a bed of leaf mould,—with leaves, too, from every part of the earth,—from which the new tree may spring. Although I am no prophet, it seems not so unlikely that this so-called Queen Anne's style may be the germ from which the tree is to spring, adapting itself to the outline, and freedom of Gothic with the Classic detail,—and when I say Classic, I mean excellent. Even now it does not refuse alliance with the best sculpture and painting that this age affords, as Gothic does.

The first thing wanted is for you to train and drill yourselves, and when the power of expression is attained, to observe the temper of the age, and to work out the style which will suit that temper, and seize on the budding aspirations of the age. My own notion is, that this will be found to be perfectly proportioned and graceful simplicity, almost free from ornament, but enriched with the finest sculpture and figure pictures that the age can afford. When you have done this, you want to convert the nation, if the nation will then require any conversion. For if a national taste arise, you, as a part of the nation, must be imbued with its spirit, and be sure that, if you can give tongue to that aspiration, the pack will follow you. Probably there is no profession requiring so much study, so poorly paid; so the architect works mainly for reputation and for fame.

Besides the hints about study that I have dropped in the course of this lecture, I want to direct your attention to the claims your art has on every age, in every nation. It is at least a lasting record of that age's taste and temper. From the durability of its works it to some extent supplies the want of those more brilliant and lasting records, eloquence and poetry. The illiterate nations of the past would be as last year's snow were it not for their architecture, and its enshrinement of the cognate arts. Let us suppose that the ancient Egyptians had contented themselves with houses, tombs, temples, and palaces of reeds and Nile mud, with all their glory and achievements, they would be as utterly gone from human remembrance as the men who built the lake dwellings. We know

* Transactions of R.I.B.A., vol. i., part 2. On the Construction of the Vaults of the Middle Ages, by R. Willis, M.A.

that Egypt must have been great, because we see how vast, sumptuous, and artistic are its structures, while its sculptures tell of achievements in war and peace. When we consider the power of our art to endue buildings with sublimity, grace, elegance, beauty, or even with appropriate gloom or horror,—when we consider that our art is enshrined in buildings of vast size and of long endurance,—when we consider, too, that they reflect the character of the age in which they are built,—I cannot for a moment doubt that architecture is worth living for, although I must admit that we are at this moment beset with so many depressing influences that it is not surprising that some of us are tempted to despair,—to throw aside our high aspirations, and to see if we cannot win in the race for fortune when we have lightened ourselves by throwing away the desire for fame. But I say, despair not; black and tempestuous as may be the sea on which you are about to venture, let your courage and endurance rise superior to the danger, and some of you at least will weather the storm. I believe that no good piece of work is ever thrown away, but, even if you can do no more, you will help to hand down the tradition of your art unimpaired to happier times and more sunshiny days.

Master the art of architectural expression, master construction and arrangement, master a cultivated style, and then set yourselves to really adapt it to present requirements. Cut off all the redundancies, all that is not called for by actual needs, either practical or æsthetic; recollect, too, that iron must enter even more largely than at present into every building that is not of the most modest size. Consider that though the bones of the mammal are ghastly they are hidden, and that the bones of the crustaceans are outside. Nothing, for instance, can be more elegant in treatment than the shell of the king crab. Mountains, rivers, rocks, and forests all abound in lessons for the architect. Every leaf and every plant may give him inspiration for a form, a moulding, or an ornament.

Reputation, honours, and fortune are the prime movers of the second-class spirits of the world; and if we do not wish mankind to relapse into sloth and barbarism, we should do what we can to uphold these incitements to exertion, and not let the envious, the dull, and the brutish abolish them, in the hope that when all are reduced to the condition of swine, they will be indistinguishable from the rest of the herd. Higher motives, however, have actuated the noblest of our race; men of brilliant genius and overwhelming power have devoted themselves to the good of the world, of their country, or their creed, for no greater meed than bare subsistence and a sense of duty. It is this spirit that I want you to adopt; perfect yourselves in your art, and then preach a crusade against the apathy and tastelessness of our age, and so confer on your country and your art a benefit of incalculable value. Did I not think this reward coupled with the feeling of having done one's duty was so much higher than any other, I might have pointed out the cases when pious monks, with no aims but the improvement of mankind, have ended their lives as popes.

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In the course of the discussion which followed, The Chairman (Mr. Cole A. Adams, President), said he was glad that Mr. Aitchison, speaking from his long experience, had laid such stress upon the subject of drawing and its relation to architecture. One could not help also being struck with the wisdom of the remarks upon the little progress made by architecture in this country through the deadening operation of the law of leasehold tenure.

Mr. Stannus agreed with what had been said about pictures being bought as investments. He knew instances of City men who had almost the acuteness and judgment of an Agnew for buying pictures, and who, after holding them for a few years, had realised more than 5 per cent. per annum (on the money thus invested) by their sale. At the same time one could not help feeling that the diversion of capital from ordinary mercantile pursuits led to an abnormal development of picture-making, while preventing outlay upon architecture. With regard to the disappointment often resulting from the attempt to reproduce some feature which looked well from a mere sketch, he believed the old men did much of their designing *in situ*. The architect in those days was merely a superior kind of workman, and as the detail was wanted, he sketched it on a board with chalk or charcoal. Designing *in situ* was the grandest form of training any young fellow could have. The modern tendency for simplification was a hopeful sign. It was as if they were throwing over, bit by bit, the worthless portions of the cargo, so that the good ship *Architecture* might weather the storm. An eloquent writer on architecture had termed these the "trimmings," and they were what Mr. Aitchison had said should be thrown overboard. The great desire of the age seemed to be for classification, and in the case of architecture it would enable people to distinguish the evanescent from that which was eternally true. Mr. Aitchison had referred to new materials, and one of those with which his name had been associated was iron, which had never had a fair trial. The whole paper was really an inspiration to younger men. He concluded by moving a vote of thanks to the writer.

Mr. Hilton Nash seconded the vote, adding that it was a pleasure to the members to hear such an elevating paper. He believed that leasehold tenure only existed to any great extent in the South of England. They all deplored the rows of rotten and ugly houses in and around the neighbourhood of London.

Mr. Aitchison, in returning thanks, said that the prospects of architecture seemed very hopeless, and that was what he meant by the "black and tempestuous sea" they were venturing upon. Nothing could be more damping to the spirit than the idea that one's client did not care whether his house was good, bad, or indifferent, and every effort should be made to remedy this state of things. As to iron, it was a material which was pressing itself forward for the use of mankind, and it would enter more and more largely into buildings as time went on. With regard to style, this would not be invented by one man, but by a gradual concentration of the capacities and tastes of men working in general concurrence with the thoughts of others.

## BRITISH ARCHÆOLOGICAL ASSOCIATION.

The opening meeting of the present Session, 1884-85, was held on the 19th inst., Mr. Thomas Morgan in the chair. Mr. H. Rolfe, C.E., sent some interesting drawings showing the construction of the piers of the Roman bridge recently discovered in the bed of the River Trent during the works of widening and deepening the navigable channel. Two of the piers were found, strongly framed, there being a solid plate from end to end in the centre of each pier, from which lateral timbers extended to take the uprights of the roadway. It is supposed that five other piers remain embedded in the river. The spaces between the timbers of the piers were packed with freestone, similar to Ancaster stone. Mr. Loftus Brock, F.S.A., exhibited, by permission of the Rector of Westbere, Kent, a large number of fragments of stained glass of the fourteenth century, recently found in the Rectory-house, where they were deposited many years ago during the repair of the church. They will be replaced in one of the windows. Mr. C. Roach Smith, F.S.A., sent a paper on a remarkable oppidum of ancient British date on Hayling Island. It is surrounded by deep ditches, some of which are still filled with water. The site is a strong one, and, although the existence of a large earthwork is known in the locality, but little attention appears to have been given to it, and its extreme antiquity does not appear to have hitherto been recognised. A paper was then read by Mr. C. H. Compton on the Roman bridge found in the Trent.

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**Builders' Clerks' Benevolent Institution.** A special general meeting of the donors and subscribers was held at the offices of the Institution, 21, New Bridge-street, Blackfriars, on Tuesday, the 25th inst., on which occasion Edith A. M. Friend was elected by show of hands to succeed to the benefits of the orphan fund, in place of Ethel M. Jeffreys, whose school term will expire at Christmas. At the close of the proceedings a vote of thanks was presented to Mr. Joseph Randall, the president (who was supported by Messrs. E. Brooks, treasurer, J. Robson, E. C. Roe, E. Graystone, and other gentlemen). Mr. Randall, in reply, expressed the pleasure it had afforded him to assist in the work of so good an institution.

# Illustrations.

## MONUMENT IN WESTMINSTER ABBEY

TO THE LATE REV. LORD JOHN THYNNE.

We give an engraving of this monument, which is in the north choir aisle of Westminster Abbey. The subject of it, the Rev. Lord John Thynne, was for fifty years Canon and for forty-six years Sub-Dean of Westminster. Mr. Armstead, the sculptor of the figure, writes: "During the last sixteen years I knew him well, and have tried to represent the aged priest peacefully at rest, his long day's work done, clothed in the elaborately ornamented cope which he wore when officiating at her Majesty's coronation. The reindeer, at his feet, is the family crest."

The architectural portion of the monument, like that to Dean Stanley which we illustrated a few weeks ago, is designed by Mr. Pearson, the architect to the Dean and Chapter.

## THE LADY CHAPEL: TREVES CATHEDRAL.

There are very few churches north of the Alps which retain so much undoubted Roman work about them as does the Cathedral of Treves. Tradition asserts that it was erected by St. Helena, mother of Constantine. It was, however, almost rebuilt in the sixth century, largely added to at the commencement of the eleventh century: vaulted, and the choir enlarged, in the thirteenth century. Of the earliest building traces are still visible in the vast capitals, built into the walls of the transept, which appear to have supported the "crossing" of the church, and the brick arches visible in the walls of the choir aisles, especially that which forms the "Lady Chapel." Our illustration represents the south choir aisle of the cathedral at Treves, and shows some of the old Roman brickwork, together with additions of the eleventh and thirteenth centuries. The curious gallery to the left is a very singular example of Romanesque work; if, as there seems every reason to suppose, it was erected as an organ-loft, it is a remarkably early example of that feature. The screen at the back of the altar is also curious; it is of late Romanesque work, and consists of a series of stone panels, enclosing small slabs of black marble. The altar is an elegant specimen of late German Renaissance work, and presents a handsome appearance from its being entirely constructed of marble.

## DESIGN FOR WAR AND ADMIRALTY OFFICES.

BY MR. WATERHOUSE, A.R.A.

We give this week the design and the principal plans made by Mr. Waterhouse for the first competition for the Law Courts. A comparison of the plans with some of those which were selected from the final competition, will not be without interest, and perhaps instruction. We append Mr. Waterhouse's report in full:—

"*Central Court.*—The accompanying design has been so arranged that every important room looks either into the spacious central quadrangle, or outwards into St. James's Park, or the surrounding streets. Besides this central quadrangle (rather larger than that in the Foreign Office, it being 258 ft. by 175 ft.), are two smaller ones, each divided by a block of closets, lavatories, &c., which do not rise so high as the main buildings, so that in no case does any business room get its direct light at a steeper angle than one of 45 degrees with its window-sill, unless it be a few of the lower windows looking south into the courtyard of the Horse Guards. In the majority of cases the angle of incidence gives an amount of light very greatly in excess of this. In fact, owing to the nature of the site, the great problem of how adequately to light so great a building seems to admit of unusually easy solution. No room has less than 10 square feet of window area to every 100 square feet of floor space. In most cases much more is given, the average being 14 ft. per 100 ft. As a rule I have placed the windows 16 ft. 6 in. from centre to centre, so as to make the small rooms 23 ft. by 15 ft. 4 in., giving an area of 350 ft. of floor space; and the larger rooms 32 ft. by 23 ft., or about double that area.

*Iron Construction avoided.*—Wherever possible, I have carried up the walls continuously

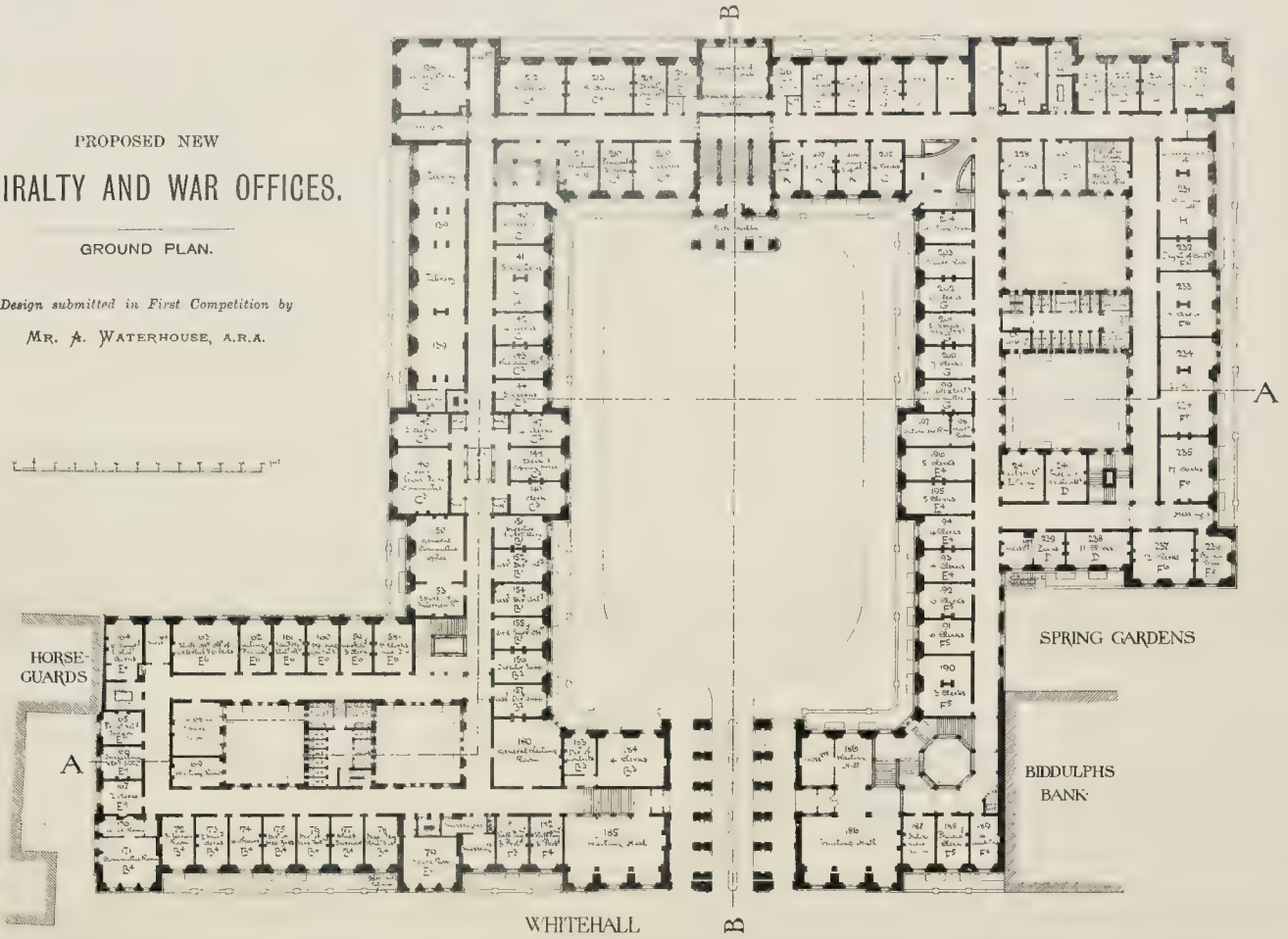
PROPOSED NEW

# ADMIRALTY AND WAR OFFICES.

## GROUND PLAN.

*Design submitted in First Competition by*

MR. A. WATERHOUSE, A.R.A.

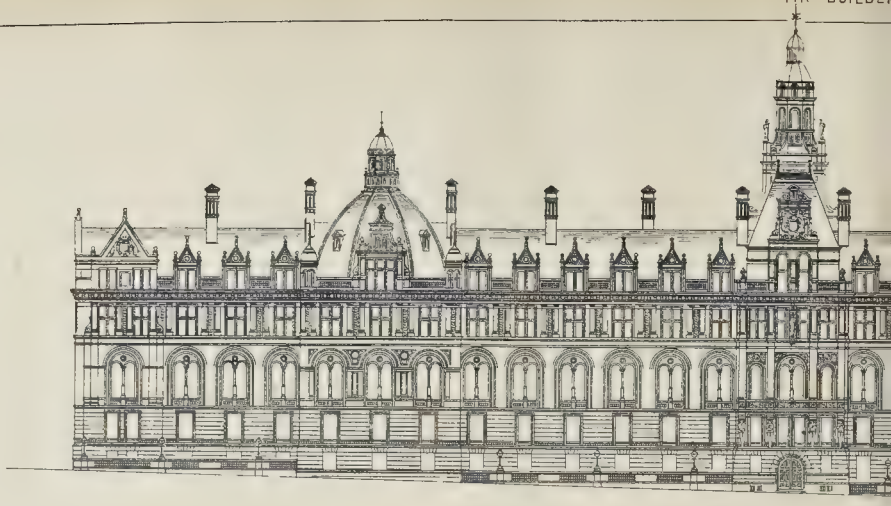



Wyman & Sons, Phot. Litho

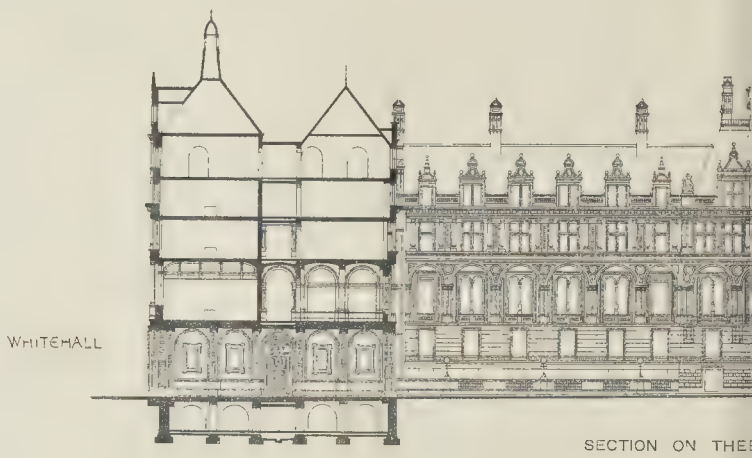
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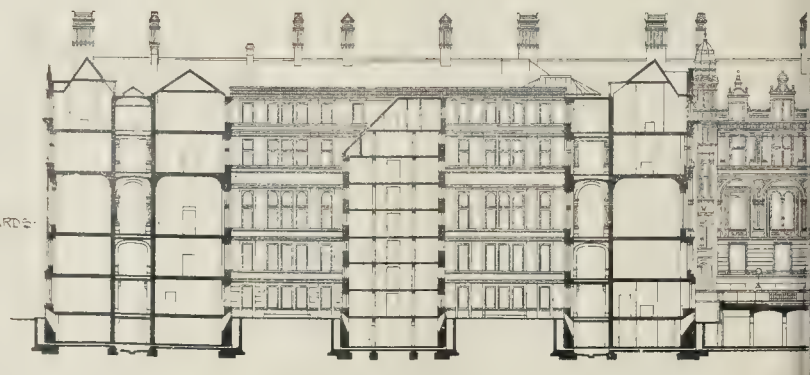
MONUMENT TO THE REV. LORD JOHN THYNNE, WESTMINSTER ABBEY.



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SECTION ON THE

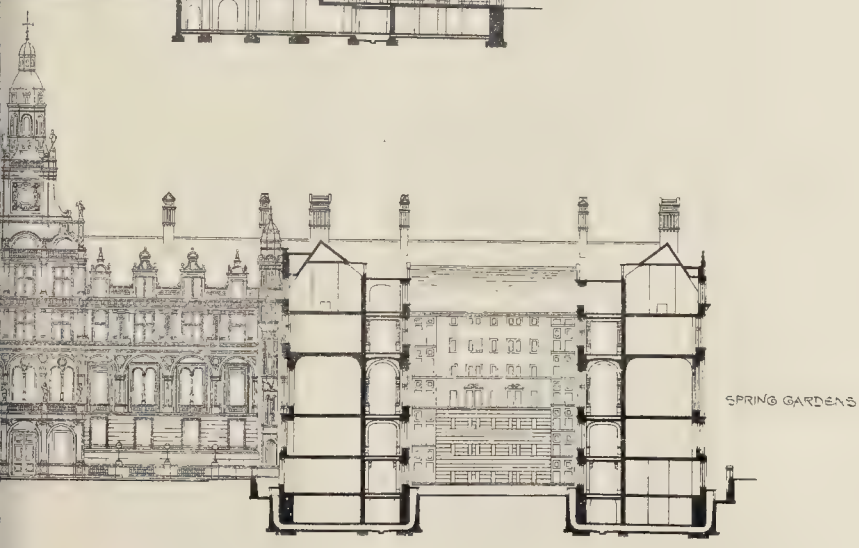



SECTION

PROPOSED NEW ADMIRALTY AND WAR OFFICES

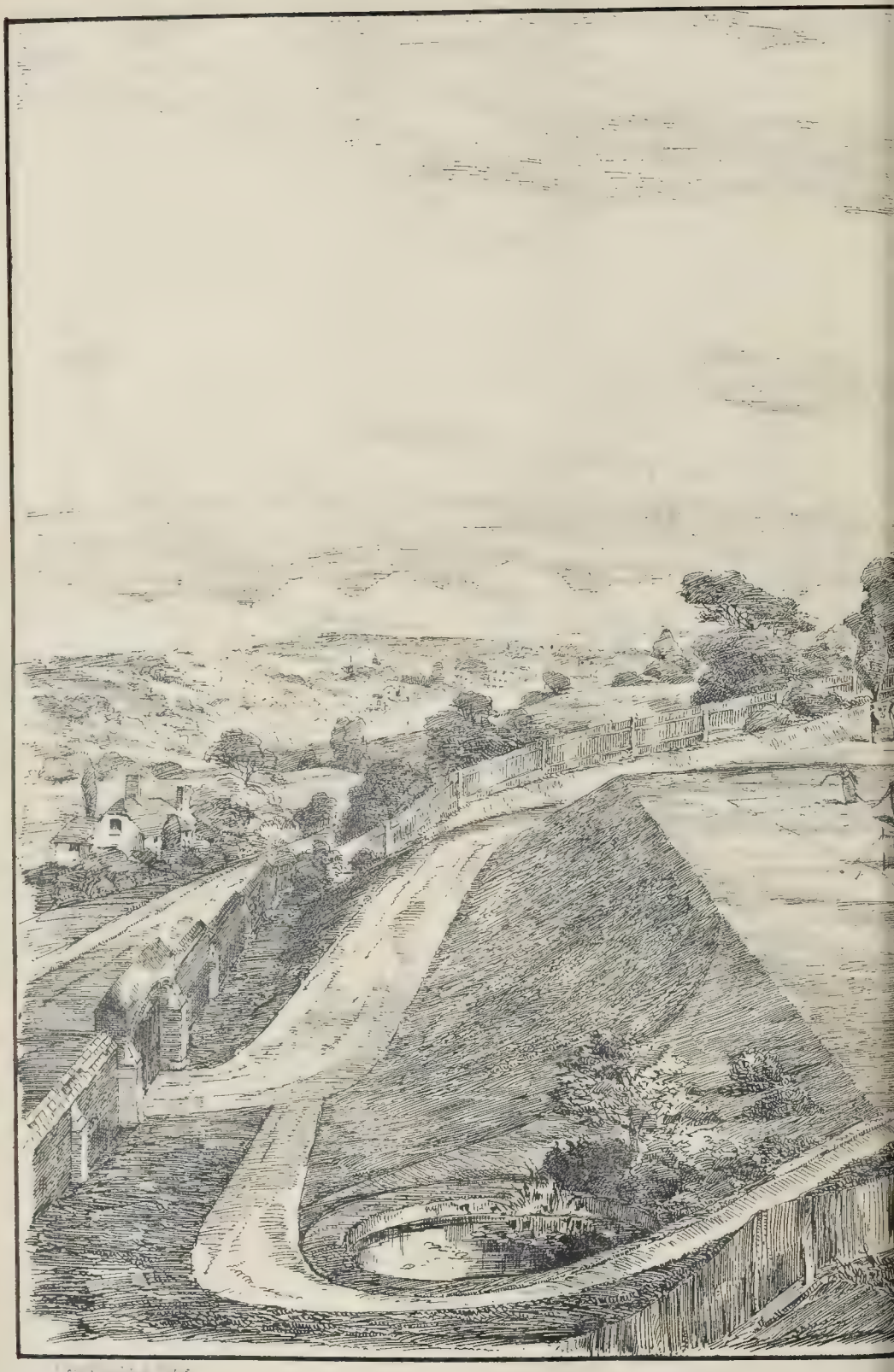


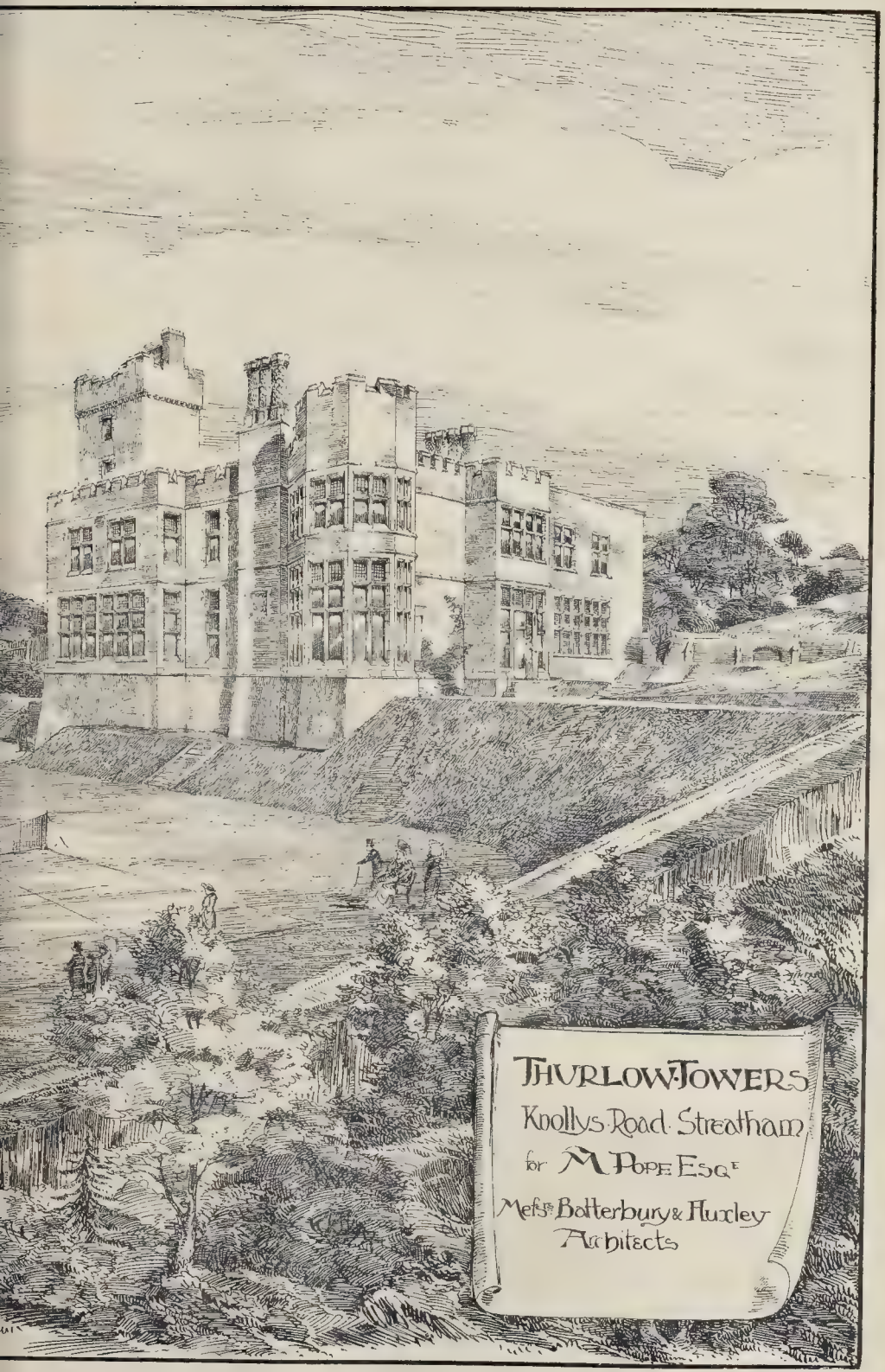


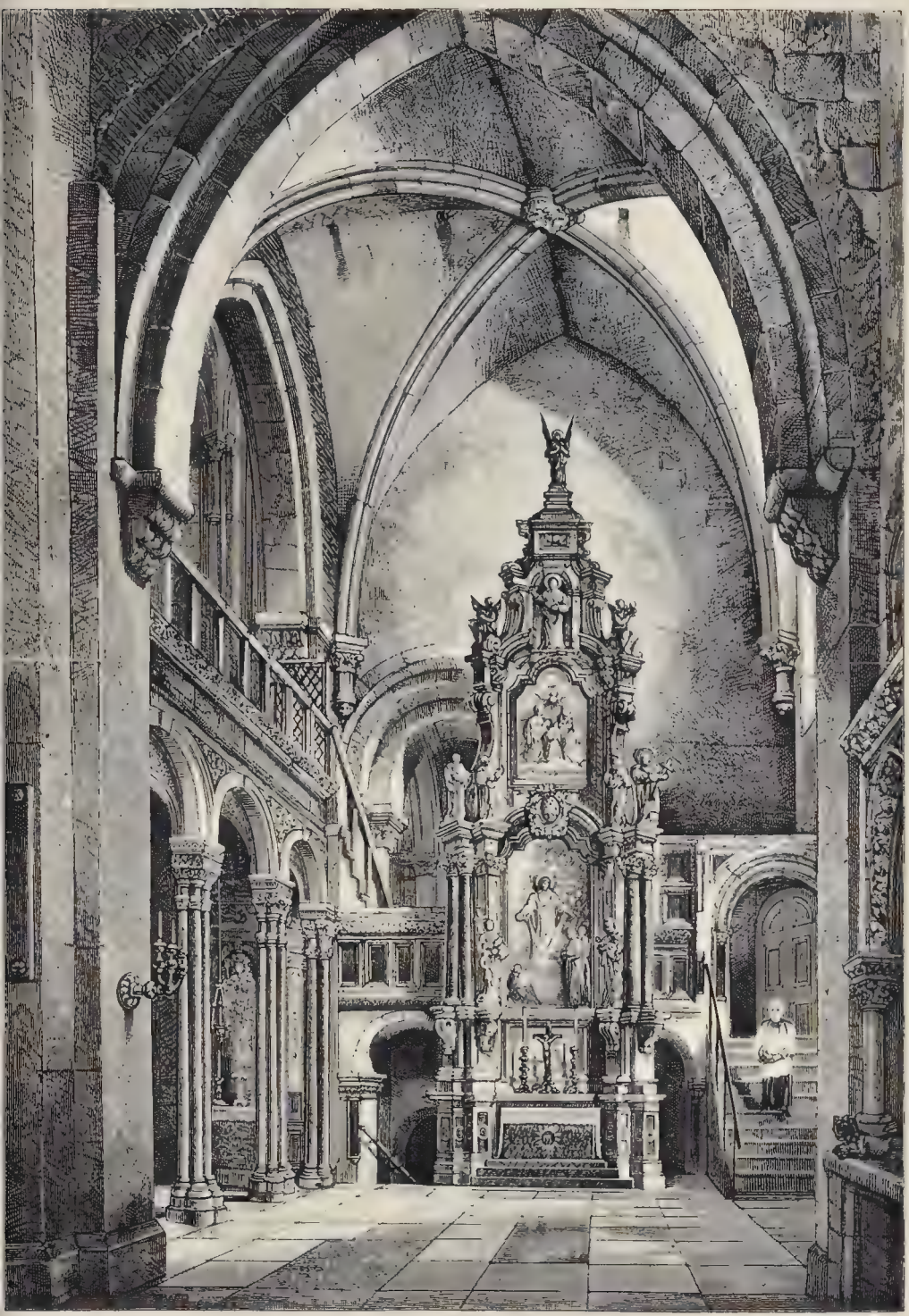




E A A.

MITTED IN FIRST COMPETITION BY MR. A. WATERHOUSE, A.R.A.




THURLOW TOWERS
Knollys Road Streatham
for M POPE ESQE
Messrs Batterbury & Huxley
Architects



THE LADY CHAPEL, TREVES CATHEDRAL.

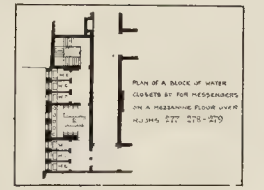
PROPOSED NEW

# ADMIRALTY AND WAR OFFICES.

## FIRST FLOOR PLAN.

*Design submitted in First Competition by*

MR. A. WATERHOUSE, A.R.A.







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74 Queen St London W.C.

from foundations to roof to avoid the introduction of much constructive ironwork. I am aware that consequently my design is placed at some disadvantage, from the areas of some of its rooms not exactly agreeing with those suggested in the schedules. I hope, however, that will be considered a less evil than the free introduction of walls on girders, especially as the deviations have been almost always to give more than the prescribed amount of space. At the same time, there can be no difficulty in adopting a more elastic arrangement of division walls if desired;—the space is there.

*Corridors.*—The corridors, 12 ft. wide, are on plan as simple and as straight as possible, without any needless angles, so as to ensure ease in finding any particular office, and expedition in going from one to another. There are only eight lengths of corridor in the entire building, and they are lighted in a varied way, so as to destroy what would otherwise be their somewhat weary monotony. The light comes either from the ends of the corridors, or from side windows looking into the smaller courtyards; sometimes, however, it comes across staircases, or down from above, the corridors being in such case carried around the well, with an arcade between. In this way I believe well-lighted, ventilated, and cheerful corridors have been secured.

*Staircases.*—The staircases are placed so as best to serve the departments which are necessarily put on more than one floor. Most of them are 8 ft. wide, and all have steps 12 in. by 6 in., or easier. In every case winding steps have been avoided.

*Number of Stories.*—In order to secure the maximum amount of light and air (to which I considered the great internal square would conduce) it has been necessary to devote five stories almost exclusively to the occupied rooms enumerated in the "schedules," and to put the repositories principally in a sub-basement story which can be kept perfectly dry by means of a through draught of air carried everywhere under the building, and be lighted from the surrounding areas. In the case of the Admiralty two thirds of department F, and the general repository of E are placed above the third floor. The basement story is surrounded by an area 6 ft. wide, and from its general elevation above the ground almost attains to the dignity of an ordinary ground-floor.

The different stories are in height, from floor to floor, as follows:—Basement, 13 ft.; ground-floor, 14 ft.; first floor, 21 ft.; second floor, 14 ft.; third floor, 13 ft. (to ceiling).

*Main Entrance.*—The main entrance from Whitehall consists of a double carriageway under a single arch leading into the centre of the great court. On either side are separate arches for footways. These arches are 10 ft. 6 in. wide, and the central one 20 ft. Opposite the visitor at the west end of the great court, and under a clock-tower of modest dimensions, is a *porte cochère* leading to a State entrance common to both Admiralty and War Office.

*Business Entrances.*—The principal business entrances, however, are under the vaulted arches of the carriageway out of Whitehall, that of the War Office being on the south, that of the Admiralty on the north, and facing each other. This is in order to give the quickest route from the street to any particular office. The entrance opens at once in each case into a cheerful waiting-hall, with messengers' rooms adjacent, and staircase leading to every floor in the building. Passenger-lifts to the different floors are at hand in each case. Other business entrances at the south-western and north-western corners of the great court would probably draw off traffic from the corridors in fine weather.

*State Entrance.*—The State entrance leads to the foot of the grand staircase, the central flight of which is 13 ft. wide, and is divided by a double arcade of glazed majolica from the side flights, which are each 8 ft. wide. This State entrance directly communicates, by means of a spacious hall, with a private entrance from the Park, to be used,—like the State entrance and staircase,—only by the heads of departments. The staircase terminates on the level of the first floor by giving access to the central council-chamber overlooking the Park. This council-chamber, not in the schedule, is intended to be common to both the great departments for which the building is devoted; the Lords of the Admiralty having their rooms to the north of it, overlooking the Park; while the Secretary of State, the Commander-in-Chief, and the heads of the War Office, are to the south, likewise looking on to the Park.

*Privacy.*—Care has been taken to prevent through traffic along the first floor corridor leading to the principal apartments. The public staircases at the north-western and south-western corners are arranged to pass up from the ground to the second and upper floors without in any way interfering with the privacy of the corridor on the first floor. In like manner the corridor on the ground-floor is diverted on to a balcony overhanging the Park entrance-hall in order to take the public clear of the State staircase.

*Arrangement of Departments.*—The arrangement of the different departments will be easily understood from the plans. Each department is kept as compact as possible, and its rooms, if on different floors, are connected by frequent staircases and paper lifts. The living-rooms are placed on the basement or third floor stories. There are private and tradesmen's entrances to these rooms from Whitehall and Spring Gardens. In the neighbourhood of these entrances are the refreshment-rooms and kitchens. These, however, can be placed on the third floor if preferred.

*Fireproof Construction.*—The whole of the floors are "fireproof," the rolled iron joists being in all cases totally encased in cement concrete to lessen the chance of injury in case of fire.

*Heating and Ventilation.*—Should circumstances favour the northern portion of the building being first erected, I should propose to warm it by low-pressure steam, the heating surfaces consisting of wrought-iron flanged pipes in channels under the whole width of each corridor. Fresh air, warmed thus in winter, but cold in summer, would be driven along these channels by fans worked by electro-motors, which would be driven by an engine receiving its motive power from the heating boilers. From the fresh-air channels under corridors, upcast flues would be carried into each room, the amount of heat and air supplied being under control by regulators, and the vitiated air passing out through flues near the ceiling of each room. The boilers and engine (which I have placed near Spring Gardens for convenient supply of fuel and removal of ashes) would be available for any motive power required for other purposes. Should the southern portion of the building be the first erected, the heating apparatus could be removed to that side of the building, or two heating centres could be arranged instead of one.

*Retiring-rooms.*—The closets, 101 in all, are placed principally in two blocks in the centre of the smaller courts. In order to supply these courts with abundance of fresh air, wide channels are brought to them under the building from each side; so as to prevent stagnation of air in the lower parts of the courts. The messengers' closets are in a mezzanine story between the first and second floors, and in retired positions. There are also some extra closets on the fourth floor. In certain exceptional cases, near the rooms of the chief of a department, an occasional closet has been introduced, but I consider this undesirable as a rule.

*The Style.*—The style adopted will, I think, admit of abundance of light, and at the same time be in harmony with the surroundings of the building. I had at one time hoped that these great Government offices would have afforded an opportunity of realising to a certain extent the magnificent dream of Inigo Jones in his design for the Palace in Whitehall; but a glance at the schedule of requirements with its 500 or 600 rooms of small size made it apparent that if they were kept of proper height for comfort and due regard to economy of construction, it was impossible to have in the new Admiralty and War Office such grandeur of proportion as exists in the Banqueting House opposite; and that a building of five important floors, each with windows of good dimensions placed at the proper distance from ceiling and floor, could not be forced into a dress suited only for two floors and an unimportant basement. A glance at the diagrams showing three bays of the Banqueting House, three bays of the Home and Colonial Office (the other most important building in the neighbourhood), and three bays of my own design, will explain my meaning better than words can do.

I have resisted the great temptation which the style adopted offers to introduce deep arcades in front of my windows, feeling sure that in our climate such aids to darkness, however beautiful in themselves, should be very sparingly introduced.

*Materials suggested.*— The material for the exterior I propose should be Portland stone, as the most durable stone which can be used in London, and as harmonising more with the architecture of the neighbourhood than any other material; though I believe that terra-cotta might be employed with advantage, both as to durability and economy. Internally I should be disposed to recommend glazed terra-cotta in the walls of the staircases and principal corridors.

*Cubic Contents and Cost.*—The cubic contents of my building, from 10 ft. below the basement floor to half way up the roofs, including all high roofs and other exceptional features, amounts to 10,191,641 ft., or from 15 ft. below the basement floor (as I think my design ought to be measured), 10,757,615 ft. I estimate its cost from the lower level at 543,880*l.* This price is less than such work would have cost some years ago; but not less than recent contracts warrant if the work be proceeded with at present prices.

*Divided Contents and Cost.*—The Admiralty and War Office interlock to a certain extent in my design, on the different floors. This occurs on the upper floors above the main entrance, and very slightly near the State staircase. Should it be desired to make each department entirely self-contained, so as to build one before the other, it will be easy to completely divide them by a vertical line drawn from foundation to roof at the walls south of rooms 344, 335, 300, and 301 on the first floor, giving the Admiralty everything north of this. The slight re-arrangement thus involved would cause a loss of spare rooms to the extent of about 1,500 square feet on the part of the Admiralty; but would increase the spare accommodation of the War Office to a similar extent.

The contents of the Admiralty measuring from 15 ft. below the basement floor, would thus be 5,628,927 cubic feet, and its estimated cost 284,646*l.*; whereas the cubic contents of the War Office would be 5,128,688 ft., and its estimated cost 259,234*l.*

*Amount of Accommodation.*—In almost every department a substantial increase in the amount of accommodation has been given over and above the areas specified. Thus, to the Admiralty has been allotted 111,334 square feet of 'carpet space,' against 102,830 specified in the 'schedules,' besides 27,565 square feet devoted to residences and miscellaneous accommodation (given in the instructions, but not in the schedules), and 24,520 square feet more in interview, waiting, and spare rooms; while to the War Office has been given 122,339 square feet, against 110,470 specified in schedules, besides 26,689 square feet devoted to residences and miscellaneous accommodation, and 26,662 square feet more in interview, waiting, and spare rooms.

These figures, with 6,150 square feet of accommodation, common to both War Office and Admiralty, give a total for the whole building of 344,259 square feet, exclusive of corridors, messengers' rooms, and retiring-rooms.

Owing to the small scale of the drawings, I have contented myself by merely showing the building in geometric outline, leaving the scheme for such decoration as appears to me to be compatible with its objects to the further development which my design would undergo, should it be so fortunate as to obtain a place in the select competition."

*Key to References on Plans.*

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
B 1. Director of Artillery.
B 2. " Supplies.
B 3. " Contracts.
B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
C 1. " " "
C 2. " " "
C 3. " " "
C 4. " " "
D. Finance Department.
D 1. Finance Department.
D 2. Auditors.
E. Military Department.
E 1. Military Secretary.
E 2. Adjutant-General and Quartermaster-General.
E 3. Intelligence Department.
E 4. Deputy Adjutant-General R.A.
E 5. Deputy Adjutant-General R.E.
E 6. Army Medical Department.
E 7. Military Education Department.

E 8. Commissary-General's Department.
E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
F 1. Army Purchase Commission.
F 2. Judge Advocate General.
F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
F 4. Pay Office. Army Hospital Corps.
F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
A 1. Board-room Suite.
A 2. Military Branch.
A 3. Intelligence Branch.
A 4. Naval Branch.
A 5. Civil Branch.
A 6. Legal Branch.
A 7. Registry Branch.
A 8. Record Office Branch.
A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
E 1. Director of Naval Construction.
E 2. Engineer-in-Chief.
E 3. Director of Naval Ordnance.
E 4. Store Branch
E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
F 1. First Division.
F 2. Second Division.
F 3. Third Division.
F 4. Fourth Division.
F 5. Fifth Division.
F 6. Sixth Division.
F 7. Greenwich Hospital Division.
F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

## THURLOW TOWERS, STREATHAM.

We published last week a view and plan of this house, with a description. We give the present view, drawn by Mr. Knight, as an admirable example of free pen-drawing of building combined with landscape, which we believe our readers will be glad to possess for its artistic value.

## THE TOWER OF LONDON AND WESTMINSTER HALL.

Sir,—The "Member of the Architectural Association" [p. 709, *ante*] has not shaken the self-evident proposition that I endeavoured to lay down in your issue of the 8th instant to the effect that true architecture consists in knowing what you want, and doing it.

There is no need to see the drawings of the intended restoration,—or restored completion,—of Westminster Hall for the purposes of this argument, much as I should enjoy the intellectual treat of seeing such expert knowledge displayed *on paper*.

The amount of study that your correspondent has devoted to the subject merely shows that there does not exist in this case the only excuse for completing an ancient building according to its original intention,—namely, the fact that the actual design has been preserved.

Cologne Cathedral is a rare instance of this, and the public are always informed of the fact by the guides to that magnificent, but comparatively uninteresting, building.

The instance of Westminster Abbey, quoted by your correspondent, most clearly bears out my argument.

First, we read that there was a Saxon church.

Then that Edward the Confessor *wanted a better one*, "Monasterium est dirutum ut surgeret nobilius" (Scott's "Gleanings," p. 67), and that he built it in the *then modern style*.

Then that Henry III. *wanted a better church still* than the Confessor's, although that must have been a peculiarly sacred one: so he started it by building that most beautiful choir and *chevet*, to which the well-known words might be adapted, "the glory of England and the shame of the rest of the world": and we see that it is designed in the *then modern style*.

Then Edward I., who was probably satisfied, as well he might be, with the form and dimensions of this beginning, *wanted to extend it*, and he did so, using the *then modern details*.

Then Henry V. *wanted to rebuild the nave*, in doing which nothing was to be gained by altering the above-named form and dimensions, and he did so, using the *then modern details*.

Then Henry VII. *wanted a mortuary chapel*, and he actually pulled down Henry III.'s lady-chapel (Scott's "Gleanings," p. 53), and built an utterly different one in the *then modern style*.

Then *western towers were wanted*, and Sir Christopher Wren, who appreciated Gothic work sufficiently to make a harmonious group, proportioned them to the Abbey, using the *then modern details*.

I might add that *we want a central flèche*, and hope that the eminent architect in charge of the Abbey may add one as well proportioned to it as the western towers, and as recognisable in date as the Early Renaissance *flèche* that surmounts the Early Gothic cathedral of Amiens.

So much for the history of the Abbey. Now, your correspondent justifies the present proposal to *complete* Westminster Hall, according to Richard II.'s design, by comparing the case with Henry V.'s nave of the Abbey. Surely, if the rage for restoration had set in at the time, Henry V. would have pulled down the comparatively recent choir and transept in order to *complete Edward the Confessor's design!* For the nave of that church then extended, we are told, as far west as the present one, so that he had as much to go upon as we have in Westminster Hall.

On the contrary, he built a *new* nave suited to his wants, while the Office of Works propose to restore a bygone building *for the sake of restored completion*. This is what I have ventured to call a fatal mistake.

Your correspondent calls this expression a "generality." It is, to my mind, a fixed principle, and I speak from over twenty years' practical experience of work on old churches, and know that there are several ways of making new work tell its own story, such as the use of distinct forms and details or of different materials, without disturbing the harmony of the entire building. When replacing any missing portion, it is a safe rule to draw a rigid line at the word "probable." For instance, there can be no harm in filling up a shabby gap in an otherwise perfect moulding,—so long as the gap does not tell some valuable story, such as the insertion of a bygone rood-loft,—but, if a feature has disappeared entirely, however *probable* its former shape may be, it is, to my mind, an architectural "taradiddle" to put the shrewdest guess into stone *for the sake of restoration*.

No one can deny the evidence of his eyes as to the disappearance of Richard II.'s outbuildings between the flying buttresses of Westminster Hall,—they are, therefore, past "preserving for our study and admiration." Whatever scattered signs and vestiges there may be left of their bygone forms, surely, for us, the first thing to consider is *what is now wanted*, and to build that, and nothing else, under the direction of the architect in charge of the building, whose eye may be safely trusted to produce no discord from the rest of this noble monument.

Your correspondent, like many other people, shudders at the mere mention of modern architecture, and singles out certain buildings that do not please his taste. There is, alas! no safer way of raising a laugh than by a long string of sparkling abuse of modern buildings and practice. I am sure that such criticism might be directed into nobler channels by seeking out the good points of our art at the present day, and seeing whether *these* cannot be strung together into a recognisable style. A paper on this subject might be profitably discussed at the Institute, but that the numerous diagrams necessary for illustrating it might never travel further than the pages of the Proceedings, and their usefulness be thus limited.

If I may be allowed to speak of one so much my senior as Mr. Butterfield, I would say that there is no actual precedent for most of his work, which commands our admiration for its fearless originality, and free use of modern improvements; and yet I believe that no man has a deeper respect for old work and for every link in its history.

It is this very respect that should prevent us from forging,—in either sense,—Mediæval links at the present day, when it is impossible and undesirable to Mediævalise ourselves as well, in order to complete the completion of such buildings as the Tower of London and Westminster Hall. Modern appliances must surround these sham antiquities, and one is tempted to reverse the picture and to imagine a real Mediæval soldier or citizen waking up, after a sleep of centuries, to find himself confronted, in one of these restored buildings, with all the surroundings of modern life,—a subject ludicrous enough for one of Mr. Gilbert's plays or of M. du Maurier's drawings in *Punch*.

In spite of the Society for the Protection of Ancient Buildings, on the one hand, who piteously cry, "Don't alter your churches for more decent worship, but leave them alone for us to sketch and moon over, and treat in other secular ways," and of the restorers, on the other hand, who say, "Don't pretend to have any architecture of your own, but give us the past over again," I believe that architecture is alive again, and that common sense will prevail.

I have endeavoured to comprise my views on the subject in this somewhat lengthy letter, in order not to inflict myself again on your readers' patience, but to leave the matter in abler hands for further discussion.

Edward J. Tarver.

P.S.—If the Government *want a restored completion* of Westminster Hall, there must be thousands of taxpayers who *don't want to pay for it*.

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Sir,—Your correspondent, "A Member of the Architectural Association," is trying to set up an analogy between the nave of Westminster Abbey and the proposed work on the west side of Westminster Hall.

The nave of the Abbey was carried westward upon lines already laid down, and differs in all its details from the eastern end. The elevation of each bay, and the section of the building, follows the work to which it is attached, but pretends in no way to be a "restoration." The building was also constructed to be of use. What your correspondent chooses to call the *completion* of the hall is set forth officially as a "restoration." The spectator is to believe that he sees the building as it may have been in the time of Richard II.

The details are carefully copied from work of the period, and so far as deception can be carried out it is intended that it shall be done.

This is not done for use. The purpose to which the rooms can be assigned is not yet decided.

First make your fanciful restoration, and then see what you can use it for. Jones.

## A SYNDICATE OF TASTE.

Sir,—Two competitions for the sculpture to crown the four pedestals of the approaches to Blackfriars Bridge have already fallen through; three and four and many more may possibly share a similar fate. That the worthy and hospitable citizens of London have some notion that such competitions may possibly be expensive to the competitors is shown by their vote of compensation; nevertheless, they do not seem to be in the slightest degree aware that there can be no possible compensation to a sculptor for the loss of an important commission which has been permitted to be gazetted as awarded to him. There is generally something unsatisfactory in all the attempts to adorn the metropolis with sculpture, for the determination of such matters is generally committed to men who are, practically, unacquainted with art. Would it not be advisable therefore, to institute a Syndicate of Taste, to which all art questions of public import should be referred,—a syndicate composed of professional men, painters, sculptors, and architects,—a recognised public Institution whose members should be paid? This syndicate should be held responsible for the selection of the proper kind of design for a purpose, and of the best talent for carrying it out. This syndicate should in all cases, as a first step towards the embellishment of any spot in the metropolis, invite suggestions; for non-professionals are very frequently capable of offering very good ones, and the public should feel that the determining of the right kind of art for any position is a matter of national importance. Besides, the question as to the fit adornment for any position should be talked out and decided before "taking thought" as to the selection of the artist for carrying out the work. The three kinds of memorial upon which the changes are commonly rung are those of bust, equestrian statue, and statue. Surely there is something more novel to be thought of than that of placing equestrian statues on the four colossal pedestals of Blackfriars Bridge, like four troopers on outpost duty. The four piers present splendid opportunities for the realisation of four grand sculptural compositions,—for four groups of sculpture which should be distinctive features of the great City of London. Ought such opportunities to be thrown away upon commonplace notions?

Should not the profession, as a body, regard the embellishment of four such remarkably prominent positions as a common cause; should

they not combine to determine the right kind of design for such positions, and also co-operate in order to carry out such works to a successful issue? W. Cave Thomas.

## "ARAB ART."

Sir,—I should not ask for space to comment on the article on Arab Art in your last number, [p. 684] dealing with a lecture I lately delivered, had not the writer misunderstood me and been thus led into unconscious error.

I was careful in my lecture to specify that the ceilings of Cairo houses are of wood, not of plaster, and I might have added that the domestic architecture of that city is not to be confused with the mosque architecture in the reckless use of plaster for decoration. I did not urge the introduction of Arab art into England, but the study of its principles. Copies come to no good end. Principles produce results worth the having. I deny, however, the unsuitableness of a Cairo room to modern needs in our climate, as I know two artists, Mr. Frank Dillon and Mr. James Wild, to have built rooms of this kind as working studios.

If your able contributor is content with the houses we are, in his forcible words, compelled to live in, I can only compare him to the old prisoner who, in his release, begged to be returned to his cell in the Bastille. I preach a noble discontent with a domestic art, defended only on the plea of necessity, a plea in art invalid. Reginald Stuart Poole.

*British Museum, November* 26, 1884.

## "SMELL FROM KITCHENERS."

Sir,—A simple and thoroughly reliable method, which I always adopt, is to fix in the top register plate a short conical pipe, with a cap over, to prevent any soot falling through on to the hot plate, thus:—



Mind, this only applies to the kitchen, and assumes all the upstair rooms to be properly *ventilated*. Should there be any deficiency in this particular, they would probably draw from the kitchen: hence the smell. Consult your architect. Robt. Crane.

Sir,—I should imagine from "Kitchener's" letter [p. 710, *ante*] that his house above basement line is devoid of proper ventilation. Consequently, on the landing-door being opened, there is an upward rush of air, bringing with it all the fumes from kitchen, &c. If this is so, nothing done in the kitchen would, of itself, be of any use.

The remedy seems to me to be the proper ventilation of the house above basement-line, and independently of basement, and then treating the kitchen, &c., locally by providing an exhaust flue or flues, taken into kitchen-flue or elsewhere, as the case will admit. This plan, skilfully carried out, would, I am positive, give satisfaction.

I have seen good effects resulting from hoods fixed as suggested, but with the addition of a valve for preventing back-draught; but I think kitchens can be ventilated better without them, and they are so ugly. Hoods are very well for fried-fish shops, where the process of cooking is confined to a place immediately under them; but in kitchens one as often sees steaming vessels on the various tables and sideboards as on or near the stove itself.

J. Kemsley.

Sir,—"Kitchener" asks for a remedy to prevent the smell of cooking finding its way all over the house. I have had many years' varied experience in such matters, but have not yet come into possession of a panacea; for I have generally found it necessary to take the diagnosis of each case, and treat it accordingly.

Now I will suggest that your correspondent first turns his attention to the kitchen chimney. Is there a thorough good draught? It may be that the chimney is not high enough, or is not of sufficient capacity all through.

Let him have two conical ventilators fixed in the register over the kitchener leading into the chimney. The bottoms of each should be about 12 in. or 14 in. in diameter, and fixed flush to the register. The tops should project into the chimney about 12 in. or 14 in., and should be about 3 in. in diameter, with an arrangement for closing when desired. Also see that the ovens are ventilated into the flue.

The kitchen should have an inlet and outlet ventilator; also place an inlet for fresh air in the hall, and so prevent the staircase drawing its air from the kitchen. W. Dunkin.

## WALLING.

Sir,—Will any of the readers of the *Builder* kindly inform me if there is such a work published as a history of walling, say from the time of mud or adobe construction to the latest in concrete or terra cotta? Frank West.

## BIRMINGHAM ART-GALLERY.

Sir,—I see in a paragraph published in your last issue [p. 708], your readers are informed that I have executed the large group over the portico at our new Art-Gallery here. The mistake probably arose from the fact that all the other carvings on the exterior of the building were entrusted to me. The group referred to is by Mr. Williamson, of Esher, and I take the present opportunity of congratulating him upon having produced one of the best examples of architectural sculpture we have seen lately.

John Roddis.

## BOMBAY MUNICIPAL BUILDINGS.

Sir,—Will you do me the favour of permitting me to acknowledge through you the receipt of the following competitive designs for the new Bombay Municipal Buildings:—

*Motto or Device.*

1. Kohinoor (A).
2. A thing of beauty is a joy for ever.
3. Drawing-pen.
4. Corinthian grace to nought gives place.
5. Audaces Fortuna juvat.
6. Queen-Empress.
7. Where gleam and gloom their magic spell combine.
8. Chiban.
9. Ferio tego.
10. Stet Fortuna Domus.
11. X in a circle.
12. Kohinoor (B).
13. Bull's-eye.
14. Perseverando vinces.
15. R in a circle.
16. Utility.

E. C. K. Ollivant,
Municipal Commissioner.

*Bombay*, Nov. 6.

## CAPE TOWN DRAINAGE COMPETITION.

Sir,—Many indignant letters have appeared in the English and Cape Town papers from English competitors respecting a recent award by the Town Council of Cape Town *in re* the sewerage and drainage of Cape Town, and as there has appeared no reply to these letters by those who have been accused of mal-decision, I trust you will keep open the question.

On calling for plans of the proposed sewerage of the city, certain rules were laid down for the guidance of the competitors, and every competitor with the exception of the person who obtained the prize, acted on these instructions: the award was made to the one who disobeyed the conveyed intimations.

This man, previously unknown here, had been appointed clerk of works at a new reservoir, where, under the instructions of the engineer, he was then employed.

The committee to whom the plans were referred were Mr. J. G. Gamble, Hydraulic Engineer for the Colony; Mr. Wood, engineer sent out by Mr. Bateman, hydraulic engineer, or recommended by him as engineer for reconstructing the Molteno Reservoir; and Mr. Cairncross, the City Engineer.

Of course, a storm was immediately raised, when the Town Council, in their immaculate wisdom, considered the award of the referee as final, and paid the money, although earned by disobeying the instructions issued through the City Engineer.

The Medical Board met and condemned the plan, but the money was paid, and the Town Council gave no sign. A Civil Engineer.

## COMPETITIONS.

*United Methodist Free Church, Headingley.*—The building committee of this church have, after a limited competition, selected the designs of Mr. W. S. Braithwaite, architect, South Parade, Leeds, for the proposed new chapel to be built in Victoria-road, Headingley. Sitting accommodation is provided for 600. The estimated cost is about 3,600*l.*

*Vicarage, York-road, Leeds.*—In a recent competition for St. Alban's New Vicarage, York-road, Leeds, the plans of Mr. W. S. Braithwaite, architect, have been accepted. The cost is to be 1,250*l.*

**Door-lock Furniture and a New Sash-Fastener.**—Messrs. Jelley, Son, & Jones, manufacturing ironmongers, of Blackfriars-road, are introducing to the notice of builders Jones & Cunningham's patent self-adjusting door-lock furniture, which embodies a very excellent though simple improvement. It can be adjusted to any thickness of door, being provided with a toothed spindle into which a rocking lever is pushed and secured by a sliding rose. Jones & Cunningham's patent guarded-lever sash-fastener is provided on the hook-plate with a slide or shield for the protection of the arm or bar of the fastening.

## HER MAJESTY'S THEATRE, HAYMARKET.

The owners of the above theatre were summoned under 41 & 42 Vict., c. 32, s. 11, by the Metropolitan Board of Works, for not complying with requisitions served upon them by the Board to remedy certain alleged structural defects in the building, so as to prevent danger from fire resulting to the public frequenting the same.

Mr. Besley, instructed by Mr. Thomas Burton, appeared for the Board; and Mr. Pollard for Mr. Tod-Heatly, the present owner.

Mr. Besley having stated the case for the Board,

Mr. Pollard raised a preliminary objection that the theatre was the property of the Crown, and, therefore, the consent of the Commissioners of her Majesty's Woods and Forests should have been obtained before these proceedings were commenced.

Under these circumstances, the magistrate adjourned the summons until the 15th of December, expressing a hope that in the meantime the parties would come to an arrangement to get the works done.

## WOODEN BUILDINGS.

KNIGHTLEY *v.* SMITH.

This case, under the Metropolis Management and Building Acts (Amendment) Act, 1882, 45 Vic., c. 14, sec. 13, was heard at the Hammersmith Police-court, on the 21st inst., before Mr. Paget.

Defendant, who is a coal agent, had caused to be erected a movable wooden office on surplus land in Uxbridge-road, Shepherd's-bush, adjoining the Hammersmith and City Railway, without a license in writing from the Metropolitan Board of Works, whereby a penalty not exceeding 5*l.* had been incurred.

The plaintiff (the District Surveyor for Hammersmith) did not press for a penalty, his desire being merely to enforce obedience to an Act which about two years since the Board obtained with a view to the suppression of wooden buildings.

The Magistrate concurred in this view, and there being no defence, fined the defendant in a nominal penalty and costs. The defendant then undertook to apply to the Metropolitan Board of Works for the necessary licence.

Mr. Haynes appeared for the defendant.

## OWNERSHIP OF PLANS.

GOODING *v.* EALING LOCAL BOARD.

This was an action brought by Mr. J. B. Gooding, residing at Ealing, against the Ealing Local Board, to compel the return to the plaintiff of certain plans and sections relating to a proposed new building, which had been sent in by him to the Local Board for approval, under their by-laws.

The plans, not being in accordance with the by-laws, were disapproved by the Board. Plaintiff then applied to them for the return of the plans. This was refused; hence the present action.

The case was tried on the 13th inst. in the Queen's Bench Division, before Mr. Justice Mathew, without a jury, and resulted in a verdict for the defendants, with costs.

The Judge was of opinion that the regulation on the back of the building notice signed by the plaintiff, viz., that "all plans will be retained in the surveyor's office for record" was a just and reasonable one, inasmuch as he considered that all plans, whether approved or disapproved, might be required by the Board as documentary evidence.

**Suggested City Improvements.**—Mr. A. B. Hudson, writing to the *City Press*, says:—The proposed extension of the Post-Office Savings Bank on land situated on the north side of Knightrider-street, extending to Carter-lane, and from Addle-hill on the west, to Bell-court on the east,—for which the Parliamentary notices for the necessary powers to acquire the land are now before the public,—suggests the opportunity of carrying out an important improvement, which could be undertaken by a combined arrangement between the Commissioners of Sewers, the Postmaster-General, and Messrs. Pawson & Co. (Limited). The outline of the scheme is as follows:—To extend the compulsory powers so as to embrace the whole block of buildings within the area of the four streets, viz., Carter-lane, on the north; Knightrider-street, on the south; Godliman-street, on the east; and Addle-hill, on the west. These four streets could then be widened to the extent considered advisable by the Commissioners of Sewers. The Commissioners also to acquire part of the premises of Messrs. Pawson, next to Paul's-chain, so as to widen that important thoroughfare. The widening of Paul's-chain would prove a great improvement; the too close proximity of the present warehouses would be remedied; the spread of a conflagration would be cut off, should a fire occur on either side of the street; and an improved view of St. Paul's from this side would be opened up.

## The Student's Column.

### IRON ROOFS.—I.

THE introduction of iron as the material for the framework of modern roofs has enabled the architect to construct them of spans that make even that of Westminster Hall appear insignificant, the span of which is hardly one-third of the iron roof over the New-street Station at Birmingham, and little more than one-fourth of that over the Midland Station in London. Its use, however, has only been gradually adopted for roofs, owing to the supposed dangers arising from the expansion and contraction of the metal by changes of temperature, since a bar of iron 100 ft. long will expand nearly 1½ in. while the temperature rises from the freezing to the boiling-point of water, and will contract the same amount as the temperature falls again. Expedients have, however, been devised and adopted of preventing the mass of ironwork which forms the framework of these roofs from having any dangerous effect on the supports consequent on a rise or fall of the temperature.

As iron was first used for constructive purposes in the form of castings, it was natural that cast iron should be employed for the earlier iron roofs. Thus we find a roof of this material erected about fifty years ago, over the model-room at the Butterley Ironworks, the span of which was 34 ft. The framework of this roof consisted of cast-iron principals in the form of a curb roof, the arrangement of the parts resembling that of a queen-post roof of wood. The principal frame was cast in four parts, screwed together by strong bolts, with a horizontal bar of wrought iron going from foot to foot, which appears to be quite unnecessary, as the framework was supported on a horizontal cast-iron girder. Details of this roof will be found in Tredgold's "Carpentry" (Appendix to 3rd edition). The purlins which carry the common rafters are fixed in sockets cast on the framework. Another roof of 40 ft. span, erected over the Smithery at Butterley (also illustrated in Tredgold), is constructed on the king-truss principle, the parts under compression being of cast iron, and those in tension of wrought iron; the principals are of cast iron of the "fish-belly" form, supported by two cast-iron struts on each side; the wrought-iron tie-rod is held up in the middle by a king-bolt passing through the heads of the principals, and there are two other vertical bolts, one on each side, passing through each principal at one-third its length from the vertex, the lower end passing through the foot of the lower strut, and also the tie-rod. The struts have a cross section, and the principals a T-section, the cast-iron purlins are L-section, and the timber rafters are spiked to them. In the same work will be found an illustration of a queen-post roof of cast-iron, with a span of 27 ft., erected at the Nottingham waterworks; the principal, queen, and strut are cast in one piece for each side, and are connected by a hinged joint, with a horizontal straining-beam; while a horizontal wrought-iron tie-rod passes through the feet of the principals, and also those of the queens. The principals are of T-section, and the other parts of cross-section.

The use of cast iron in framing roofs has of late years been discontinued, except sometimes for struts which sustain a compressive strain; all the other parts being made of rolled iron, either round, flat, or of I, T, or L section. The Mansard roofs of the Houses of Parliament were constructed with flat wrought-iron horizontal tie-bars and vertical tension-rods; the principals are of T-section; the struts are cast-iron of cross-section. Cast iron was also used for the purlins, and for the sockets and shoes by which the ends of the pieces were held together. Cast-iron tiles were used for the covering; these were of ⅜-in. metal and galvanised to prevent corrosion, and were bolted to the rafters. No timber is used in any part of these roofs, which are wholly of iron.

In roofs of iron it is not necessary that the tie-beam should be horizontal, as in trusses of timber, unless it is required to carry a ceiling or floor; and where extra height is required, as in a railway station or workshop, the tie is made to slant upwards from the supports, so as to increase the clear height in the middle. A common form of roof for spans up to 50 ft. is shown by fig. 1, where the principals A B, A D, are usually of rolled T-iron, the ties B F, F E, E D, A F, and A E, of flat or round iron, as being mainly subjected to tensile strain in the direction of their lengths. The struts C F, E G, being under compression, are sometimes made of cast iron, either round and hollow, or of + section, and made with a swell in the middle. If wrought iron is used for the struts it is of L or T section.

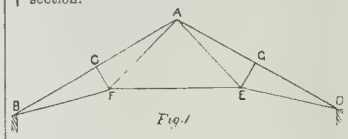


Fig. 1

Upon examination, it will be seen that this roof consists apparently of two trusses similar in form to a king-post truss, only inverted; thus A F B C and A E D G appear each to be a king-truss, having, in the former case, A F, F B for the rafters, A B for the tie-rod, and C F for the strut. But in this roof the strains to which these parts would be subjected in a king-truss are reversed, as A F, B F, and A B are stretched instead of being compressed, while C F is compressed instead of being stretched. Each of them, however, forms a complete truss as it stands, and the two are united by the horizontal bar EF, which prevents any horizontal thrust on the walls.

For wider spans a similar form of roof may be employed, but with a larger number of struts and ties, as shown by fig. 2, where G H and D I

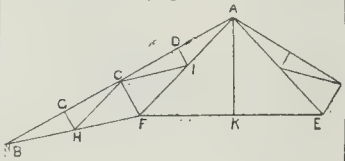


Fig 2

are struts under compression, and C H and C I are tension rods. The bending of the tie-rod E F may be prevented by a light king-bolt, A K, passing through the head of the rafters and bolted under the tie at K.

A variety of the same kind of roof is shown by fig. 3, where the tie-rod is in five distinct

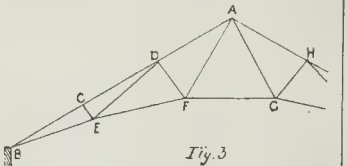


Fig. 3

parts, coupled together at E, F, G; the struts C E, D F, G H are under compression, while A F, A G, and D E act as ties.

In a roof of either of these forms the scantlings for a span of 50 ft. may be as follow:—Principals of ½-in. T-iron 4 in. deep by 4 in. wide; struts of hollow tubing, D F being 2 in. diameter, and C E 1½ in. diameter, or else of ½-in. L-iron, 3 in. by 2 in., and 2 in. by 2 in. respectively; the tie-rods A F and D E of ¾ in. round iron, or ⅛ in. flat iron 1 in. wide; the tie-bars B E, E F, F C of 1½ in. round iron or ⅝ in. flat iron 2 in. deep. The feet of the rafters are made to rest in cast-iron sockets fixed to the wall or other support, and the tie-rod is attached to the feet of the rafters by the end being flattened out and held by key wedges between two plates bolted on the sides of the rafters. The ends of all the ties should be screwed into a union or socket-piece, so that they can be tightened up as much as may be required in order to give stiffness to the truss. The purlins are usually of L or T iron, the size of which will depend on the distance apart of the trusses, if 10 ft. apart the purlins may be about 4 in. by 3 in., and of ⅜-in. or ½-in. metal.

The strains on the parts of these roofs can be ascertained by means of a diagram, as before described for king-post roofs of timber (see page 677). In fig. 4, let the vertical line A C represent, on any scale, the pressure, W, on one side of the truss shown by fig. 1; take A B for the pressure at B (fig. 1), which we may suppose to be one-fourth of W; take B D equal to half W, or the pressure at C (fig. 1); draw B *b*, D *d*, parallel to A B (fig. 1), C *b* parallel to B F, *b d* parallel to C F, *d c* parallel to E F, and C *c* parallel to A F. Then the lines in fig. 4 will represent on scale the strains to which each of the parts of the truss to which they are parallel will be subjected in the direction of their lengths. Thus B *b* is the compression down B C in the truss, and D *d* that down A C; *b d* is the compression down the strut, C F; C *b* is the tensile strain in B F, C *c* that in A F, and *c d* that in E F. Therefore, by means of the known rules for the strength of materials the scantling of each piece can be determined.

We will suppose, for example, that a roof of the design shown by fig. 1 has a span of 30 ft. and a pitch of 30°, the distance apart of the trusses being 10 ft. Then the length of the rafter will be 17½ ft., and if the load to be supported is put at 40 lb. per square foot, we have 400 multiplied by 17½, or 6,932 lb. for the value of W, which we take approximately as 60 cwt. Then the load at C is 30 cwt.; that at B and A, 15 cwt. each, for one rafter. Take A C (fig. 4)

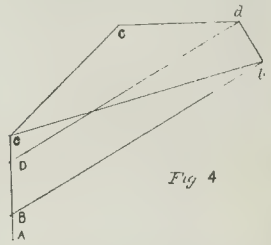


Fig 4

to represent 60 on any scale, A B to be 15, and B D to be 30, then we shall find by measurement that B *b* is 163, D *d* is 150, C *b* 147, C *c* is 86, *c d* is 67, and *b d* is 26, all these numbers representing in hundred-weights the strains along the several parts of the truss (fig. 1) to which these lines are parallel.

Allowing 5 tons, or 100 cwt., per square inch as the utmost tensile strain to which wrought iron should be subjected in a truss, we see that the tension rod, B F, which is strained with 147 cwt., must have a sectional area of nearly 1½ square inch, while the tie A F, which is strained with only 86 cwt., need not be more than ⅞ square inch of section, and the tie E F, being strained with 67 cwt. will only require to be ¾ in. in section. The rafter, B C, may be considered as a long pillar sustaining a load of 163 cwt. in the direction of its length, and will require a sectional area of 4 square inches; the strut C F is also a pillar sustaining a load of 26 cwt., and will require a sectional area of 1⅛ in.

In order to allow for the expansion and contraction which takes place in iron roofs of large span, the feet of the rafters are secured to a cast-iron shoe, which is placed upon iron rollers, so that it can move freely on a cast-iron template laid on the wall. By this arrangement, full play is allowed to the truss, and no injurious thrust is brought on the supports when the iron expands by rise of temperature.

We have all along considered the load as acting vertically on the truss, but there are occasions when it may be strained by an oblique force, as in the case of a gale blowing strongly on one side of the roof, in which case some of the tension bars in the roof, fig. 2, may be temporarily subjected to a compressive strain. Thus, if the rafter A B yielded at all at C it would tend to thrust along the tie-rod F E, and if this bent upwards it would produce a compression in the bolt A K. A certain amount of compression would also be produced from the same cause in the tension rods C H and C I. The several parts must, therefore, be made of sufficient strength to prevent them from yielding under a temporary alteration of strains, for a long rod of iron that would bear a heavy tensile strain will bend under a very moderate amount of compression.

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**Enfield, Middlesex.**—The memorial stone of a Mission Hall, situate at New Lane, Enfield, was laid on Tuesday afternoon by Mr. J. Holbarn, J.P., chairman of the Congregational Union. The architect is Mr. W. D. Church, of South-place, Finsbury, and the builder is Mr. E. Tinson, of Kensington.

## RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

298, Improved Apparatus for Opening and Closing Casements and Ventilators. J. Bruce.

For all casements and for the louvres of ventilators. The improvement consists in attaching to the frame a metal bracket-piece carrying a rotating bar, with a screw thread, upon which travels a block with a guiding piece working on a slot along the bracket. To one end of the rotating-bar is attached a pulley, so that by the action of an ordinary blind cord over the pulley the bar is rotated, and the block is caused to travel up the rod. A lug upon the block-piece works on a slot upon a plate attached to the casement or ventilator, so that the travelling of the block up or down causes the casement or ventilator to open or shut Thus the casement is always locked whether open or closed.

1,504, Cements. F. W. Gerhard.

Near Wolverhampton there is found a compound locally known as "rotch," "bat," or "bovin," an impure silicate of alumina and lime, comparatively inexhaustible, which has hitherto not been utilised. It is deficient in the necessary quantity of lime; but by adding twice its weight or thereabouts of di-carbonbate of lime, and burned with the bat, either separately or together, it forms, when reduced to powder and mixed, an excellent cement. Black lime, which is found in a lower stratum, is also treated so as to be available for cement.

542, Improved Polish for Furniture or other Articles of Wood, Brass, &c. E. A. Russell.

This consists in the combination of vinegar, methylated spirit, and linseed oil, to which is added a small quantity of the analine dye, known as Bismarck brown. These ingredients, when combined in suitable proportions, give not only a polish for furniture, &c., but will extract ink and other stains from the articles on which it is used.

351, Improvements in Brick Kilns. H. Knowles.

These improvements are applied to continuous or semi-continuous action kilns for drying and burning bricks. It applies to down-draught kilns, and gives the burner more effectual control over the working of the kilns in transmitting the waste or surplus heat from one chamber to another. It also secures greater economy in fuel and labour and consumption of smoke by passing the products of combustion from chamber to chamber in as direct a manner as possible. It also provides for effectually closing the connexion between the chambers when necessary. The chambers are separated from each other by an improved partition wall, at the bottom of which on one side are constructed flue openings, which lead into damper chambers. The dampers are worked from outside the kiln, and the flues closed when necessary. A series of openings or perforations lead the heat into a next chamber, where goods on each side are heated by radiation and diffusion of heat. Great economy is claimed, as all the heat is utilised and regulated, and the smoke, especially when burning the best class of goods, is thoroughly consumed.

APPLICATIONS FOR LETTERS PATENT.

*Nov.* 14. -14,983, R. L. Lowe, Cement or Composition for Laying Floors or Pavements.—14,997, W. H. Burdock, Glazing Skylights, Horticultural Buildings, &c.—15,014, J. Thompson and J. H. Bryant, Improved Artificial Stone.—15,019, W. Stewart, Stone-cutting Apparatus.

*Nov.* 15.--15,037, R. Anderson, Improvements in Flushing Apparatus.—15,042, A. Waters, Hot-water Pipes for Heating Buildings.—15,047, W. Macrone, Machinery for Varnishing or Sizing Paper preparatory to Decoration.—15,048, W. Macrone, Varnishes and Sizes.—15,068, A. Emanuel, Cleansing Pipe to Overflow of Water-closet Basins. 15,070, S. S. Phillips and H. F. Green, Water-closets.—15,071, D. Tennant, Drain-pipe Trap.—15,077, J. Halley, Public Urinal.

*Nov.* 17. -15,086, J. Inshaw, Domestic Fireplaces. —15,088, E. Jones and J. Calcott, Cheeks for Register Stoves. — 15,090, W. Fulleylove, Improved Heating Stove. —15,095, A. Laurencot, Safety Device for Doors.—15,115, J. W. Heward and J. L. Heward, Manufacture of Cut Nails.

*Nov.* 18.--15,124, T. Pickles and B. Blakey, New Process for Treating Timber.—15,157, A. H. Kendall, Disconnecting Soil-pipes from Sewers, and Ventilating same. — 15,161 and 15,162, W. S. Morton, Embossing Canvass for Decorating Walls, &c.—15,186, C. Wiltshire and J. Wiltshire, Glazing Skylights, Windows, &c.

*Nov.* 19.—15,192, W. Russell, Over-mantels and other Ornamental Frames.—15,193, W. Wright, Heating Apparatus for Mansions.—15,197, E. W. Turner and J. Reynolds, Circular Rack and Band Machine for Sawing Timber.—15,203, J. Matthews, Electric House Bells.—15,204, W. Chynoweth, Stop, Chamfer, and other Planes.—15,228, H. A. Stuart, Ratchet Drills or Braces.—15,202, R. H. Hayhurst, Gully for Sanitary Purposes.—15,255, A. Gerlach and H. Unger, Improvement in Kitcheners.

*Nov.* 20.—15,266, A. B. Milne, Stay for securing French Casements and other Hinged Sashes. 15,275, J. T. Welch, Manufacture of Bricks and Tiles.—15,301, L. Coppard, Improvements in Hanging Sashes.—15,314, J. C. Spooner and P. S. Spooner, Apparatus for Supplying Water Cisterns with Disinfectants.

PROVISIONAL SPECIFICATIONS ACCEPTED.

10,164. S. Bivort, a New Mode of Flooring. — 12,787, W. Corteen, Opening and Closing Windows. —13,452. B. Hawerkamp, Grates and Kitcheners.—13,817, F. W. Turner, Flushing Tanks or Cisterns. —13,891, W. Elkin and C. J. Elkin, Improvements in Ventilators.—14,036, F. C. Cramer, Manufacture of Glue.—14,196, F. W. Rees, Ball Castors.—14,324, R. M. Justice, Furnaces for Burning Cement.—14,365, W. Dawson, Mills for Reducing Cement, &c. —4 040, J. Gilmore, Ventilating Apparatus.—12,965, W. H. Vivian, Syphon-flushing Cistern.—13,243, E. Sherwood, Manufacture of Rolled Cathedral Glass.—13,422, A. Caspar, Imitating Stained Glass.—13,864, A. Finch, Preventing Draughts under Doors —13,912, C. Smith and F. Smith, Opening and Closing Fanlights, Window Skylights, Ventilators, &c.—13,981, A. Yates and W. Smith, Adjusting the Table of Circular-saw Frames.—14,480, H. Gilchrist and C. Bellamy, Gas Pliers.—14,687, W. R. Lake, Regulating the Supply of Fresh Air to Houses.—14,687, G. Messenger and S. T. Messenger, Ventilators and Chimney Cowls. —14,868, A. Spencer, Holding Sliding Windows in Closed or more or less Open Positions.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

625, E. Norcombe, Lock Furniture.—728, F. Alford, Floating Flushing Valve.—1819, J. Noble, Glazing Street Lamps.—2,000, J. Imray, Improved Water Meter. — 2,129, W. Bennett, Automatic Flushing Apparatus.—2,404, G. Harrington, Ventilation.—2,640, A. Guattari, Manufacture of Marble. —2,805, H. Renold, Cutting or Turning Tool.—6,375, J. Lamers, Combined Pocket Tools.—10,375, H. Blyth, Manufacture of White Lead.—10,723, H. Tunis, Planing, Tongueing, and Grooving Machine. —12,434, C. Watkins and W. Sutton, Distemper and Whitewash Brushes. — 13,621, R. Kirton, Chimney Top and Ventilator.—13,770, T. Elsley, Metal Frames for Casement Windows.--2,787, A. Guattari, Manufacture of Marbles. — 2,847, A. Guattari, Manufacture of Imitation Marble.—2,920, J. Lorrain, Ventilators.—2,950, W. Fawcett and H. Ashley, Improvements in Fireplaces.—3,036, T. Anwyl, Chimney Pot.—5,384, J. Russell, Kitchen and Cooking Ranges.—13,875, T. Elsley, Metal Frames for Casement Windows.—13,943, E. Clark, Floating Breakwaters. — 13,947, W. R. Lake, Metallic Lathing.

## RECENT SALES OF PROPERTY.

NOVEMBER 20.

By FULLER, MOON, & FULLER.

Croydon—1 to 6, Cairo-cottages, and 6 to 15, Lower Drayton-place, 974 years, ground-rent 40*l.* ..... £2,050
Nos. 1 to 12, Upton-cottages, freehold ..... 1,630
Beddington Corner—Two cottages, 299 years, no ground-rent ..... 425
Two cottages, partly leasehold and freehold ..... 480

NOVEMBER 21.

By G. A. WILKINSON.

Somers-town—17 and 19, Charrington-street, 38 years, ground-rent 13*l.* 10s. ..... 970

By HARDS, VAUGHAN, & JENKINSON.

Blackheath—15, Vanbrugh Park, 73 years, ground-rent 16*l.* ..... 1,740

By REYNOLDS & EASON.

Blackeath -- 7, Vanbrugh Park-road, 73 years, ground-rent 12*l.* 5s. ..... 900
Crouch End—1, Crescent-road, 84 years, ground-rent 15*l.* ..... 865

By GREEN & SON.

Vauxhall - Prince's and Clarence Wharfs, 42 years, rent 250*l.* ..... 945
Acton—273, 275, and 277, Uxbridge-road, 79 years, ground-rent 18*l.* 15s. ..... 855
Blackheath—1 and 2, Richmond-villas, 82 years, ground-rent 32*l.* ..... 1,920

By BAKER & SON.

Rudgwick, Sussex — The freehold residence, Hermongers, and 274 acres ..... 12,400
Marylebone—114 and 116, Lisson-grove, freehold... 3,810
Ground-rent of 34*l.* a year, reversion in 15 years 1,210
Sutton-at-Hone, Kent—A plot of land, 2a. 1r. 7p., freehold ..... 500
Finchley—39 plots of freehold land ..... 3,315
Hendon—18 plots of freehold land ..... 620
New southgate—16 plots of freehold land ..... 387

NOVEMBER 24.

By W. SIMMONDS.

Camberwell—45 and 47, Albany-road, f. ehold ..... 1,480

By FOX & SON.

Dalston—39, Wilton-road, 55 years, ground-rent 5*l.* 330
Peckham—19, Soames-street, freehold ..... 570
Old Ford—16, Milton-road, 76 years, ground-rent 3*l.* 10s. ..... 235
Nos. 145 and 147, Armagh-road, 65 years, ground-rent 6*l.* ..... 450

NOVEMBER 25.

By J. HIBBARD.

St. Luke's—2, Macclesfield-terrace, freeho'd ..... 910
Stoke Newington—Church-street, Ivy House, copyhold ..... 500

By S. HERRICK.

Marylebone — 22, Manchester-street, 3½ years, ground-rent 8*l.* 8s. .. ..... 185
Clerkenwell—30, Th mas-street, 25 years, ground-rent 1*l.* 10s. ..... 190

By VENTOM, BULL, & COOPER.

Hyde Park—111, Westbourne-terrace, with stabling, 42 years, ground-rent 3*l.* ..... £4,000
Clapton—1, Maclaren-street, freehold ..... 260

By PRICKETT, VENABLES, & Co.

Lambeth — 12, Wincott-street, 84 years, ground-rent 7*l.* ..... 535
No. 1, Reedworth-street, 81 years, ground-rent 2*l.* 485

By MESSRS. FOSTER.

Hyde Park — 17, Southwick-crescent, 52 years, ground-rent 2*l.* ..... 4,525
No. 8. Somers mews, 48 years, ground-rent 5*l.*... 1,000
Brighton—39, Sussex-square, freehold ..... 2,325
The freehold stabling, in rear ..... 800

By E. ROBINS & HINE.

Drury-lane—Freehold house and warehouses..... 2,600
Nos. 1 to 4, Harford-place, freehold..... 1,890

By W. H. MOORE.

Kentish-town—6, 8, and 12, Frideswide-place, 64 years, ground-rent 18*l.* 18s. ..... 970
No. 13, Peckwater-street, 64 years, ground-rent 5*l.* ..... 270
No. 15, Hammond-street, 64 years, ground-rent 6*l.* ..... 235

By DEBENHAM, TEWSON, FARMER, & BRIDGEWATER.

Aldersgate-street—Ground-rent of 450*l.* a year, reversion in 49 years ..... 16,200
Blandford-square—Ground-rent of 101*l.* a year, term 52 years ..... 2,000
Ground-rents of 105*l.* 6s. 8d. a year, term 55 years 2,235
Ground-rents of 72*l.* a year, term 52 years ..... 1,580
Ground-rents of 59*l.* 13s. 4d. a year, term 55 years 1,100
Ground-rents of 43*l.* 8s. a year, term 52 years ... 710
Clapham—Ground-rent of 8*l.* 13s. 6d., term 15 years 75
Ground-rent of 45*l.* 19s., term 21 years ..... 800
Ground-rent of 72*l.* 13s., term 24 years ..... 1,065
Camberwell—Denmark-road, Myrtle Cottage, 40 years, ground-rent 4*l.* 5s. 8d. ..... 270

NOVEMBER 26.

By BRIANT & SON.

South Lambeth — Copyhold, ground-rent of 60*l.*, reversion in 68 years ..... 1,550

By WALTER HALL.

Stoke Newington—64, Hawkesley-road, 89 years, ground-rent of 6*l.* 10s. ..... 255
Teddington—Gomer-road, Tyre Cottage, freehold... 450
Peckham—207, Hollydale-road, 88 years, ground-rent 4*l.* 13s. 4d. ..... 305

By GEORGE GOULDSMITH, SON, & Co.

Belgravia—56, Hans-place, 40 years, ground-rent 100*l.* ..... 2,100

By J. BAKER & WILKINSON.

Neasden — The Model Farm, with Stabling, 1a. 0r. 12p. freehold ..... 1,600
Eight plots of freehold land ..... 715

By DANIEL SMITH, SON, & OAKLEY.

City, Queen-street—A plot of land, area 1,180 ft., term 80 years, let at 76*l.* a year..... —

By DALE & SON.

Clapton—Ground-rent 37*l.* 10s. a year, reversion in 49 years ..... 965
St. George's-in-East—20 and 22, Prusom-street, copyhold ..... 140
Mile End—20, Knott-street, freehold ..... 125
145 to 151, Bridge-street East, 62 years, ground-rent 20*l.* ..... 1,000

NOVEMBER 27.

By BEADEL & Co.

Clapton—Pond-lane, Saratoga House, and 2a, Pond-lane, 98 years, ground-rent 12*l.* ..... 580
2 to 28 even, Pond-lane, 98 years, ground-rent 84*l.* 3,910
13 and 15, Colenzo-road, 98 years, ground-rent 10*l.* 550

By M. HUMM.

East India Dock-road—Nos. 439 and 441, 89 years, ground-rent 10*l.* 10s. ..... 695

By JAMIESON & STANHAM.

Putney—College-street, a plot of freehold land ..... 130

By H. J. BLISS & SONS.

Cambridge-heath—3, St. Andrew's-road, 83 years, no ground-rent ..... 250

By C. C. & T. MOORE.

Stepney-green—4, 5, and 6, Garden-st., freehold..... 550
Poplar—497 and 499, Manchester-road, 58 years, ground-rent 7*l.* 10s. ..... 300

By NEWBON & HARDING.

Homerton—178, High-street, copyhold..... 1,000
Hackney—41, Groombridge-road, 69 years, ground-rent 8*l.* ..... 375
City-road — 68, Shepherdess-walk, 59 years, ground-rent 6*l.* 6s. ..... 760
5, Graham-terrace, 54 years, ground-rent 6*l.*..... 350
Hoxton—11, Hemsworth-st., 25 years, gr.-rent 1*l.* 1s. 280
Kingsland-road — Nos. 239 and 241, 48 years, ground-rent 28*l.* ..... 500
Pentonville -27, Amwell-street, 21 years, ground-rent 6*l.* 15s. ..... 500

By E. STIMSON.

Camberwell—41, 46, and 48, Blake's-road, 83 years, ground-rent 10*l.* ..... 450
Hackney—68 to 72 even, Frampton Park-road, 62 years, ground-rent 20*l.* ..... 1,325
72 to 80 even, Devonshire-road, 62 years, ground-rent 25*l.* ..... 1,520
19 to 24, Havelock-road, 71 years, ground-rent 18*l.* 18s. ..... 1,005
15, 16, and 17, Cross-street, 71 years, ground-rent 8*l.* 15s. ..... 425
19, Cross-street, and 38, Palace-road, 71 years, ground-rent 6*l.* 10s. ..... 265
Hoxton—16 to 22 even, De Beauvoir-crescent, 46 years, ground-rent 16*l.* ..... 1,250
23 and 24, Gopsall-st., 53 years, ground-rent 11*l.* 750

By GLASIER & SONS.

Barnsbury—74, Bride-street, 76 years, ground-rent 7*l.* 10s. ..... 400
Willesden—18, St. Alban's-road, 82 years, ground-rent 9*l.* ..... 380
Holloway-road—No. 464, rental of 48*l.*, term 24 years, and short reversion ..... 170
No. 466, Rental of 45*l.*, term 24 years, and short reversion ..... 180

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|---|---|
| Holloway-road—No. 468, rental 42*l.*, term 2 years, and short reversion | £180 |
| No. 474, rental of 43*l.* 10*s.*, 2¼ years, and short reversion | 150 |
| Nos 476, 478, and 480, rental of 90*l.*, term 3½ years, and short reversion | 580 |
| Improved ground-rent of 8*l.* a year, term 2¾ years, and short reversion | 140 |
| Improved ground-rent of 15*l.* 10*s.*, term 20 years | 155 |
| Improved ground-rent, 41*l.* 0*s.* 6*d.*, term 20 years | 390 |
| Improved ground-rent, 46*l.*, term 20 years | 426 |
| Eighty shares of 50*l.* each (2*l.* 10*s.* paid), in Westminster and General Life Assurance Co. | 1,122 |

## MEETINGS.

MONDAY, DECEMBER 1.

*Royal Institute of British Architects.*—Adjourned discussion on Mr. Stannus's paper "On the Internal Treatment of Cupolas in General, and that of St. Paul's Cathedral in particular." 8 p.m.

*Clerks of Works Association.*—Monthly Meeting at 31, Spring-gardens. 7 p.m.

*Society of Arts (Cantor Lectures).*—Mr. Harold B. Dixon, M.A., on "The Use of Coal Gas."—I. 8 p.m.

TUESDAY, DECEMBER 2.

*Institution of Civil Engineers.* (1) The Hon. R. C. Parsons on "The Working of Tramways by Steam." (2) Mr. W. Shellshear on "The Sydney Steam Tramways." 8 p.m.

*Society of Biblical Archæology.* 8 p.m.

WEDNESDAY, DECEMBER 3.

*British Archæological Association.*—(1) *Résumé* of the Tenby Congress, by Mr. Thomas Morgan. (2) Mr. C. Lynam on "The Inscription on the Cross at Carew." (3) Mr. G. R. Wright on "The Maunday Distribution." 8 p.m.

*Sanitary Assurance Association.*—Dr. Norman Chevers on "House Sanitation." (Parkes Museum.)

*Society of Arts.*—Mr. W. H. Preece on "Electric Lighting in America." 8 p.m.

THURSDAY, DECEMBER 4.

*Royal Archæological Institute.*—(1) Mr. W. H. St. John Hope "On the Augustinian Priory at Repton." (2) Admiral Tremlett "On the Menhir Autel at Kernuz, Finisterre." 4 p.m.

*Parkes Museum.* General Meeting of Members to receive Report from the Council." 5 p.m.

*Society of Antiquaries.*—8 p.m.

*Society of Arts (Husband Lectures).*—Mr. W. Anderson on "The Conversion of Heat into Useful Work." II. 8 p.m.

FRIDAY, DECEMBER 5.

*Architectural Association.*—Dr. Dresser on "Some Features of Japanese Architecture and Ornament." 7.30 p.m.

*Institution of Civil Engineers (Students' Meeting).*—Mr. H. H. Dalrymple-Hay on "Trigonometrical Surveying." 7.30 p.m.

## Miscellanea.

**New Buildings in Finsbury Pavement.** Extensive new premises are at present being built by the Finsbury Estates Company, in Finsbury-pavement, at the corner of Cross-street. During the progress of the excavations the original level of the ground surface of old Finsbury Fields was found to be between 13 ft. and 14 ft. below the present surface of the roadway. The new buildings, at the basement level, will cover an area of 13,000 superficial feet, and at the ground-floor level 7,500 ft. The new basement, about 15 ft. in depth, is constructed with massive iron columns, girders, and concrete, and will, together with a suite of offices on the ground and first floors, be occupied by Messrs. Probyn & Co., ale and beer merchants. The buildings will have a frontage to Finsbury-pavement 46 ft. in length, with a return frontage in Cross-street 119 ft. long. The Finsbury-pavement elevation will be 62 ft. high, and will be faced with white Suffolk brick, and Portland and Dumfries stone, with polished Aberdeen granite for window dressings and ornamentation. At the corner of Finsbury-pavement and Cross-street the buildings will be surmounted by a lofty gable. The Cross-street frontage will be 52 ft. in height, and, like that in Finsbury-pavement, faced with white Suffolk brick and Portland and Dumfries stone. All the upper floors are intended to be arranged in suites of offices and chambers. Mr. J. W. Brooker, of Railway Approach, London Bridge, is the architect, and Mr. W. Downs, of Hampton-street, Walworth, the builder, whose contract amounts to 14,967*l.* Mr. W. W. Game is foreman of the works.

**The Nail Trade.**—In consequence of the heavy and differential charges, &c., made by the railway companies coming to Birmingham some of its prosperous trades are leaving the town. It was pointed out in the *Builder* some time ago that there had been an amalgamation of the wrought nail-makers, and that they had removed their works to Chepstow, on the sea-coast. Now we find the wire and wire nail trade following suit, and removing out of the country altogether to Belgium and Germany. These nails appear to be superseding cut nails everywhere amongst builders.

**Builders' Benevolent Institution.**—At a general meeting of this Institution, held on Thursday afternoon at Willis's Rooms, Mr. Stanley G. Bird, president, in the chair, five pensioners were elected,—four men and one woman. There were nine male candidates, viz., William Humphrey, of Barnes, aged 66 (fourth application); Matthew Harrison, of Exeter-street, Lisson-grove, aged 74 (third application); John Richmond Bisley, of Lynton-road, Bermondsey, aged 74 (second application); George Shearing, of Ingatestone, aged 65 (second application); Reuben Hurren, of Dartmoor-street, Notting-hill, aged 66 (second application); William Charles Allen, of Kilburn Park-road, aged 61 (second application); William Hutton, of Harewood-place, Marylebone, aged 63; James Robert Rawley, of Downham-road, Kingsland, aged 64; and William Thornton, of St. John's-hill, Wandsworth, aged 62. The female candidate was Harriet Shapland, aged 66, widow of James Shapland, late of York-road, Lambeth. The poll opened at two p.m. and closed at four p.m. Shortly after the last-named hour the scrutineers (Messrs. Thomas Stirling and Thomas F. Rider) declared the result of the voting to be as follows, viz., Humphrey, 835 votes; Harrison (dead since the voting papers were issued), 248; Bisley, 183; Shearing, 1,313; Hurren, 403; Allen, 1,426; Hutton, 1,036; Rawley, 356; Thornton, 94; and Shapland, 103. The chairman therefore declared the successful candidates to be Messrs. Allen, Shearing, Hutton, and Humphrey, and Mrs. Shapland,—Messrs. Shearing and Allen owing their election to a great extent to votes allotted to them in respect of their having been formerly subscribers to the Institution.

**Trial of Steam Fire-Engines.**—During the past week a trial has taken place at Messrs. Merryweather & Sons' works of what are described as "two of the most powerful steam fire-engines in the world." They have been constructed for the Corporation of Liverpool. Capt. Nott Bower (chief constable of Liverpool) visited the works when the new engines were displayed. Steam was raised in the boiler of No. 1 engine (which indicates 100 horse-power) in nine minutes and a half, and the steamer was tested for its fire-extinguishing powers. A jet was thrown 300 ft. with great force, the engine being capable of working twelve streams simultaneously. At the same works trial has also been made of one of the fifteen steam tramway locomotives now being constructed for the North London tramways. These engines have cylinders 7½ in. diameter, and 12-in. stroke, and it is stated that each is capable of drawing three loaded cars at a speed of eight miles per hour, at a working cost of 30 per cent. less than horse-power. It is expected that the whole of these engines will be running in the course of the next two months.

**The Sanitary Condition of the East End.**—At the meeting of the Whitechapel District Board of Works last week, it was moved by Colonel Munro, seconded by Mr. Catmur, and resolved, that a small committee be appointed by the Board to consider the charges made by the Jewish Board of Guardians against the sanitary administration of the district, and to investigate the whole circumstances; and that the committee be empowered to employ such assistance as in their opinion may be necessary to prosecute their inquiry. In the course of the discussion, Mr. Harris urged the appointment of two more sanitary inspectors as the most efficacious way of meeting the complaints. Mr. Barham said that although that might be one of the results of the committee's investigations, it was only a part of the question, and did not dispense with the necessity for investigation. Mr. Struthers did not see how the appointment of two more sanitary inspectors could alter the superstructure of the houses complained of.

**The Uses of Coal-Gas.**—A course of three Cantor Lectures, on "The Uses of Coal-Gas," will be delivered at the Society of Arts, by Mr. Harold B. Dixon, M.A., on December 1st, 8th, and 15th. The subject of the first lecture will be on "The Composition of Coal-Gas, its Properties, its Combustion;" the second, "Coal-Gas as a source of Light"; and the third, "Coal-Gas as a source of Heat."

**Working Class Thrift in New South Wales.**—During 1883 the number of deposits in the Post Office Savings Banks was 147,627, representing £922,803. This is exclusive of the large sums deposited in other Savings Banks, or invested in Land or Building Societies.

**Housing the Poor.**—The principal facts that have been elicited after all that has been written and said on this subject, may be thus summarised:—1. That the poor of the labouring class, out of their limited resources, cannot afford to pay more than a rental of from 1s. to 2s. per week for their dwellings, of whatever size and construction, and wheresoever situate. 2. That no practical plan has yet been devised by which dwellings can be built, which, after paying a fair market price for land, labour, and material, can be let at these low rentals, and prove remunerative to the builders. 3. If this desirable end is to be accomplished, it must depend to some extent on philanthropic aid, either from Government, corporate authorities, or private individuals. 4. The most efficient aid that the Government can give is to grant loans at a low rate of interest,—say 2½ per cent.,—to companies who erect dwellings at a low rent for the *bonâ-fide poor*, the repayment of such loans to extend over a longer period than is now the custom (thirty years). 5. That it shall be incumbent on corporate authorities, as the appointed guardians of the public health, where the want of proper dwellings for the poor is shown to exist, to provide sites for the erection of such dwellings; and, in order to encourage such erection, to grant a reduction of rates, or afford such other aid as may enable the promoters to secure a satisfactory return. 6. That the sanitary officers should take more vigorous action under the powers already conferred upon them to improve the condition of existing dwellings and the removal of nuisances, whether caused by bad tenants, or the neglect of unscrupulous landlords, care being taken to reach the real offenders.—*Sanitary Record.*

**Railway Progress in Australia.**—From the *Melbourne Argus* we learn particulars of the scheme of railways proposed in the Bill before the Legislature, for providing the colony with about 900 miles of new lines. When the Bill for raising a loan for the purpose was introduced in 1882 a sum of 2,700,000*l.* was set apart as sufficient to meet their cost. It appears, however, that that sum has disappeared without one inch of the lines in question having been constructed. But now it is said that a sum of no less than 7,700,000*l.* will have been expended before the lines proposed in 1882 are constructed. Such varying estimates, it is added, amount to trifling with the public, and their inevitable tendency is to discredit the railway cause. "Worthless political estimates" are considered to be the secret of the evil. Surely there must exist some remedy against such an evil if those in authority would only seek for it.

**Messrs. Jones & Willis**, the well-known art metal workers and church furnishers, have recently had erected for them new business premises in Edmund-street, Birmingham, from the designs of Mr. Phipson, architect, of Birmingham. The elevation is of a Gothic character, and is chiefly remarkable for having above the shop story an oriel window of two splays only, meeting in a central angle. The effect is, for a central window, somewhat thin and weak. The land on which their old premises stands in Temple-row has been taken by the managers of the Conservative Club on which to erect a new clubhouse. Some eight architects were invited to send in designs in competition, to which six responded, and those of one gentleman were selected. On these being exhibited to the members so much dissatisfaction was expressed, that a general meeting of members was called, when both plans and site were condemned, and the building committee are reported to have resigned in a body.

**Wandle Valley Main Drainage.**—We may mention that these works, to which we referred in a recent "Note," were carried out under Mr. Baldwin Latham, C.E., for the Croydon Rural Sanitary Authority. Nearly ninety miles of pipes, &c., have been used, supplied by Messrs. Doulton & Co., and about two miles of concrete tubes, supplied by Messrs. Sharp, Jones, & Co. Bricks by the Aylesford Pottery Co. The whole of the manhole-tops, valves, sluices, &c., have been supplied by Messrs. Stone & Co. The works were constructed by Messrs. B. Cooke & Co., of Battersea, whose contract amounted to about 110,000*l.*, this sum including the whole of the house connexions, which were constructed under the local surveyor, Mr. R. M. Chart. The resident engineer was Mr. Wm. Santo Crimp, C.E., F.G.S., Surveyor of Wimbledon; and the clerks of works, Messrs. Snook, Wren, & Brown; the contractor's representative being Mr. T. Wilkinson.

**New Workhouse Buildings at Shoreditch.**—Extensive additions have just been made to the workhouse at Shoreditch, and the new buildings are intended to be opened for the reception of inmates in the course of next month. They are situated in Reeve-place, contiguous to the present work-house buildings, and occupy a ground area of nearly 9,000 superficial feet. They consist of three separate blocks, one block being for able-bodied inmates, male and female; another block is for children; and the third block for casuals. The several blocks are all in picked stock brick, with red Fareham bricks for dressings. The principal block is that for able-bodied paupers. It covers an area of 3,120 ft., and is 70 ft. in length, the front elevation being surmounted by a central pediment, rising to a height of about 80 ft. It contains four floors, in addition to a basement devoted to work-rooms. The ground-floor contains day-rooms. All the upper floors are arranged as dormitories. This block has accommodation for 150 inmates, seventy-five males and seventy-five females. The children's block occupies an area of about 1,200 ft., in addition to which there is a recreation space of 800 ft. The casual ward block covers an area of 3,000 ft. The casual wards are built on the cellular principle. Messrs. Lee & Smith, of Queen Victoria-street, are the architects, and Mr. T. Boyce, of the Eagle Works, Hackney, is the contractor. Mr. Birtchnell is clerk of the works. The cost of the buildings is 20,000*l.*

**Sanitary Assurance Association.**—The first of a series of lectures on sanitary subjects was given on Wednesday evening last, at the Parkes Museum, Margaret-street, W., when Mr. Henry Rutherfurd, barrister-at-law, lectured on "Sanitary Assurance, from a Householder's Point of View." Dr. R. Farquharson, M.P., presided. Mr. Rutherfurd began his lecture with an allusion to the apathetic attitude of a large portion of the public in regard to sanitation. He spoke of the absence of efficient sanitary arrangements in large houses as well as in smaller dwellings, and referred to his own experience as a householder who had sought the advice of the Sanitary Assurance Association, which led to his ascertaining the fact that instead of the drain from his house going into the main sewer as he had imagined, it ran in an opposite direction and discharged itself into his neighbour's garden; and further, that the drain was not in any way disconnected from the house. In speaking of the Association, he said that sanitation had become a science in itself, only to be mastered by special study and actual experience. He did not recommend the compulsory inspection of dwellings; the intrusion into our houses of officials who merely came to see if any evils existed, was a form of paternal government which we were not as yet disposed to encourage. At the same time, he suggested that every house ought to possess a sanitary certificate, obtained from a properly-qualified person.

**An Improvement in Stoves.**—According to a correspondent, a Birmingham engineer has recently patented an arrangement by which a greatly-increased result may be obtained in our parlour stoves. In the case of one with a semicircular arched front, and a fire-brick back, but no register, he makes a narrow cast-iron frame to fit over the fire around the back and across the front, and tilted to an angle, say of 30 deg., with the horizontal, the front part of the frame being at the springing of the arched opening or thereabouts. To this front bar is hinged a valve which can either be fixed upright against the back of the arched opening, when it acts upon the fire as a blower, or it may be shut down upon the frame, so as to stop the direct draught with the chimney; the smoke and flame striking the under-side of the valve, and is deflected forward with its attendant heat, the smoke is met at the front edge of the frame by the draught and carried over up the chimney. The valve can be worked with a hooked poker, or more elaborately by a screw arrangement. The heat radiated into the room is about doubled by the use of this valve. Mr. John Inshaw, who has made this invention, is now over seventy-seven years of age, and is the same gentleman who got the prize for the first passenger steamer on the Thames,—a vessel which he made in Birmingham and steamed to London through the canals.

**Erratum.**—On page 689, *ante*, first line of first column, for King Henry "III." read "VIII."

**Manchester Architectural Association.** The second ordinary meeting of the above Association was held at the Old Town-hall on Tuesday last, Mr. Colley in the chair. Mr. J. S. Hodgson read a paper on "Sewage Farms," in which he said:—Sewage farms at one time were looked upon more as the invention of speculators for the utilisation of the manure than for the speedy removal of the filth from the neighbourhoods of habitations, but are now admitted to be the only true means of disposing of liquid sewage from inland towns. These farms are often spoken of in no very flattering terms, but, properly constructed and managed, are very satisfactory. There is great prejudice against them, from the notion that they are injurious to health, which is contradicted by the report of the Rivers Pollution Commission, Dr. Littlejohn, Medical Officer of Health to the City of Edinburgh; Professor Christison, of the Royal Society of Edinburgh; Dr. A. Carpenter; and many others. A discussion followed, in which Messrs. Colley, Oldham, Brooke, Chadwick, Talbot, Worthington, and Preston took part.

**Porthleven (Cornwall).**—The picturesque village of Porthleven, Helston, Cornwall, has received an addition, both useful and ornamental, by the erection in the tower of the Institute of a new clock, manufactured by Mr. J. W. Benson, of Ludgate-hill, London. The clock has four dials of upwards of 4 ft. diameter, one of which on the land side is illuminated. The hours are struck upon a bell of 4 cwt. of a full rich tone. The clock and tower have been erected at the sole cost of Mr. W. Bickford Smith, of Helston.

**Market Weighton.**—A company is being formed for supplying Market Weighton with water. Mr. J. F. Fairbank, M. Inst. C.E., and engineer for the Beverley and Driffield Water Companies, is the engineer.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Plans for Erection of a Hospital | Newbury District Hospital Trustees... | ..... | Not stated ... | i. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Compressed Asphalte Pavement | Liverpool Corporation | City Engineer | Dec. 1st | ii. |
| Erection of a Stand for Animals on Peckham Rye Common | Met. Board of Works | *Official* | Dec. 3rd | ii. |
| Stores | Great Northern Ry. Co. | ..... | Dec. 6th | ii. |
| Stoneware or Fireclay Pipes, Land Drainage Tiles and Carriers, &c. | Normanton Local Brd. | Thos. Reid | Dec. 8th | xviii. |
| Paving Works | Vestry of St. Giles, Camberwell | *Official* | do. | ii. |
| Sewerage Works | Greenwich Bd. of Wks. | do. | Dec. 10th | ii. |
| Well-Sinking and Pumping | Croydon Town Council | Borough Engineer | Dec. 11th | ii. |
| Additions, &c., to School | Chigwell School Board | E. Egan | do. | xviii. |
| Broken Granite | Bishop Stortford L. B. | ..... | do. | ii. |
| Construction of Concrete Pier at Newlyn | Newlyn Pier & Harbour Commissioners | J. C. Inglis | Dec. 13th | xviii. |
| Works and Materials for one year | St. George, Hanover-sq. | G. Livingstone | do. | ii. |
| Erection of Inland Revenue Office, Portsm'th | Commissnrs. of Works | *Official* | do. | ii. |
| Works, &c., and Supply of Building Materials | War Department | do. | Dec. 15th | i. |
| Baths and Washouses | City of Newcstle-on-Tyne | Gibson & Allan | do. | ii. |
| Sewerage Works | Darlaston U. S. A. | E. Pritchard | Dec. 18th | ii. |
| Alterations to Assize Courts, Hertford | County of Hertford Magistrates | Urban A. Smith | Dec. 19th | xviii. |
| Completion of Cottages, Epping | ..... | J. K. Green & Son | Not stated ... | i. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Architectural Draughtsman | Civil Service Com. | Not stated | Dec. 24th | xvi. |

### TENDERS.

For the erection of villa residences at Norbiton Park. Mr. Frank Fowler, architect. Quantities supplied:—

| | One House. | Two Houses. | Eight Houses. |
|---|---|---|---|
| Thornsett | £780 | £1,440 | £6,128 |
| Hooper | 757 | 1,497 | 5,783 |
| Worman | 745 | 1,541 | 6,040 |
| Holliday & Greenwood | 737 | 1,449 | 5,723 |
| Fisher | 697 | 1,359 | 5,233 |
| F. Higgs | 690 | 1,360 | 5,200 |
| Pile | 630 | 1,230 | 4,790 |
| Sillick | 620 | 1,200 | 4,700 |
| Pack Bros. | 597 | 1,166 | 4,640 |

For small hall and offices, for the Local Board of Health, Carshalton, Surrey, for the Carshalton Public Hall Company, Limited. Mr. J. D. Hayton, architect. Quantities prepared by Mr. C. R. Griffiths, Bank-chambers, Tooley-street, London Bridge:—

| | | | |
|---|---|---|---|
| Brazier & Son, Blackfriars-road | £770 | 0 | 0 |
| F. Dawes, Peckham | 680 | 0 | 0 |
| S. Sabey & Son, Islington | 634 | 0 | 0 |
| T. J. Meesom, Twickenham | 629 | 0 | 0 |
| Thos. Taylor, Kingsland | 623 | 0 | 0 |
| Maides & Harper, Croydon | 594 | 0 | 0 |
| Lilley & Anderson, Wallington | 577 | 17 | 9 |
| W. & F. Croaker, Southwark | 568 | 0 | 0 |
| C. Dearing & Son, Islington | 566 | 5 | 8 |
| J. Smith & Son, South Norwood | 547 | 0 | 0 |
| B. Cook, Stonecutter-street | 538 | 0 | 0 |
| W. Hazell, Mitcham | 530 | 0 | 0 |
| A. M. Deacon & Co., Lower Norwood | 498 | 0 | 0 |
| Martin Taylor, Croydon | 490 | 0 | 0 |
| W. Pearson, Croydon | 485 | 0 | 0 |
| C. Coles, Croydon | 477 | 0 | 0 |
| J. B. Potter, Sutton | 477 | 0 | 0 |
| H. Clark, Wallington | 472 | 0 | 0 |
| Howe & White, Wallington | 470 | 0 | 0 |
| W. H. Richardson, Carshalton | 451 | 0 | 0 |
| R. J. Humphris, Sutton | 450 | 0 | 0 |
| Duncan Stewart, Wallington | 448 | 0 | 0 |
| E. J. Burnand, Wallington | 445 | 0 | 0 |
| J. Sedgwick, Croydon | 436 | 0 | 0 |
| S. J. Evans,* Carshalton | 397 | 0 | 0 |

* Accepted, subject to modifications.

For the erection of a school for 870 children, in Eglinton-road, Greenwich, for the School Board for London. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| Grover | £12,600 | 0 | 0 |
| Lonergan Bros. | 12,298 | 0 | 0 |
| W. Scrivener & Co. | 12,572 | 0 | 0 |
| E. C. Howell & Son | 12,553 | 0 | 0 |
| Patman & Fotheringham | 12,419 | 0 | 0 |
| Wall Bros. | 12,249 | 0 | 0 |
| C. Wall | 12,184 | 0 | 0 |
| S. J. Jerrard | 11,993 | 0 | 0 |
| Stimpson & Co. | 11,970 | 0 | 0 |
| Kirk & Randall | 11,883 | 0 | 0 |
| W. Johnson,* Wandsworth-common | 11,600 | 0 | 0 |

* Accepted.

For carrying out various structural improvements to Mantua-street school, and providing class room accommodation for forty-seven additional children, for the School Board for London. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| J. Oliver | £5,064 | 0 | 0 |
| W. Goodman | 4,747 | 0 | 0 |
| E. C. Howell & Son | 4,565 | 0 | 0 |
| Steel Bros. | 4,549 | 0 | 0 |
| Turtle & Appleton | 4,542 | 0 | 0 |
| J. Smith & Sons | 4,530 | 0 | 0 |
| W. & F. Croaker | 4,529 | 0 | 0 |
| W. Bangs & Co. | 4,451 | 0 | 0 |
| W. Oldrey | 4,447 | 0 | 0 |
| Kirk & Randall | 4,437 | 0 | 0 |
| S. J. Jerrard | 4,379 | 0 | 0 |
| C. Wall | 4,376 | 0 | 0 |
| Holloway Bros. | 4,298 | 0 | 0 |
| F. & F. J. Wood | 4,292 | 0 | 0 |
| H. L. Holloway | 4,277 | 0 | 0 |
| Lathey Bros. | 4,270 | 0 | 0 |
| Stimpson & Co. | 4,263 | 0 | 0 |
| W. Johnson,* Wandsworth-common | 4,238 | 0 | 0 |

* Accepted.

For the construction of a reservoir at Crosby Meadows, Dartmouth, and for providing and laying iron water-mains, for the Town Council. Mr. E. H. Back, C.E., Borough Surveyor:—

| | | | |
|---|---|---|---|
| Hawking & Best, Teignmouth | £862 | 12 | 6 |
| Shaddock Bros., Mutley, Plymouth | 844 | 0 | 0 |
| Hawkins, Dawlish (accepted) | 647 | 0 | 0 |

For alterations to the Victoria Tavern, Grove-road, Mile-end. Messrs. Hammack & Lambert, architects:—

| | | | |
|---|---|---|---|
| Hearle & Son | £1,683 | 0 | 0 |
| Cocks & Co. | 933 | 0 | 0 |
| Lascelles & Co. | 890 | 0 | 0 |

For seven cottages on the Artillery Field Estate, Guildford, for Mr. G. W. Cole. Messrs. Peak, Lunn, & Peak, architects, Guildford. Quantities supplied:—

| | | | |
|---|---|---|---|
| Pink, Milford | £2,779 | 0 | 0 |
| Nye, Guildford | 2,459 | 0 | 0 |
| Garnett, Guildford | 2,449 | 10 | 0 |
| Mitchell, Shalford | 2,413 | 2 | 7 |
| Martin Wells & Co., Aldershot | 2,400 | 0 | 0 |
| Kingerlee, Oxford | 2,390 | 0 | 0 |
| Peters, Horsham | 2,235 | 0 | 0 |
| Strudwick, Guildford | 2,195 | 0 | 0 |
| Bottrill, Reading (accepted) | 1,973 | 0 | 0 |

For shops and offices, Broad-street, London, for Mr. Edward Lukyn. Mr. Edwin T. Hall, architect, Moorgate-street. Quantities by Mr. G. A. Pryce-Curzon, Westminster-chambers, and Mr. E. Overall, Henrietta-street, Covent-garden:—

| | | | |
|---|---|---|---|
| W. Brass | £6,371 | 0 | 0 |
| Clarke & Bracey | 6,280 | 0 | 0 |
| J. & J. Greenwood | 6,197 | 0 | 0 |
| Colls & Son | 6,176 | 0 | 0 |
| Holland & Hannen | 6,075 | 0 | 0 |
| Foster & Dicksee | 5,950 | 0 | 0 |
| J. Woodward | 5,926 | 0 | 0 |
| Bangs & Co. (accepted) | 5,690 | 0 | 0 |

For repairs, &c., 15, Green-street, Grosvenor-square. Mr. Edwin T. Hall, architect:—

| | | | |
|---|---|---|---|
| Lynde | £189 | 0 | 0 |
| Tavener & Sons (accepted) | 182 | 0 | 0 |

Accepted for alterations, and building new wing, to Alleston Hall, near Leeds, the residence of Mr. W. L. Jackson, M.P. Mr. Thomas Winn, architect, 18, Park-lane, Leeds. Quantities by the architect:—

| | | | |
|---|---|---|---|
| *Bricklayer, Mason, and Joiner*, Nicholson & Son, Leeds<br>*Plasterers*, Franks & Evans, Leeds<br>*Plumber*, Joseph Lindley, Leeds<br>*Slater*, James Seasons, Leeds<br>*Bellhanger*, James Simpson, Leeds<br>*Ironfounder*, Dawson & Kinneley, Leeds. | £1,732 | 18 | 6 |

Accepted for building new offices, model-making and stoveing shops, new foundry, and drawing offices, at the Old Foundry Steam Crane Works, Rodley, near Leeds, for Mr. Thomas Smith, Mr. Thomas Winn, architect. Quantities by the architect:—

| | | | |
|---|---|---|---|
| Wm. Nicholson & Son, Leeds | £2,315 | 0 | 0 |

For alteration of premises in Albion-street, Leeds, for Mr. Samuel James Brown. Mr. Thomas Winn, architect. Quantities by the architect:—

| | | | |
|---|---|---|---|
| Irwin & Co., Leeds | £640 | 0 | 0 |
| Longley Bros., Leeds | 602 | 0 | 0 |
| Tomlinson & Son, Leeds | 600 | 0 | 0 |
| J. A. Thorp, Leeds | 589 | 0 | 0 |
| Franks & Evans (accepted) | 554 | 0 | 0 |

For the continuation and completion of the Wightman-road sewers, surface-water drains, &c., on the Harringay Park Estate, Hornsey, for the British Land Company, Limited Mr Henry R. Mitchell, surveyor:—

| | | | |
|---|---|---|---|
| Nowell & Robson, Kensington | £2,857 | 0 | 0 |
| Harris, Camberwell | 2,700 | 0 | 0 |
| Keeble, Regent's Park | 2,627 | 0 | 0 |
| Killingback, Camden-town | 2,397 | 0 | 0 |
| Pizzey, Hornsey | 2,377 | 0 | 0 |
| Bloomfield, Tottenham | 2,280 | 0 | 0 |
| Wilson, Walthamstow | 2,150 | 0 | 0 |
| Jackson, Leyton | 2,084 | 0 | 0 |
| Peill, Bromley, Kent (accepted) | 1,920 | 0 | 0 |

For alterations to the Craven Hotel, Lavender-hill, Wandsworth, for Mr. Edward McKinnell. Mr. Henry S. Tyack, architect, 5, Bloomsbury-square:—

| | | | |
|---|---|---|---|
| J. Dodson | £492 | 0 | 0 |
| S. Hayworth | 484 | 0 | 0 |
| Burch & Co. | 417 | 0 | 0 |
| J. Watkins | 409 | 0 | 0 |
| Wm. Ellis | 339 | 0 | 0 |
| J. W. Taylor (accepted) | 311 | 10 | 0 |
| W. H. Thorn | 297 | 10 | 0 |

For rebuilding at 8, Blackfriars-road. Mr. Richard Groom, architect, Bridge-chambers, 172, Queen Victoria-street:—

| | | | |
|---|---|---|---|
| Stains & Son | £516 | 0 | 0 |
| Marsland | 505 | 0 | 0 |
| Oldis Bros., Wilson-street | 452 | 0 | 0 |

For the construction of about 4,903 lineal yards of brick, stoneware, and cast-iron sewers, with all necessary junctions, manholes, lamp-holes, and the outfall and intercepting tanks, for the Stroud Rural Sanitary Authority. Mr. J. P. Lofthouse, C.E., engineer. Quantities by the engineer:—

Contract No. 1.

| | | | |
|---|---|---|---|
| T. Small & Sons, West Bromwich | £2,727 | 0 | 0 |
| Bottoms Bros., Batterses | 2,713 | 0 | 0 |
| J. Greenslade, Stroud | 2,565 | 0 | 0 |
| J. T. Whettam, Weymouth | 2,495 | 0 | 0 |
| B. Cooke & Co., Battersea | 2,364 | 0 | 0 |
| H. Welsh, Hereford | 2,358 | 0 | 0 |
| J. Young & Co., Hertford | 2,288 | 0 | 0 |
| Thos. Williams, Swansea | 2,285 | 0 | 0 |
| G. Cowdery & Sons, Newent, Glos. | 2,274 | 0 | 0 |
| J. Dickson, St. Alban's | 2,158 | 0 | 0 |
| J. Bawkins, Dawlish | 2,097 | 0 | 0 |
| Ambrose & Son, Bath (accepted) | 1,948 | 0 | 9 |
| Engineer's estimate | 2,465 | 0 | 0 |

For the erection of a shoe factory at Starch-green, W., for Messrs. Peal & Co. Mr. T. Chatfeild Clarke, architect. Quantities by Mr. H. H. Leonard:—

| | Wrought Timbers. | | Total. |
|---|---|---|---|
| Colls & Sons | £2,985 | £117 | £3,102 |
| J. Grover | 2,934 | 150 | 3,084 |
| J. Woodward | 2,865 | 115 | 2,980 |
| J. T. Chappell | 2,815 | 85 | 2,900 |
| Brown, Son, & Blomfield | 2,775 | 110 | 2,885 |
| J. & J. Greenwood | 2,750 | 110 | 2,860 |
| Ashby Bros. | 2,699 | 134 | 2,833 |
| P. Lawrance & Sons | 2,695 | 78 | 2,773 |
| Hall, Beddall, & Co. | 2,620 | 98 | 2,718 |
| B. Nightingale | 2,620 | 70 | 2,690 |

For alterations and shop fronts, &c., at Nos. 30 and 31, Peter-street, Soho, for Mr. E. Saville. Mr. Frederick H. Culverhouse, surveyor:—

| | | | |
|---|---|---|---|
| Gould & Brand (accepted) | £298 | 0 | 0 |

Accepted for sundry works, decorations, &c., at the Walford Arms, Stoke Newington-road, for Mr. G. C. Busley:—

| | | | |
|---|---|---|---|
| Oldis Bros., Wilson-street | £173 | 0 | 0 |

*Stables, Seamore-place.*—The architect of this work is Mr. E Crosse, not *C.* Crosse. The list as inserted last week was (we suppose inadvertently) sent to us by one of the builders a second time, it having already appeared some weeks ago.

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than four p.m. on Thursdays.

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Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

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PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher No. 46, Catherine-street, W.C

### TO CORRESPONDENTS.

F. C.—A. B. M.—D. J. M.—C. L. (copy forwarded).—"Improvement" had better improve his own spelling before he next writes).—"Highlander" can be obtained from Messrs. Doulton's, Lambeth Potteries Signature to accompanying letter not legible).—Mr. H. and G. P. (cannot advise).—H. T.—W. G. K.—G. C. (will write).—A. E. (shall be happy to give it consideration).—C. E. C.—W. F. L.—C. J.—O. Bros. (we see no reason for departing from our rule).—E. C. (below our mark).

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

**Best Bath Stone.**
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

**Dry Corsham Stone.**
150,000 FEET CUBE.
PICTOR & SONS,
BOX, WILTS.
[ADVT.

**Doulting Freestone and Ham Hill Stone** of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.

**Doulting Free Stone** HAM HILL STONE, BLUE LIAS LIME (Ground or Lump), For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

**Asphalte.**
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90 Cannon-street, E.C. [ADVT.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT.
COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD,
LONDON, S.E.
DISCOUNT TO BUILDERS.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.
IRON CISTERNS.
F. BRABY & CO.
LONDON, LIVERPOOL, GLASGOW.
VERY PROMPT SUPPLY.
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# The Builder.

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### *Leonardo da Vinci as Architect.*

UNDER this title comes to us a publication of great interest, though in a form which is somewhat puzzling to the reader. There are some things which we manage best in England, and one of them is the arrangement and "entitling," if we may use the term, of architectural publications. We can generally at least make it clear who a book is by, and what it is about; but French and German editors and publishers despise these ways of pleasantness. They delight in preparing puzzles for the reader; in sending out the last part of a book first, placing the title-page at the end and the index in some unexpected place in the middle, and so on. The present volume* is no exception to this pleasing rule. The outside cover bears the title as given below, but no date or publisher's name, only an announcement that "this treatise forms part of the literary works of L. da Vinci, by Jean Paul Richter, and has not appeared separately." On the inside title-page we find this latter title, and the notification "Vol. II.," the name of Messrs. Sampson Low & Co., as publishers, and the date 1883. Then follows the table of contents of "Vol. II.," which, however, is not the table of contents of the volume before us, and seems to have nothing to do with it; and then an index of the contents of plates from numbers LVI. to CXXII., whereas the plates actually appended to this volume range from LXXVII. to CVI., and the contents of some of them correspond to the descriptions under the same number given in the index, and in other cases do not. After this we give it up, and have to be content with the vague conviction that it is a volume containing a number of fac-similes of rough sketches by Leonardo, of great interest, preceded by a good many pages of desultory remarks, some of which obviously have some reference to the plates; but further than that we cannot get.

What can be extracted from these facsimile sketches, and the hasty memoranda of Leonardo, which latter are printed in double columns of Italian and English, is of much interest, partly in its inherent suggestiveness, partly as throwing light on the character of Leonardo and his way of regarding things architectural. Baron de Geymüller remarks in some prefatory notes, that in spite of the prevalent idea as to Leonardo's architectural acquirements, partly based on the famous letter in which he practically undertook to do everything that could be required and some other things besides, no building is known to have been planned and executed by him. But certain documents, preserved at Milan, show that Leonardo was not only employed in preparing plans, but that he took an active part as member of a Commission on public buildings (which in those days seems to have presupposed some knowledge of the subject); and that his name is linked with the history of the building of the cathedrals both of Milan and Pavia. The evidence that he gave a great deal of thought to architecture is obvious enough from the sketches and the notes included in this volume, though they are very desultory and the sketches in many cases exceedingly slight. The compiler observes:—

"Leonardo's writings on architecture are dispersed among a large number of MSS., and it would be scarcely possible to master their contents without the opportunity of arranging, sorting, and comparing the whole mass of materials, so as to have some comprehensive idea of the whole. The sketches, when isolated and considered by themselves, might appear to be of little value; it is not till we understand their general purport, from comparing them with each other, that we can form any just estimate of their true worth. Leonardo seems to have had a project for writing a complete and separate treatise on architecture, such as his predecessors and contemporaries had composed,—Leon Battista Alberti, Filarete, Francesco di Giorgio, and perhaps also Bramante."

The compiler, however, seems doubtful about this, and certainly there is nothing in most of the notes here printed to suggest any such general and comprehensive scheme. They seem rather the thoughts and jottings of an eager comprehensive mind that could never be without employment and speculation, and was constantly trying to solve some knotty point in art or science as it presented itself to him.

The contents of the work divide themselves naturally into two sections—sketches, and theoretical investigations and memoranda. In both we find plenty of traces of what we venture to think a characteristic of Leonardo's genius and character, viz., a certain eccentricity, a bent towards out-of-the-way solutions and unusual methods, a tendency towards ingenuity rather than really practical invention, which argues a certain want of the true *mens sana*. In these sketches, for instance, the remarks and comments are nearly all written backwards way, from right to left, so as to read right only in a looking-glass. That is Leonardo da Vinci all over. He never could be content to do an ordinary thing in an ordinary way: he was always wanting to outshine others in mere cleverness, even when nothing was to be gained by it. So with some of the constructional ideas, the sketches for which are reproduced. One of the first is a design for a system of navigable canals under the streets of a city, the canals communicating with the basements of the houses, which are flooded with water and vaulted. Another sketch shows a kind of tower loggia built over water, with a fountain in the middle of the upper floor, which is to be kept supplied by a turbine-wheel outside, actuating, by long levers, pump-rods, which are carried down the insides of the columns of the loggia stage. Apparently, the pumps deliver first into a large cistern on the top, over the whole area of the building, and carried only on the rather widely-spaced colonnade of the loggia; an incident which seems to show that Leonardo had very indifferent notions as to the weight of such a mass of water. Some of Leonardo's practical drawings for engines of war and other such things were shown at one of the Winter Exhibitions at Burlington House some years ago, and we commented on them at the time. The practical designs in Baron de Geymüller's book produce the same impression which the Burlington House drawings did; they seem the productions of a very active and inventive, but certainly not a soundly practical mind. They are all very interesting on paper, yet they all leave a doubt whether they would work, or whether they would be of any good use if they did; and in many cases, as in that of the fountain loggia aforesaid, the elaboration of the means is ludicrously disproportionate to the end to be attained. The written memoranda on practical architecture which are here published form a curious mixture of really practical suggestion with often illogical and untenable theory, introduced by his favourite formula "and this can be proved" (*e questo si prova*); the "proof" consisting usually of a simple statement of supposed facts evolved out of his fertile and imaginative brain. The memoranda on the value of the arch are very curious in regard to their generally true conclusions and the empirical way in which these are expressed. "The arch is nothing else than a force originated by two weaknesses [*causata da due debolizze*], for the arch in buildings is composed of two segments of a circle, each of which being very weak in itself tends to fall, but as each opposes this tendency in the other, the two weaknesses combine to form one strength." Elsewhere he puts it differently; if the space to be bridged over be 20 in measurement, and the material of the arch 30, it is obvious that 30 cannot fall through 20. From some memoranda on the pointed arch it is evident that he was alive to the fact of the superior resistance of the pointed arch at the crown, as compared with the round arch. Some of the numerous notes on cracks and fissures in walling are of interest, and are more practical than the other practical

* Leonardo da Vinci as Architect. By Baron Henry de Geymüller, architect.

memoranda. "A wall which does not dry uniformly in an equal time always cracks. A wall, though of equal thickness, will not dry with equal quickness if it is not everywhere in contact with the same medium. Thus, if one side of a wall were in contact with a damp slope, and the other were in contact with the air, then this latter side would remain of the same size as before; that side which dries in the air will shrink or diminish, and the side which is kept damp will not dry." Another remark to be noted is "When the crevice in the wall is wider at the top than at the bottom, it is a manifest sign that the cause of the fissure in the wall is remote from the perpendicular line through the crevice," which in a general way is true enough. Leonardo does seem to have projected an elaborate essay on this subject of cracks, as the notes commence with the mem.,—"First write the treatise on the cause of the giving way of walls, and then separately treat of the remedies." He contradicts himself rather about the method of building walls to ensure stability, in one place stating that "walls must be built up equally, and by degrees, to equal heights all round the building, and the whole thickness at once, whatever kind of walls they may be"; but in the very same chapter he lays down positively that "walls should always be built first and then faced with the stones intended to face them, since the wall settles more than the stone facing,"—a direction which at once carries the mind to that architecture of veneering so prevalent in Renaissance Italy. In another place, in regard to the resistance of beams, he carries us to the subject of building to resist earthquakes, on which we said a few words the other day. After observing that "the part of a beam built into the wall should be steeped in hot pitch and filleted with oak boards [*fasciatia d'asse di quercia*] likewise so steeped," he continues, "Each beam must pass through its walls and be secured beyond the walls with sufficient chaining, because in consequence of earthquakes the beams are often seen to come out of the walls and bring down the walls and floors, whilst if they are chained they will hold the walls strongly together, and the walls will hold the floors."

On the whole, it does not seem that the suggestions of Leonardo on constructional matters will be of more value to modern students than as curiosities of a great man's mind. Where they are at all novel they are mostly rather doubtful; where they are not they serve now only to show how much, with all his wild and ambitious genius, he was alive to and interested in small practical details, as in his direction that "all privies should have ventilation [by shafts] in the thickness of the walls, so as to exhale by the roofs"; and "the privies must be numerous and going one into the other in order that the stench may not penetrate into the dwellings, and all their doors must shut themselves off with counterpoises"; swing doors, in fact, with spring hinges. But the interest is much greater when we come to the artistic side of the architectural notes. Here we are at once struck by the boldness of many of the sketched suggestions, and the genius which shines through these rough and sometimes hardly intelligible pen sketches, which are accurately reproduced in Baron de Geymüller's plates, even down to the tone and the stains on the paper. A considerable number of the plates are occupied with studies for various treatments of the dome and its substructure. They are almost all based on the Greek cross idea, Leonardo evidently regarding the dome as the proper culmination of a wide rather than a long plan, spaced equally on all sides, and nowhere advancing far in front of the base of the dome. He places the dome as the culmination of a square, a circle, an octagon, in various ways; he surrounds it with semi-domes, niches, and minarets, leading up in pyramidal composition to the central cupola. These combinations are not all equally happy; but they nearly all suggest ideas capable of being further worked out. They are in nearly every case accompanied by carefully sketched plans, sometimes by perspective sections. Some of them are rather Oriental in appearance; the combination of the dome with various semi-domes almost inevitably leads to this Eastern feeling. He has one or two sketches for a dome over a Latin cross plan, but this is evidently no more a favourite combination with him than it was with Wren, who would have so much preferred to carry out the Greek cross plan for St. Paul's. One or two points in connexion with these dome studies are worth notice, as of special interest in relation to St. Paul's. One is a section, on larger scale than usual, of a lofty domical lantern of elliptical outline, the larger axis of the ellipse placed vertically, surmounting a dome the upper portion of which only is shown. The space behind the haunches of the dome, from which the inner cupola of the lantern springs, is apparently treated on the cellular system; the voussoirs of the dome are shown carefully joggled together; but the remarkable point is that Da Vinci seems here to have partially anticipated Wren's contrivance of the cone to carry the lantern, for from the lower part of the haunches of his dome springs a straight course of masonry, forming an oblique line from the haunch of the dome to the base of the inner cupola. The cupola lantern, again, is in two masonry domes, one within the other, of slightly differing section (the outer one spreading more widely at the base), and again there is this oblique wall from the haunch of the inner cupola to the drum of the outer cupola, carrying part of the weight of the inner cupola to the outer part of the dome. Another point to which the compiler calls attention is that in some of these dome sketches not only are the domes decorated externally with vertical ribs, but also with horizontal courses or strings one above another. It is true these are in most cases very slightly marked, and the compiler, perhaps, makes a little too much of the point; but it is of some interest at the present moment in reference to the "zone principle" of decorating domes which is being discussed.

Baron de Geymüller considers Da Vinci to have been in considerable architectural relation with Bramante, and to have been influenced by him in the style of those architectural compositions of which he has left sketches, but which, so far as we know, were never carried out. There are certain sketches for bits of arcuated and dome architecture which certainly recall the manner of Bramante as shown in that remarkable collection of drawings and studies for St. Peter's, the publication of which some time ago we owed to Baron de Geymüller, and which we fully noticed at the time. But these are only a small proportion of the dome studies in the volume; and the majority, except in so far as the dome and semi-dome forms were, of course, there ready to Leonardo's hand, appear to us to display the most remarkable originality, and to be little indebted to the suggestions of other men. The working out of some of them in more finished form would be an interesting task, and we might suggest that it would be a very good subject for an architectural students' competition for the Institute, if Baron de Geymüller, or the publishers, or whoever has the copyright of the sketches, should be willing to permit a limited reproduction or copying of some of them for the purpose.

Among the boldest conceptions in the book is one for a monument. On the top of a great artificial conical mound or hill, suggesting a recollection of the Japanese pictures of Fusiyama, is a circular temple with a colonnade and a central cupola. About one-fourth of the descent the slope is interrupted by a terrace cutting a channel round the hill, with a wall and eight doors, two of which give access to the steps up to the temple, the other six to a series of vaults under the surface of the hill, and not visible in the external design except by their doors of entrance in the wall. The plan of the whole is given beneath.

Some designs for domes, by Leonardo, somewhat similar to those in this volume, were given as a kind of appendix page to the work on Bramante to which we before alluded. We commented on them at the time. Baron de Geymüller is doing most useful and interesting work to architectural students of the Renaissance in thus bringing out to the light the architectural memoranda of the giants of the Italian Renaissance. He has apparently special means of information, and plenty of time to devote to the work, and is doing it in a manner which cannot be too cordially recognised. We are glad to learn that he is engaged on a life of Bramante, which will be a desirable supplement to the drawings previously published.

## THE STORAGE OF WATER.

ALTHOUGH it is not often that England suffers from a scarcity of water, such was the case during the past summer in many parts of the country. Instances occurred of water having to be carried long distances for domestic use, and in one case the sum of eighteen shillings per diem was paid for its carriage.

Much might be done in the collection of rain-water to come in usefully at such times of need. In the first place, rain-water is the most useful for household purposes, whether it be for cooking, washing, or bathing, and, when quite clean and pure, it is excellent for drinking. The difficulty is to obtain it clean, for, as the collecting surface is generally the roofs of houses, the water is apt to be tainted with soot, the *débris* of sparrows' nests, dust, and so on. Filtering, however, may do much to remedy the difficulty, as well as such expedients as the rain-water "separator," of which an illustration is given in another column this week.

As the storage of rain-water has been a general practice in the South of France from time immemorial, we propose to give an account of it from our own personal observation, both as regards what may be called the ancient and the modern system of collection. For house use one plan was to collect the roof water and lead it into a tank underneath the house, often made round like an ordinary well, from which it was pumped up as required. This water was beautifully cool and pure, owing to the cleanliness of the house roofs where coal is not used and where fires are comparatively few.

Some months since we went to inspect a large tank that had been made to collect water for irrigation. This tank was about 30 yards by 24 yards and 17 ft. deep. The water coming off a large hill-side was led into it, and the quantity was very great. The tank had cost about 600*l*. The water, coming as it did from the surface of the land, was much discoloured and only useful for irrigation.

We have, however, another property in view where the storage of water, both for domestic use and for irrigation, has been carried out completely, so that an account of the plan there adopted will be the best way of making the matter clear.

Some years ago an English proprietor residing in France built a house on the side of a hill, the geological formation of which was limestone overlying a bed of gypsum and the Red Sandstone. There was a well at the lower part of the property in the gypsum bed, but it was far from the house, and the water was so hard as to render it practically useless for household purposes. It was decided to rely chiefly for water on the rain falling on the roof, and with this object in view a tank was constructed on the hillside some twenty yards behind the house, and a little lower than the level of the roof. Its position was ingeniously fixed so that while it received all the roof water from the house by means of a cast-iron pipe, 4½ in. in diameter, the same pipe delivered the water on the upper floor of the house, whence it was distributed wherever required. After a few years' trial it was found that the roof surface,—some 150 square yards,—was insufficient in a country where rain often ceases to fall for months together, and it was decided to add to it. It may here be mentioned that the house gutters are all covered with galvanised wire netting to keep out dirt as much as possible.

The first point decided was to utilise the surface of the tank itself. This surface, walls

included, being 9 yards by 5½ yards, gave nearly fifty additional square yards. The inside measurement is a little over 23 ft. by 13 ft., and the depth over 6 ft. 6 in. The capacity may be taken at over 12,000 gallons. Experience having shown that still more surface was required, it was provided in the following manner :—The surface of the tank itself was composed of light brick arches on iron joists, covered with rough mortar, which was always coming off in flakes. This, wherever loose, was scraped off, and a coat of the best cement, with a proportion of sand to prevent cracking, was laid on. A fall was made from the four sides to the tank lid, which is about 2 ft. square, and in the centre, slightly above the surface of the tank. Four holes were made in the brickwork below the lid for the water to pass into the tank through galvanised wire netting fixed in the holes to prevent any leaves, &c., from passing. Thus, as before mentioned, an area of 50 square yards was added. It was now proposed to add another area of the same size.

The trees and brushwood having been cleared away from the ground above the tank on the hillside for a distance of about 5 yards by 9 yards, corresponding to the length of the tank, a wall about 3 ft. high was built on the edge, to retain the earth from falling, and for a purpose now to be described. The wall having been completed, a row of tiles projecting about 3 in. beyond its face was bedded in mortar on it, and laid with sufficient slope to enable water to fall clear on to the cemented surface of the tank. A strip of galvanised iron wire netting was laid under the tiles, and turned up in front of them some 4 in. in height, so as to catch any leaves or *débris* of any kind that might fall from time to time. The cleared surface was then covered with sheets of corrugated iron, slightly raised above the ground to prevent injury. These sheets of iron, and the row of tiles provided nearly fifty more square yards surface. Thus the total area gained is equal to nearly 100 square yards. The tank contains between 12,000 and 13,000 gallons ; and as the roof-surface has, at times of heavy rain, more than half filled it, it is presumed that the additional surface now described will quite fill it. For a consumption of 60 gallons per diem, which experience has shown to be the ordinary quantity for a family of five or six persons, there would be sufficient water for 200 days, supposing even that no more rain fell. The figures above given are very nearly correct. Any slight discrepancies will be accounted for by the measurements having been taken in mètres, and the contents in litres, in the first instance.

The supply for the house being provided for, it was thought well to have another tank to supply water for the garden, poultry, &c. This tank is about five yards and a quarter square, and not quite 6 ft. in depth, and holds nearly 10,000 gallons. It is situated about 150 yards from the house, and is supplied from the water running off three roads on the property, sloped to one side, where a paved channel receives the water. There are two small settling-tanks in front of the receiving-tank, notwithstanding which the water is much discoloured owing to the soil being very red in colour. It is, nevertheless, a very useful supply for the purposes for which it is intended, and prevents the house tank being drawn upon for any purpose not strictly household. This tank was exceedingly cheap ; the walls were built of the stone taken out in excavating, and were faced by a brick on edge and a coating of cement. The bottom was lime concrete, with a coating of cement. The whole of the mason work was done by a handy labourer, so there was no skilled labour to pay for. Stone being on the spot, there was no outlay beyond bricks, lime, cement, and labour. No top has yet been added, and the cost has not exceeded 20*l.* The cost of the house-tank has not been reckoned, as it was a necessary appendage to the house in any case, but the work with materials for adding the additional surface of one hundred square yards may be put down at eight pounds, corrugated iron included.

W think we have been able to show that in many cases a good supply of rain-water is easily attainable, and very serviceable. In the instance we quote the comfort of using soft water for bathing and washing is so great that when the supply runs short, and hard water has to be accepted, a general outcry is made. As regards economy, all is in favour of the tanks. The cost of laying a pipe from the water company's main, about 350 yards distant, would have been very considerable, and as, owing to the level, it could not be brought nearer than 100 yards distance from the house, and 60 ft. below it, the difficulty was insuperable.

The question resolves itself very much into the cost of providing tanks ; but on hill-sides, where the collection of rain-water is comparatively easy, and at the same time is most required, stone will in most cases be found in the excavations that will serve for the walls of the tanks.

## ARCHITECTURAL DISCOVERIES AT DELOS.

IN a recent number of the *Builder* it was remarked that "architectural subjects do not at present occupy a very large portion of the attention of the Hellenic Society." The reason, perhaps, is not difficult to understand. The Hellenic Society has been, unhappily, up to the present time too poor to undertake extensive excavations, such as are necessary to lay bare the foundations of ancient buildings and recover the scattered fragments which may lead to conjectural restorations. The members of the Society have, for the most part, been compelled to content themselves with working upon the already existing material in their own and other museums, and the *Journal* has published, in the main, small objects of art, vases, painted sarcophagi, inscribed armour, and the like. But for their architectural studies better days are already dawning, and wider fields opening. Once let the Society establish its archæological school at Athens, and England will no longer be backward in the work in which Germany, France, and America have already reaped such rich harvest.

The main work of the French school at Athens has, as is well known, been carried on at Delos, and certainly the "Bulletin de Correspondance Hellénique," issued regularly by the School, does not err on the side of neglecting architectural topics. By far the longest and most interesting article in the latest number now before us is devoted to the elucidation and reconstruction of the architectural remains of a temple discovered in the sacred enclosure (*temenos*) of Apollo.

This temple, M. Homolle thinks, may, almost without doubt, be identified with one of the most famous monuments of antiquity, *i.e.*, the temple containing the celebrated "altar of the horns" (*keraton*). Of the fame of this temple we have abundant literary evidence. Callimachus tells us the story of the building ; how Apollo, who delighted ever in the founding of cities, built for himself with his own hands an altar, laying the foundations in fair Delos, near to the wheel-shaped lake, and how Artemis brought to him from her hunting the horns of wild beasts, and of them Apollo wove the texture of the altar, and round the altar made walls of the horns to enclose it. Ovid, again, makes his heroine Cydippe tell in her letter to her lover how she landed at Delos, and how, while sacrifice was being offered to Apollo, her careful nurse led her through the temple enclosure and showed her the wonders of the place, and chiefly the great altar made of countless horns.

"Miror et innumeris structam de cornibus aram."

Some even think that it was this ancient altar that Homer knew,—"Yet in Delos once I saw as goodly a thing, a young sapling of a palm-tree springing by *the altar of Apollo*." Martial reckons the altar of horns among the wonders of the world. He counts it with the Pyramids, with Babylon, with the Mausoleum.

"Dissimuletque deum cornibus ara frequens."

Many legends gathered about its construction. Plutarch implies that, made of horns only, and of the horns of the right side of the stag's head only, it yet held together in an almost supernatural manner, without any apparent means of fastening. An anonymous author gives another tradition. The altar was made, he says, of the right-hand horns of victims offered to Apollo in a single day. It is needless to say that an altar of so fragile a construction has perished utterly. What M. Homolle thinks he has discovered is the ruin of the building which enclosed the altar, and, no doubt, shared its fame. He has undoubtedly laid bare the complete foundations of a rectangular building, divided into three distinct portions,—a sanctuary and a pronaos, between them a very long gallery, the floor of which is of a lower level. The building is of the Doric order, the noticeable part of it being this long gallery. If M. Homolle's supposition is correct, its presence would be easily accounted for. He supposes that the altar itself stood in the sanctuary ; huge blocks of stone still remain there which may well have formed its foundations. The gallery, M. Homolle thinks, was built of such unusual length for the convenience of certain ritual observances. A sacred dance of a peculiar nature was performed in front of the altar of the horns. Tradition said it had been instituted by Theseus on his return from Crete in memory of his escape from the Labyrinth. The dance consisted of certain complicated labyrinthine figures, and was known as the crane dance (*geranos*), probably from a supposed analogy to the movements of flocks of cranes in the sky. A bas-relief, which has unfortunately perished, was found at Delos representing a dance of this nature. The architectural arrangements of this gallery are well suited for a dancing-place, — the sunken part in the centre for the performers, the raised dais all round for the judges and spectators. The general arrangement of the temple will be best understood by reference to the plates which accompany M. Homolle's article. He gives a plan of the actual state of the ruins and a proposed restoration ; also a restored elevation of the interior and a restoration of the roof. About the general arrangement of the temple there can be no doubt, as the foundations are, with some very slight exceptions, intact. Besides the architectural remains a considerable number of sculptured fragments have been discovered, and two immense blocks of marble, part sculptured, part architectural, of the utmost importance. Each of these forms on the one side a Doric half-column, on the other the capital of a pilaster, surmounted by *a kneeling bull*. A Doric column surmounted by a kneeling bull is, in Greek architecture, a startling and unique phenomenon. In Oriental architecture it would not surprise, but the Greeks, as a rule, used sculpture only in the non-operative portions of their buildings ; it served for them a decorative, not a tectonic purpose. So startling an exception demands an explanation, and such an explanation is given by M. Homolle's supposition that we have here the ruins of the temple which had contained the marvellous altar of the horns. There seems little doubt that M. Homolle has given back to us all we shall ever know of one of the wonders of the world. The plans and restorations he gives are an anticipation of a larger work undertaken and approaching completion by the architect M. Nénot.

## NOTES.

THE Committee on the treatment of Westminster Hall sat again last Tuesday, when the examination of Mr. Charles Barry was continued. He produced a plan showing the buildings to front St. Margaret's-lane, as designed by Sir Charles Barry, but carried a little further in towards the Hall, so as to allow of a greater width of roadway. This left a court between the proposed new buildings and Westminster Hall of about 60 ft. width at the northern, and 40 ft. width at the southern end, which seems rather too narrow. An alteration in the plan might remedy this. The building

Sir Charles Barry had proposed was of very much the same character architecturally as the present House of Lords building. Mr. Barry expressed a strong opinion as to the insufficiency of the proposed committee-rooms between the buttresses. Mr. J. J. Stevenson was the next witness examined, and gave expression to his well-known views against every sort of restoration, saying that even if Mr. Pearson had authority for every detail, he would oppose the carrying out of the project. The Chairman had the bad taste to ask this witness "whether he had written the article in the *Builder*" (referring to our leader of last week). The incident is amusing, as showing how much at sea the authorities are on these points, as we have always opposed Mr. Stevenson's extreme views, and part of his evidence was in direct opposition to our article; but we think most people will agree with us that it was hardly a fair question to put to a witness.

THE subject has elicited four letters in the *Times* since our last issue, from Mr. Pearson, Mr. Butterfield, Precentor Venables, and Mr. E. W. Godwin. Mr. Pearson's letter is, of course, a defence of his own views, in which he bestows far more attention than was necessary on a foolish letter of Mr. Loftie's some days previously, in which that self-constituted authority asserted that the original architects had "carefully avoided" allowing the roof of Westminster Hall to be seen, which is, of course, simply nonsense. All we complain of in Mr. Pearson's letter is his defence of his committee-rooms, as "large and well-proportioned," which they most assuredly will not be, and his assertion that the adoption of his scheme will be no impediment to the completion of Sir C. Barry's plan. It certainly would be; his north-west building comes right in the way. Mr. Butterfield writes a thorough architect's letter. He says, the roof at present is overpowering, the windows below it mean, the west side sunk in a hole. He would lift the roof and lengthen the windows upwards. He confirms the view that the west side of the Hall has never before been seen as it is seen now. It "must be made presentable," but the particular question of Mr. Pearson's proposals he avoids. We do not think his proposition of raising the roof will be carried out. We quite agree with him that new buildings should not be put up for the mere sake of concealing Westminster Hall. The connexion between the two subjects is only indirect. The Office of Works and Mr. Pearson say "new committee-rooms are wanted, —here they are." We say, those are not enough and are bad in themselves; if you are going to increase accommodation to the extent to which it is really wanted, do it in the proper and only efficient manner, by completing the design of Sir Charles Barry. Precentor Venables's criticism is purely negative, and he, with others, falls into the mistake of confounding the *porte cochère* under the cloister with the horse stand under the grand committee-room. Mr. E. W. Godwin is shocked at Mr. Butterfield's suggestions.

APART from the political effects, to which it is not our province to refer, of the new electoral division of the country, it may be regarded as a step towards what may be called the urbanising of England. The rapidly increasing pressure of population on area must,—if continued long enough,—in time convert a populous island into a group of towns. But the rate of agglomeration varies very much. Towns with fewer than 10,000 inhabitants, as a rule, are now hardly increasing in population. Some of them are actually decreasing, as are some rural districts. As a general rule, the outer ring of the metropolis, and the towns of between 100,000 and 200,000 inhabitants, are most rapidly increasing. Most marked of all is the increase of certain seaports and water-side towns. In twenty-five towns classed as seaports, the increase of houses from 1871 to 1881 was 16·6 per cent. In Great Grimsby it was 71 per cent., and in Barrow-in-Furness 148 per cent in the decade. This determination of the population towards certain centres of activity is a matter of primary importance as regards the building industry of the country, with a general increment which would double the population enumerated in 1881 by the year 1936. The actual rate of urban increase in the number of inhabited houses was 15·6 per cent. in ten years against a rural increase of 11·0 per cent., and in the sixteen towns with populations between 100,000 and 200,000 each, which contain in all 408,000 houses, the increase in the decade has been on the average 21·5 per cent. The town builders are thus those whose activity is most apparent.

THE proceedings of the Boundary Commission, which held its first sitting on December 2nd, will be watched with no little interest by all persons concerned in domestic architecture. The principles laid down for the guidance of the Commission include the maintenance, as far as possible, of existing boundaries; those of parishes being in no case intersected. With this provision, the object of the Commission is to divide the country, as far as practicable, into districts of equal population, —the unit proposed being 54,200 inhabitants per division. It is possible that the influence of this change, as far as it goes, will tend to the multiplication of houses in rural, rather than in urban districts. At all events, the stimulus to urban building which is afforded by the desire to obtain a borough vote, will be weakened. More important, perhaps, than this will be the influence of the new districting of the country in the way of promoting self-government in matters connected with building. At the present time there are instances where the distance of a few yards,—as bringing a site within or without a borough,—makes all the difference as to whether a proprietor can build as he chooses, or whether he is subject to the control,—possibly vexatious, —of some urban authority. These differences will now tend to disappear, and that, we think, to the benefit of domestic architecture.

MR. FERGUSSON writes an article in the current number of the *Nineteenth Century* on the "New Cathedral for Liverpool," dealing with other matters also, but, as far as the Cathedral is concerned, advocating the adoption of a Classic type, and recommending a plan which he had drawn out years ago, as a kind of typical plan for a modern Renaissance church, before any talk had been made about a Cathedral for Liverpool. He places a shallow cupola on a crossing which is nearly a square, the angles only being slightly cut off, and which provides a larger arch on the cardinal sides, in relation to the diameter of the cupola, than in St. Paul's; and he proposes two western towers, somewhat on the type of Wren's Bow steeple, in place of a lofty dome at the crossing. We have a letter also which appeared in one of the Liverpool papers, expressing an earnest hope that "the committee will decide on having a cathedral designed on primitive lines, rather than a mere reproduction of a Mediæval church." We have already urged the same course, both in regard to the architectural surroundings of the site, and the religious feeling and spirit of the present day, which a Mediæval cathedral does not represent. Two things in Mr. Fergusson's article puzzle us; first, why he should depreciate, as he does, Wren's earlier design for St. Paul's (that of the model) which Wren preferred, and which we certainly think a finer design than the executed one; secondly, why he should go out of his way to bring in the west front of St. Alban's, and why he should appear so completely unconscious of its exceedingly bad detail. In spirit, we agree, it is the sort of thing that modern architecture should do; in detail it is, in many respects, coarse and vulgar in the extreme, and, bad as it is, there is no proof that the person who claims the credit of it can "design," or ever has "designed," anything at all, or done anything else but pay the money and boast of his achievements. If Mr. Fergusson can appreciate the excellent Gothic detail of the Law Courts,—which, nevertheless, we agree with him in thinking a failure as a whole,—surely he might have been expected equally to appreciate the exceedingly bad Gothic detail of the St. Alban's front.

IN the annual address at the Royal Society on Monday last, Mr. John Evans, who presided in the absence of Professor Huxley (who has gone abroad for his health), touched on the subject of metric weights and measures, recognising the value of the metric system scientifically, but intimating that the superior practical usefulness of the duodecimal system for everyday use was still a matter for argument. On the vexed question of a prime meridian, he suggested that France might meet the case by selecting some place on the same meridian as Greenwich—such as Argentan—as her nominal starting-point. The French objection to accept Greenwich, merely because it is an English town, is one of the most foolish pieces of national *amour-propre* on record. The chairman also referred to the proposal, at the Geodetic Congress at Rome last year, for a universal solar day of twenty-four hours, but expressed no opinion. The idea will furnish *Punch* with a few jokes for a time, and will probably in the end be quietly adopted.

WE learn from the *Gazette des Architectes* that the "Société des Amis des Monuments Parisiens" has resolved to demand from the Government a law visiting with decisive punishment the injury to, or "dégradation" of, works of art,—a kind of law which, we venture to think, they will find it more easy to talk about than to formulate in any practical manner. A committee of the Society has collected the remains of the former sculpture of the Pantheon and Ste. Geneviève, and another committee has been named to carry out a classification of works of art,—a very useful piece of work, which, we should say also would be a necessary preliminary to the talked-of legislation. The Society has recognised the necessity of asking the authorities for a sum of 50,000 fr. to prevent the destruction of the Porte St. Denis. Altogether, the society (of which M. Chas. Normand, 215, Boulevard St. Germain, is the hon. secretary) seems to be commencing its career in an energetic manner. We only hope it will not—like our analogous society—lose its head, and run into extremes.

THE Cambridge University Town and County Fine Art Association held its opening meeting on Saturday evening last, in the new Studios, St. Andrew's-street, Cambridge. Dr. Waldstein afterwards presided at a meeting in the adjacent Theatre Royal, at which Mr. Seymour Haden and Mr. Sparkes were present and made some remarks. We quite concur with the latter gentleman in his three great principles in the study of art, viz., to draw, and to draw, and to draw. It is a pity Mr. Seymour Haden should have committed himself to the statement that it was "a notorious fact in the profession that surgeons who could draw were the best operators." Some of the greatest surgeons of the day cannot draw a stroke, and no good purpose is served by making *ad captandum* statements of that kind.

A CORRESPONDENT writes:—"The care which is sometimes taken to recover facts about the dead who have died long ago is out of proportion to that which we take to preserve a record of the lately dead. On the 19th of last October there passed away, after some months of great suffering, an architect whose talents would have entitled him to a far more prominent place in his profession if he had thought the prize worthy of the struggle which must nowadays precede success, and who excited the most sincere respect in all who had dealings with him. Mr. Major Rhode Hawkins was the son of Mr. Edward Hawkins, sometime Keeper of Antiquities at the British Museum, and a prominent figure in literary and artistic circles of his day, and was born in 1821. He was educated at the Charterhouse, and passed thence first to the great building establishment of Mr. Cubitt, where he grounded himself in practical knowledge, and afterwards to the office of Mr. Blore. He then accom-

panied Sir Charles Fellowes to the East, and, returning to England, commenced the practice of his profession as an architect. Amongst his works the Royal Patriotic Asylum at Wandsworth Common, the Church of St. Michael and All Angels in Praed-street, a church at Exeter, St. James's Church, Vicarage, and Schools at Birtswith, Yorkshire, and numerous smaller churches, schools, and parsonage-houses attest his constructive skill and artistic taste. For thirty-one years he was the professional adviser of the Committee of Council on Education. He was an assiduous collector of beautiful things, and the Surrey home in which he died was a very storehouse of examples of precious art selected with rare knowledge and discrimination. The writer knew him well, and only records the general sentiment in saying that he was both a skilful artist and a thorough English gentleman."

ONE of the most dangerous places in London is the junction of Northumberland Avenue with the Thames Embankment. During the daytime it is bad enough when cabs and carts fly over the wide crossing in all directions. We ourselves have seen one horse killed in a collision on this spot. But after dark the danger to foot-passengers and vehicles is further increased. All this arises from the want of a proper "refuge" in the centre of the roadway. This would not only be a place of safety for foot-passengers, but would regulate the vehicular traffic, and the Board of Works should place such a refuge in this thoroughfare without delay.

IT appears that a few days since there arrived, by the P. & O. steamer *Brindisi*, the first detachment of native Japanese who are to colonise a Japanese native village, to be opened shortly at Albert Gate. The affair seems to us to be a foolish one. Show villages got up in that way rarely show the real life or manners of a people, and the only effect will be probably to get up another little and local Japanese craze, just as the big one is dying out, and most people are beginning to come a little more to their senses on the subject. The Japanese, it appears, are now doing all they can to imitate English customs and dress, while people here will probably get the mania for imitating things Japanese,—a foolish paradox on both sides.

A LETTER in the *Times* of Thursday, signed "X.," in relation to the decoration of the cupola of St. Paul's, takes the line that all the propositions made have been deemed undesirable, and that it will be "no matter for surprise if the Committee should, for a solution of their difficulties, and a satisfactory discharge of the semi-public duties confided to them, turn to the original plan of coffering the cupola of St. Paul's in accordance with the recorded mature experience of the architect of St. Paul's Cathedral." Concerning which we need only remark that, in the first place, to obliterate Thornhill's work, which has a certain artistic value, for the purpose of replacing coffers, which are a mere semi-mechanical expedient for breaking up a surface, would be a retrograde step little short of contemptible; secondly, that "the trace of Wren's pristine ideas now to be seen in the coffering above Thornhill's gloomy paintings" is a delusion, inasmuch as these cofferings are not real, but only painted imitations.

THE collection of Venetian drawings by F. N. Roussoff, now on view at the rooms of the Fine Art Society, should by no means be missed. Though M. Roussoff shows himself a good figure-painter, the majority of the paintings are mainly architectural in their subject and interest; and they exhibit a union of breadth and force of style with architectural truthfulness, such as is not often met with.

MR. WATTS'S grand but rather inexplicable painting, "Time, Death, and Judgment," has been reproduced in mosaic on the outside of the tower of St. Jude's Church, Whitechapel, forming an important incident in Mr. Barnett's admirable efforts to bring art home to the East-end population. We should have thought a painting more simple in its idea would have been better suited to the occasion; and, for mosaic to be effective, it should have been further from the eye. With tesseræ of the usual size it is impossible to model a face properly to be seen at only a few feet from the eye. The work was unveiled on Saturday last, when Mr. Matthew Arnold gave a very beautiful address in relation to it in the adjoining schoolroom.

## THE COUNTRY BUILDER.

HE lives on the verge of a breezy common, bright with golden gorse. A shallow river of clear water courses swiftly by over its gravelly bed, and is seen in flashes of light between the trees whose drooping boughs frame the squat church-tower, and half obscure the sacred structure with their lace-like veil of now almost leafless branches. His house stands a little back from the skirting road, and the intervening "waste" is littered with the fantastic trunks of fallen elms,—monarchs of the forest and hedge-row. Originally a simple weather-boarded cottage, his dwelling has expanded with the increasing family and fortune of its owner, and now forms a long irregular line of straggling structures, partly in wood, partly in ruddy brickwork, and partly in the bravery of freestone, "credits" from a neighbouring mansion, which he remodelled some years ago. The office, stable, and workshops continue the series, the latter gay with dabs and smears of bright colour with which the painters have experimentally adorned their sides, and which have a value in the general effect never contemplated by those artists. The yard is a medley of stone, brick, drain-pipes, tiles, crestings, and old lead. In the midst stands a sun-dial on a stone baluster-pedestal,—a perpetual reminder of the fleeting character of man and his works. The yard dies away imperceptibly into the orchard beyond where the saw-pits are, and where the children have established their swings and see-saws, partly for the comparative quiet and security of so remote a portion of the establishment, and for other reasons. There are apples on the trees, and blackberries in the enclosing hedges, and the railway runs along the further corner, and affords the youngsters opportunities for that shouting and waving of kerchiefs in which all country children delight. The office is a tight little apartment, 7 ft. by 6 ft., and by some artful adjustment and much mutual forbearance, it accommodates the jolly builder and his slim clerk. It has the smallest fireplace in the world, and one of the most primitive construction. The furniture is necessarily sparse, and intentionally far from sumptuous. A couple of wooden stools, home-made, very high, and uncompromisingly hard. Two deal desks, also home-made; a penny bottle of blue ink, and one ditto of red; some scraps of dusty blotting-paper, quite obsolete; memorandum-books and ledgers, some showy trade-cards, and a perfect forest of plethoric "files." Everything which is not bundled unceremoniously into the desk is impaled upon a "file," and hooked up to a nail in the rafters, whence the files depend like some new form of stalactite. The worthy builder is a manly man, of noble presence and proportions, so noble, indeed, that he has to sidle through his office-door to greet you. He was selected to serve on a local committee, on the ground that he complied expressly with the qualification, "a substantial householder." He probably weighs some seventeen stone, when "disarrayed as to his rest." What he may weigh as he stands is not to be conjectured. As he steps into that light spring-cart his horse steadies himself resolutely, spreading out his fore-legs as buttresses against the thrust of the deflecting shafts, and shows a sensible relief when the seat is safely reached and the general balance restored. Our friend's great coats are voluminous, vast, and weather-defying. One favourite garment would, he boasts, turn a week's rain. The pocket-books which he stows away in the recesses of his costume are big and bulky beyond all belief. It costs him a struggle to fish them up from their hiding-places deep down in his capacious pockets, and when caught and landed, with much accelerated breathing and redness of face, the wrong one generally comes first. His honest, wholesome face is brimming over with good health and good spirits. Nature has carefully passed over it a flat tint of her choicest "ruddle," and the rich colour is preserved by draughts of home-brewed and daily drives in the brisk country air. His jovial countenance is set in a stiff frill of bristly brown hair. He shaves a square inch or so in the immediate region of his mouth, and lets the rest take its course. He has a pair of piercing brown eyes, full of bright intelligence, and not without a suspicion of a latent humour. At the penny readings over which the vicar presides, he will recite pieces of a sentimental and even savage cast, but on club nights, or the annual bean-feast, no one can sing a rollicking country song better than he. His humorous anecdotes would be effective but for their extreme antiquity. After some years they are received with impatience by his hearers, but they never fail to throw the good man himself into fits of laughter. He is a man of property, owning casual patches of land here and there,—to which he is continually adding,—and not a few of the cottages in his neighbourhood, building them in slack times rather than discharge his old hands. His men have an unbounded admiration for him,—a chance remark on his great depth of chest elicited the startling rejoinder that "It is not only in the *chest* as master's deep. He's pretty deep every way, sir, he is!" And by depth the speaker meant not cunning, and not guile, but wisdom. If a man cannot be a hero to his valet it is certain that he can be one to his foreman of bricklayers, which is just as good or better. During working hours and about his work he is reserved and even stern, as becomes a man of his occupation. His children meeting him in the yard fly before him like the fowls, and even the partner of his joys ventures upon no familiarities in business hours, but devotes herself silently to the house affairs. He is known in every town and village for twenty miles round, and respected wherever he is known. It has been his interest to cultivate the acquaintance of the agents, stewards, butlers, and housekeepers of all the great houses within his radius, and he has contrived to conciliate them all. The county gentry meeting him driving through the green lanes of Dampshire tilt the ends of their whips, and nod in passing. The slowness and deliberation with which he will, when on his rounds, conduct a conversation about nothing with the innkeeper or the blacksmith must be witnessed to be believed. If you want to know where the best ale is to be had in Dampshire and the neighbouring counties you may consult a less trustworthy authority than he. Needless to say that he is the soul of hospitality, and in more than one sense a cheerful giver. Once upon a time, calling by arrangement at his house we found him not,—haled thence by a summons he could not deny. A note awaited us, full of confused but sincere apologies for his enforced temporary absence. We were shown into the "parlour," where this embarrassing array of good things had been extemporised for our behoof, viz., about 2 lb. of biscuits; one bottle of port, freshly decanted; one ditto of sherry, ditto; one jug of foaming ale (strong, no doubt, and old); one bottle of whiskey; a plate of apples; one of oranges; one of nuts; a box of figs; a box of cigars,—quite new; one ditto of cigarettes,—ditto; a half-pound packet of tobacco (some used), and, prettily tipped with sealing-wax, a long, long pipe of the virgin clay. With trifles such as these, he thought, good soul! that one might beguile a brief half-hour. Nor was there the least suspicion of satire in this amazing preparation for the casual refection of a poor dyspeptic Cockney. The alternatives were offered with the instincts of a true gentleman, and we have never ceased to reproach ourselves for our want of breeding in leaving the whole untouched.

The good man is not without his weaknesses, but they are neither discreditable nor mean. He prides himself upon an accurate and minute acquaintance with London and its ways. He has been at much pains to inform himself of the geography of the less known portions of the great city, and the recondite character of his knowledge of out-of-the-way localities gives him a great importance in the eyes of the local butchers and grocers who confine their travels to Oxford-street, the Strand, or Cheapside, never in their annual visits deviating further than the Agricultural Hall on the one side or Kennington Oval on the other. These he looks upon as "home-keeping youths," and receives their

attempts to interest him in London and its doings with a supercilious smile which means that he should like them to tell *him* anything on that subject which he is not already "up to."

Another of his weaknesses is connected with his business. He has retained a special liking for the descent of wells, and will in this department admit no rival, looking upon young aspirants (wanted, a word of equivalent force with a minus sign) as upstarts (or ? downstarts) and nincompoops. He knows the depth, capacity, and idiosyncrasies of every well for twenty miles round, and many are the strange stories he can tell of the perils of those who go down into the earth in buckets and do business in deep waters. It is a fearful thing to watch him descend, candle in hat, down, down, down, until the light dwindles to a scarcely distinguishable spark, and the wearer is lost in gloom. A discreet helper accompanies him in all these expeditions who may be depended on to understand and obey the signals of his master. They go about their work silently, with set faces, as though they were engaged in some wicked trade, with consciences burdened by the accumulation of untold crimes. But there is a fascination to both of them in the risks run, and they court rather than shrink from fresh opportunities for their solitary enjoyment. Strange things are brought up in these excursions, — things which we cannot here describe. Not truth only,—or not only in the accepted sense,—lies hidden in wells, and when next the *Daily Telegraph* young man is in want of a basis of truth for his imaginative flights he cannot do better than spend an hour with our friend and "draw" him on the subject of wells.

Adieu, honest friend! We have known and loved thee from our youth up! "Such men as thou art England's pride," and long may your race be spared before it makes way for the inevitable mercantile gentleman with his machinery and "improvements" and new-fangled ways. We had rather explore thy rugged and picturesque "yard" than the most scientifically-arranged "contractor's" establishment, and the peace and quiet of your uneventful home-life has for some of us more attractiveness than all the joys that South Kensington itself can offer.

## THE APHRODITE OF CNIDUS.

The attempt to reconstruct in imagination the masterpieces of Greek antiquity from the dim distorted shadows preserved for us in Græco-Roman copies is heartbreaking work, and yet, however certain and painful the failure, so potent is the fascination that we cannot withdraw our hand. Praxiteles made a statue of Aphrodite which the goddess came over the waves from Paphos to see, and, seeing, approved, —a statue which the Cnidians themselves refused to sell for the payment of their city's debts. The marble image perished, but the memory of the statue of the goddess in her matchless, unveiled beauty has haunted men's minds, and goaded them to hunt through the museums of Europe for some echo, however faint, in statue, coin, or gem, of this masterpiece of Praxiteles. What they have found is briefly this: five statues, three belonging to the Vatican, one in the collection at Lowther Castle, one in the Glyptothek at Munich, all of them reproducing the same motive, Aphrodite standing near a water-jar, on which she lets fall from her left hand the drapery she has just cast off. She is about to enter or leave the bath, or possibly, as some have poetically suggested, the sea from which she rose. Add to these five statues three coins struck at Cnidos under Caracalla, the design of which is indubitably copied, however roughly, from the famous statue. Of the five statues the two best known, and on the whole, we think, the nearest to the original, are the Munich statue and the Vatican replica distinguished as Museo Pio Clementino, No. 574. We are glad that casts of these two have been chosen to represent the goddess in the new Cast Museum of the South Kensington Museum, not because we consider that the two statues are by any means of equal merit, but because their juxtaposition as replicas of the same original suggests certain reflections. We hold that the Vatican Aphrodite (in the catalogue No. 115) is far the finer of the two, and that the Munich copy represents a downward step in the degradation,—only too speedy,—of the Praxiteles Aphrodite type. Briefly for these reasons. First, the Vatican Aphrodite is distinctly *letting fall* her drapery; it is just about to escape from her hand, the folds of the stuff all witness to the downward motion; there is no dragging, upward tension. This is further witnessed to by the distance between the figure of the goddess and the water-jar; she has evidently not advanced to pick up her robe, but turned away, and is dropping it negligently as she goes. All the intention of her posture is away, not towards, the drapery. Now, in the Munich copy, No. 116, the goddess is close up to the water-jar, and we should incline to say she was, or, at least, might be, *catching up* her drapery. One sees at once what a gulf there is between the two thoughts. In the one, Aphrodite is a goddess, who in her fearless innocence casts aside her robe and simply and unconsciously unveils her peerless beauty; in the other, she is a timid Susannah catching up a garment to screen herself from the eyes of peering Elders. The authorities of the South Kensington Museum are to be congratulated for their good fortune in possessing a cast of the Vatican statue in its original simplicity, no longer disfigured and degraded by the stucco drapery imposed by the mock modesty of a prudish Pope. A second point of superiority we claim for the Vatican goddess: she is looking *down* quite simply and unconcernedly in entire unconsciousness; the Munich Aphrodite is looking *about* her, as if on the alert for a possible spectator. Of course, in deciding the question which statue is nearest to the original of Praxiteles, we naturally claim the higher conception as his,—a copyist frequently degrades, rarely, if ever, improves. We naturally, also, refer to the Cnidos coin. We find the distance between the goddess and the hydria accords with the Vatican statue. Of the direction of the eyes we can scarcely judge, as the face is turned profile-wise, after the usual custom of of coin art.

We think, then, that in the Vatican statue we have the highest nude Aphrodite ideal, and that nearest to Praxiteles. We cannot enter here into the question whether by thus representing the goddess entirely undraped, Praxiteles degraded the conception of the goddess altogether, and showed himself a near precursor of the downfall of art. Our own conviction is, that he did. There is about beauty undraped a certain sense as of a thing overdone,—a charm overstated, a last word said which vexes even sensuous enjoyment if it be refined,—we long for a little reserve, a little holding of the hand. M. François Lenormant makes the ingenious suggestion that the worship of the nude Aphrodite came in with the worship of the nude Anaitis, which was revived under Persian rule by a decree issued about the time of Praxiteles. We would gladly find any excuse for what seems slight reverence to an awful goddess. Be that as it may, we may safely welcome the Vatican Aphrodite and even the Munich goddess; for, though conscious, she is still delicate and refined. Surely these examples of the type might have sufficed. In a museum where space is very precious, and where, if our object were general criticism, we could note some glaring omissions, why is place to be found for a statue so utterly vulgar as the Venus de Medici? Winckelmann, who desired so earnestly to see the day that we see, and did not see it, has called this statue "a rose which bursts at sunrise after a beautiful dawn," but had he ever been allowed to see for one moment any fragment of the Pheidian age, how swiftly would he have unsaid his words. It is too much that a nation that possesses the maidens of the Parthenon frieze should be taught, in the words of the South Kensington catalogue, that this self-conscious, prudish, suggestive statue is "the embodiment of the highest ideal of a lovely woman in the early springtide of her beauty, arrayed in all the external attractions which can charm the senses and fascinate the heart . . . . it appeals at once to the senses and the hearts of all." If this Venus were considered too prominent an example among the known works of antiquity to be omitted, at least she need not have been thus disproportionately and unsuitably extolled.

**Building in Toronto.**—The Canadian correspondent of the *Liverpool Journal of Commerce* says that Toronto in building operations is getting ahead. Last year the total value of buildings erected was about 1,500,000 dols., but this year the amount is over 2,000,000 dols., exclusive of St. Mark's and St. Matthew's wards, annexed this year.

## THE SOCIETY OF PAINTERS IN WATER COLOURS.

For once we do not feel quite inclined to join in the enthusiastic verdict which this exhibition usually tempts people into, that this is one of the best exhibitions they have ever had. It is not so good as some; it is a little quiet. Mr. Hunt exhibits nothing,—a great gap in itself. The loss of Mrs. Angell's exquisite work seems more felt every time the exhibition comes round. Mr. Tadema is not represented, and Mrs. Allingham is not at her best. We cannot get over these facts; but there is a great deal to be seen.

In the absence of Mr. Hunt, there is no doubt that Mr. A. Goodwin takes the highest place as an original water-colour artist; one who has risen above manner and escaped from the clogs of paintiness. "The River at Rest, Stratford-on-Avon" (90), is an exquisite piece of landscape steeped in warm, misty sunlight, and looking rather like a vision than a material work of the brush. Other works by the same artist show the variety of his powers; also, perhaps, a tendency to idealise nature a little too much, in scenes which do not profess to be those of faërie-land. Mr. North is another idealiser, but with only one way of doing it, though that is a very beautiful way; still, the first question one asks before his "English Water-mill" (30) is, Can that be called "English" in any sense? Among landscapes of the more sober and real type, yet broad in handling, those of Mr. T. J. Watson stand out pre-eminent, especially "An Autumn Landscape, Surrey" (270). A very fine work of a more idealised class is Mr. Tom Lloyd's "Through the Barley Field" (220), an evening landscape finished down to the most delicate demi-tint effect, with two small children coming between the barley in the middle of the foreground. This is a very taking picture, but produces on one rather the same feeling as over-papered and polished up carving; in seeking after high finish and delicacy, force has been lost. There is plenty of the latter quality in Mr. Lockhart's "Auld Kirk of St. Monance" (51), where the old building is a solid heavy brown mass against the very distant and aërial sky; the broad manner in this and other works by the same artist, which leaves washes nearly untouched in texture and trusts to truth of tone for definition, is noticeable. Mr. H. M. Marshall continues his admirable views of London streets and localities; a very good one of Whitehall is seen in the present exhibition, besides a number of other drawings, among which "The Fish Pier, North Shields" (27), is, perhaps, the best. Mr. Thorne Waite sends a considerable number of small studies, he being one of the few who keep to the original idea of the Winter Exhibition as a "sketch and study" exhibition. The Princess Louise sends a very good drawing of the "Schloss Heidelberg" (97), a well-known Turner subject taken from the same point of view as Turner's drawing, and also a pencil sketch portrait of the Princess Victoria of Wales (142). Mr. Wilmot Pilsbury's works present the same admirable qualities and the same limitations which we have before noticed. Among other good landscapes are those by Mr. Brierley, Mr. Eyre Walker, Mr. Naftel (especially 251); some architectural sketches in Rome by Mr. H. P. Riviere, and a subject by Mr. G. H. Andrews, "The Temples of Selinuntum, Sicily" (258), exhibiting chiefly the huge drums of fluted columns lying about on the ground, which is of some interest to architects, and is a good work in itself. Mr. Wallis's "The Bishop's Tomb" (31) is another good architectural bit. Miss Mary Forster, the new Associate, has some beautiful drawings in true water-colour style, especially "Pembroke Castle" (286).

Among the figure subjects, the most pathetic is Mr. A. H. Marsh's "When Work is O'er" (57), which has a little of the inspiration of Mason in it, and, like Mason, shows us rather idealised rustics; but it is a fine thing, good to look at. Equally good in the most opposite way is Mr. Arthur Hopkins's "The Result of the Races" (209), a crowd of betting men, grooms, and other varieties of horsey persons listening to the announcement by a coarse and forbidding person under a portico. There is character in every figure. Mrs. Allingham's best is the "Apple-tree Seat" (118). Two figures by Mr. J. D. Watson, "The Sliding Panel" (127), where a bravo, with sword drawn, is entering, and "Ash Wednesday" (168), a figure bowed over a chair in grief, are both exceedingly ex-

pressive in their way. Sir John Gilbert's "A Retreat" (172) is spirited, but like many other things he has done. Mr. Parker sends a pretty figure under the title "Scraps" (197); Mr. Poynter, some studies of heads (305, 310); Mr. Marks, two figures, entitled "An Argument" (324), oddly divided in the mounting, though they belong to the same subject; Mr. Walter Duncan, a couple of studies of foliage; and M. Du Maurier, two coloured drawings, which make us wish he would restrict himself to Black and White.

## THE INSTITUTE OF PAINTERS IN OIL-COLOURS.

THIS exhibition, which is "like Cerberus, two gentlemen at once," for it is the "Institute of Water-Colour Painters" in summer and the "Institute of Oil Painters" in winter, opened as usual on the same day as the Society of Painters in Water-Colours, Monday last to wit. There are some pictures of great merit, with a fairly good average, but including a good many works of very little interest. The wall space is too large, in proportion to the objects and scope of the exhibition, to leave any chance of filling it worthily.

As in the case of the Society, some strong names are wanting or little represented. Mr. Abbey contributes nothing; Mr. Collier only two small drawings looking a good deal like replicas of former ones; Mr. Linton only a single figure, "The Knight" (352). Among the more important works, perhaps the very finest is Mr. Arthur Severn's sea-coast scene, "A Gleam of Sunshine after Rain" (145). Heavy clouds float over the sea, just rendered lurid rather than bright by a touch of red light from a low sun; the sea, with its wave faces all turned away from the light, still retains the cold brown gleam of sea under a rainy sky. The attempt is bold, but successful, and the painting is full of poetic feeling. After this perhaps the works which are likely to attract most notice are Mr. H. J. Stock's imaginative or allegorical subjects, "He giveth His Beloved Sleep" (46) and "Two Lovers meeting after Death" (139). In the former a nude angel, not specially suggesting the idea of sleep, but fine in attitude, kneels beside a sleeping figure; in the latter two figures rush to embrace each other in a landscape which is purposely kept rather vague in its incidents. The colour of the first-named work is fine. In the two lovers the expression of the female, who has evidently been the first to enter into everlasting life, is very beautiful; she floats in the air and stretches out her arms with a calm and tender welcome; the other figure, still treading the ground, rushes towards her in rapture. Both works belong to that type of painted allegory which is dangerous ground, and in which some may perceive a certain ludicrous element; yet, with all the prosaic materialism around us in the painting of the day, we cannot but sympathise with an artist who aims at least at speaking to the heart and to the imagination. To aim high is to strike high; and Mr. Stock may end in accomplishing higher things yet. Mr. John Parker sends a life-size head of a young woman, entitled "Study" (12), which is painted with much power. Among figure groups Mr. Joseph Clark's "An Appreciative Audience" (504) is in his best way as a study of "cottage life," and has the merit (not uncommon in his work, though) of being singularly well composed without obtruding "composition" on the spectator. Mr. Seymour Lucas has a large work under the title "Eloped" (517), not quite in his best vein, but among the leading pictures of the collection. To say truth, we have not, after all, been able to note much that gave one the higher kind of satisfaction that painting at its best affords. Among things that have a certain point and speciality we noted "A Woman of the Fields" (22), by Mr. G. Clausen; "Amateurs" (71), an "impressionist" work by Mr. E. Stott; "Salome" (84), by Mr. Melton Fisher; "St. Kilda" (222), by Mr. MacWhirter; "Portrait of A. J. Lloyd, Esq." (447), by Mr. Shannon; "Anticipation" (460), a capital study of cats and "still life," by Mr. G. E. Waller; "Afternoon, Early October" (465), by Mr. Mark Fisher (only, begging Mr. Fisher's pardon, his tone for "early October" is precisely the same as in the works he calls "Early Spring"); "Here lies Captain Nicholas Comfrey, Master Mariner, Rotherhithe, 1678" (525), a study of a delightful old tombstone with scrolls at the angles, by Mr. F. Murray; "Study of a Lion's Head" (641), by Mr. Heywood Hardy; "Sea Urchins" (669), by Mr. Wetherbee; and "De Gustibus" (698), by Mr. Dendy Sadler, a capital painting both in execution and character. In the interests of architecture we may note that Mr. P. Morris sends "A Wedding at St. George's" (766), in which the columns of the portico are only five-and-a-half diameters high. Odd that the eye sees only what it is trained to see. To an architect the column looks ridiculous at once, and yet here is a painter who has probably made a study from it on the spot, who deliberately paints it all out of proportion. He would never make a human figure so out of proportion, and a column is ever so much easier to draw; but he has not been in the habit of noticing its proportions. So we are made.

## THE INTERNAL ARCHITECTURAL TREATMENT OF CUPOLAS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the third ordinary meeting of the Institute, on Monday last, Mr. Ewan Christian, president, in the chair, the discussion on Mr. Stannus's paper on "The Internal Architectural Treatment of Cupolas"* was resumed.

Letters were read from Mr. Edmund Woodthorpe and Mr. J. G. Crace regretting their inability to be present. The latter thought that the decoration of St. Paul's should be strictly in accordance with its simple dignity, and any exuberance of subjects would be out of place. He agreed with Mr. Armitage that there should be a grand design, clearly defined, and almost flat, with slight shadows.

Mr. George Aitchison, A.R.A., said it was hardly necessary to repeat the thanks which had been already given to Mr. Stannus for his exhaustive treatise, which was one of the most valuable ever submitted to the Institute. As regards the proposed decoration of the dome of St. Paul's, he could only say that nothing would, in his opinion, be so disastrous as the postponement of the work. Our public buildings were crying in vain for completion by sculpture and painting, and if the work be now indefinitely postponed until the best of all possible designs can be got, a blow will be given to decoration from which it may never recover. Who can say that we should not become involved in a great war, and the adornment of our public buildings be postponed for a century, or perhaps for ever? Whatever might be said of the late Alfred Stevens's design, it was undoubtedly that of a man of genius. Owing to objections of the Committee to portions of this design, Mr. Poynter was asked to make certain modifications of it, and this modified design was now to be seen *in situ*. Sir Frederick Leighton undertook, as a tribute to Stevens's memory, to make the cartoons for the larger circles at such a cost as would involve him in heavy pecuniary loss for a series of years; but this sacrifice could not be well asked for if some other design were substituted for Stevens's. When the country was able to secure the services of such eminent men for a nominal sum, it appeared to him to be the very height of madness to reject the offer. But some wiseacres said that our buildings should not be decorated until we could secure the services of an English Titian, and this reminded one of the Greek who swore he would never go into the water until he learned to swim. The triumphs of Titian, Tintoretto, Paul Veronese, Correggio, Raffaelle, and Michelangelo were due to the antecedent century, when decoration was applied to every public building. By this means a school was formed, from which these transcendent geniuses were evolved, and we should be putting a stop to further excellence in mural decoration if we neglected the work of the greatest extinct genius this century had produced in England, carried out as proposed by two of the ablest painters of the day. If Stevens's design was to be rejected, and a fresh one made, in common courtesy Mr. Poynter and Sir Frederick Leighton should be first asked to give their views of what was appropriate, and the committee must be prepared to pay the current price for that design, and the subsequent cartoons.

Mr. Frampton contended that if panels were used they should be egg-shaped. The pictorial work of the dome might be in fresco. A gold back-ground, with either light or dark figures, would not produce an aërial effect. Gold was terribly opaque; it contracted the appearance of vastness, and as the glittering enemy of all solemnity, was unsuitable as a means for decorating the ceiling or dome of a grand cathedral. It might be used with effect in secular buildings where a gorgeous result only was desired. The dome of St. Paul's should be an ideal of the great azure canopy formed over this wondrous world, with a blue background representing the heavens, and the figures should be draped in whitish raiment, placed in spiral groups, and of majestic size. A magic lantern might be used for throwing the designs on the dome, and determining which was most suitable. He hoped the decoration would be carried out in accord with the sacred character of the building.

Mr. Emerson referred to what Mr. Stannus had said as to the necessity for the articulation of the dome with the subjacent architectural features. An attempt to carry out this proposition might lead to difficulties. Out of twenty-six of the most important domes, in only three did the internal decoration articulate with the subjacent parts, and in each of these cases the lines were carried down to the ground. Out of the twenty-six examples only four articulated with the axis of the architectural features under the vault, and in all the rest there was no suggestion of articulation with the subjacent parts. A subdivision of the surface into ribs seemed to hint at some constructive feature behind, which was a suggestion of false domical construction.

Mr. Edward Armitage, R.A., referred to the design by Mr. Wild which had appeared in the *Builder* (see p. 689, *ante*), and which, as a painter, he preferred to those which were cut up either by vertical ribs or circular panels. In Mr. Wild's design the painter had fair play; his groups and figures, whether good or bad, would at any rate be seen, and not smothered, as Mr. Poynter's were, by very questionable painted architectural details. No one blamed Mr. Poynter or Sir Frederick Leighton for this; the only regret was that so much good work should be thrown away where it could not be seen. The better the work, the greater would be the regret if this unfortunate arrangement of Stevens's should be adopted. He was not in favour of a revival of Gothic or Romanesque stiffness in the figures, but considered that the personages depicted in a Christian cathedral should be simple, calm, and dignified. This could only be attained by allowing the artist plenty of space to develope his groups. Where this was not allowed, he was forced to give unnatural attitudes to get them into the small panels allotted to them. In Mr. Wild's design he found four unbroken segmental spaces, each about 60 ft. long by 24 ft. perpendicular height, and this was a magnificent field for a painter. The figures he (Mr. Armitage) had sketched in were probably too upright, but he had exaggerated their perpendicular form to show the general nature of the composition, which might be termed a sort of zonal treatment. These figures would be found 13 ft. to 14 ft. high, and would be sufficiently large to be seen from below. When grouped in masses the angles at the top of the cupola would radiate from the centre and be about 11 ft. high. These arrangements might have to be considerably modified if the subjects were different, but he felt strongly that if figures were to be introduced at all into the dome there should be ample space left for their free development. It might happen that some day the dome might be brilliantly lighted by electricity, but even then the figures would be much better seen from below if grouped in large masses and not mixed up with painted architectural ribs and panels. He had no objection to ribs in a dome if treated architecturally. What he did deplore was their union with figures. The painted architecture chilled the figures, and the figures injured the architectural decoration. In spite of the authority of Michelangelo there seemed to be a want of reverence in making angels and apostles do duty as caryatides in building up the architectural features. Before the decoration of the dome was settled he hoped the incubus of Stevens's design would have ceased to overawe the minds of those who had to deal with it. He was convinced that any arrangement founded upon it would prove impracticable and unjust to those who might be commissioned to carry it out.

* See p. 687, *ante*.

Mr. Ralph Neville thought it was rather late in the day to pick holes in other people's designs, when they had come to discuss the question of the decoration of cupolas generally. The gold mosaic was always the valuable part in decoration wherever it was used, and anything put on it should be looked upon as a framework and ornament to it. No figures showed against the strong light of the gold mosaic, and it was the one thing which struck the eye. In all the earlier examples this was very much attended to, and little colour put upon it. One fine example was the beautiful little Church of St. Praxed, which Mr. Statham had referred to on the last occasion. No figure subjects would show up in the dome of St. Paul's under ordinary circumstances, and even gold mosaic would only show where the light caught it. The earlier examples showed that little colour should be used on gold mosaic. The rib treatment seemed to be a false treatment, and the only reason for introducing it was that as it was a serious thing to make a design for a whole dome, it was easier to divide it by ribs and treat each section separately.

Mr. Woodward could not understand how a man possessed of so much information as Mr. Stannus was could have connected himself with the two cartoons now hanging in St. Paul's. Three points had been enforced, viz., scale, originality, and articulation. It only required a moment's study of the designs now exhibited in the dome to see that they were utterly destructive to scale, not only bringing down the dome, but also destroying its glorious concavity.

Mr. F. C. Penrose, in reference to a remark of Mr. Woodward's, said that Mr. Poynter had nothing to do with the design on the podium.

Mr. Woodward contended that the ornament on the podium was of a vulgar character. In regard to the treatment of the upper portion, the circles were quite destructive of articulation, and discorded with the architecture. He had gone up to the Whispering Gallery, and even there it was impossible to distinguish what the figures were. They did not want pictures. Give the dome three coats of paint, and then distemper. [This seems to have been meant for a joke,—and a very poor one.]

Mr. G. A. Audsley could realise nothing in the conditions of the dome to call for the articulation of its design with the subjacent architecture. When they had got strong corner lines over the peristyle they had surely done with the substructure. If the divisions were vertical and few in number a grand design was impossible, and all mystery as regards form and dimension would be done away with. The details consistent with eight divisions again would produce a dwarfed effect, and the introduction of a few colossal figures would also help in this direction. The proper scale for the figures became a work of the greatest importance, and one worthy of exhaustive study and experiment. He would lay down the following propositions as to the decoration of the dome:—(*a*) That the internal surface of a dome, circular in plan, must not have a vertically divided treatment; (*b*) that the surface of a circular dome, being uniform and unbroken, must not have any decoration calculated to impart a different character to it; (*c*) that if the surface of the circular dome must be divided by its decoration, it must be in the horizontal or zonal manner; (*d*) that the zonal treatment must not be of so pronounced a character as to call special attention to the lines of division; (*e*) that subject decoration must admit of the introduction of a great number of details of moderate size, so that the dome may be increased in appearance to the eye of the observer; (*f*) that the subject must form one grand composition rather than be disconnected and isolated in its constituent parts; (*g*) that the subject must be one which, transferred to the domical surface, will not strain the eye of the observer, or strike it with a feeling of absurdity; and (lastly) that the subject should be one in which a certain mysterious and supernatural character prevails, and which should call forth the highest powers of imagination. The subject which presented itself with most force to his mind, as full of the most solemn mystery and grandeur, would be the glory in heaven immediately following the Last Judgment. Mr. Audsley read a description of his proposed scheme, arranging the figures according to the Mediæval idea of the divisions of the heavenly hierarchy into Cherubim, Seraphim, Thrones, &c.

Mr. Blagrove considered the coffer treatment was not only appropriate, but that intended by Sir Christopher Wren. He objected to any paintings of a Mediæval character such as had just been described, and thought the subjects chosen should be in accordance with modern feeling and modern belief.*

Mr. J. Douglass Mathews thought that the dome should be treated as a vault. The hemispherical form suggested the firmament, and it should be cut up into three horizontal divisions, indicating earth, sky, and heavens. A first-class fresco-painter would be more suited for the work than a painter like Sir Frederick Leighton or Mr. Poynter.

Mr. William White, F.S.A., believed that the picture of the Heavenly Jerusalem was the proper representation for such a dome. With reference to the employment of blue and gold, blue for distance was calculated to enlarge the scale, and anything in the shape of yellow or gold brought the distance nearer and lessened the scale. In such a dome as that, there ought to be a blue background, but on account of the bad light, it might have to be of the very palest tint. Large figures would be out of place, and life-sized figures would have no effect.

Mr. Penrose wished to remind the meeting that the Apocalypse was the subject now being carried out so far in the designs which had been put up.

Mr. Dawson thought that to picture the dome as the vault of heaven would be a delusion. It should be decorated so as to show itself as a dome supported by the peristyle. There should be no vertical lines to cut up the dome and diminish its size. It should receive, as far as possible, a free treatment, somewhat, perhaps, in the way of zones, and there should be no large figures to diminish it. He believed that gold would give the brightness which was required, and primary colours on white might be introduced with effect.

The Right Hon. G. C. Cavendish-Bentinck, M.P., said he was one of the members of the Committee on the Decoration of St. Paul's, and was one of a small minority who had persistently prevented its destruction by the late Mr. Burges. No man had a greater admiration for Mr. Stevens than he had, but he did not approve of his design for the dome, as it was too ornamental. His own opinion was that it should be treated in a broad way, with pictures which would strike the eye, and not coffered. Far be if from him to depreciate the skill of Mr. Poynter or Sir Frederick Leighton, but few in the room would consider it desirable that the designs now exhibited should be put up in St. Paul's. It was much better that they should be rejected. [This statement was received with partial applause.] Sir James Thornhill's designs were not so bad, after all, when they were compared with the attempts which had since been made, and until somebody was found to surpass Thornhill, they should ask the committee to sit still.

Mr. Brydon agreed with the last speaker. Before they displaced Thornhill's designs they should have something very much better. The Committee had made a mistake in altering the original treatment by Stevens, which was better than the present design. The circles contracted the subjects and gave a certain restlessness which was not found in Thornhill's treatment. The present treatment of the podium was hardly what it ought to be. He thought they were beginning at the wrong end. If they had commenced with the decoration of the choir and nave they would have acquired greater experience for carrying out the important work of the dome.

Mr. Seddon said that he thought Mr. Stannus was to be congratulated, that one at least of the many who differed from him as to the principles for the decoration of the dome of St. Paul's, had had the temerity "to write a book," that is to say, to put on paper some realisation of his idea. The time since last meeting had been short for the purpose, but Messrs. Belham had kindly permitted their artist, Mr. H. Murray, whom he (Mr. Seddon) could claim as having been his pupil as to decorative art, to work out a scheme from his sketches and directions, on the basis of the picture by Sandro Botticelli, that he had referred to. Such as the drawing was, he left it, with deference, for criticism, aware that it must be abundantly open to such; nevertheless, he maintained that he felt confident that the principles upon which it was founded were the correct ones.

* We entirely agree with Mr. Blagrove on this head.—Ed.

Mr. Stannus, in replying, said that in most cases the several speakers seemed to have answered each other. Zonal treatment was a superficial way of treating a great dome; it destroyed all sense of a cupola; and zones were common to cones as well as to hemispheres. He had seen most of the cupolas in Europe, and his experience was directly contrary to that of Mr. Emerson; nearly the whole of them were articulated, and the exceptions only proved the rule. With regard to the effect of a gold ground, he would ask them to go to St. Mark's, and say whether it was undignified or irreligious? Mr. Audsley had suggested several inside zones, but where were they to get room for them all? It would be like the man who wore breeches with horizontal stripes. With regard to the decoration of the podium, he had already stated that the apostle was too large, but this could be corrected. They all agreed with Mr. Armitage as to the necessity of simplicity in the figure drawings. This was essentially an architectural question; and the first thing was to do the best they could for the church in the sub-division. It was beginning at the wrong end to treat it as a gallery for painters. If they took care of the architecture the decoration would take care of itself. The way in which the speakers had differed among themselves, and the ill-considered and unsuitable treaments suggested, only showed that Stevens was not far wrong in what he had suggested. *Quâ* scale, the characteristic treatment of hemispherical cupolas and originality, Stevens's design was incomparably superior to every other. The treatment most suitable for the cupola, they would find, if it were reasoned out mathematically, was the plane treatment of sections which gave circles. This, if carried out, would confer a dignity and distinction to their grand dome, which every other dome in Europe lacked.

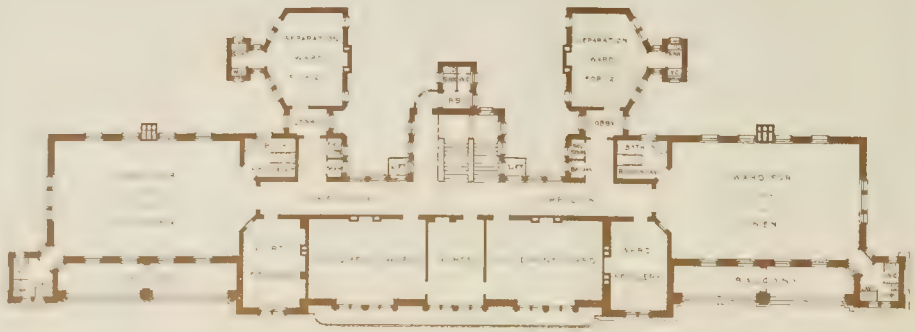
The President, in closing the discussion, said he fully agreed with one remark in Mr. Stannus's reply: if they wanted to see how to decorate a dome, he also would say, "Go to St. Mark's!"

Votes of thanks were then passed to Mr. Stannus for his paper, and to the Dean and Chapter of St. Paul's, to Mr. Penrose, and others, for the loan of drawings and models.

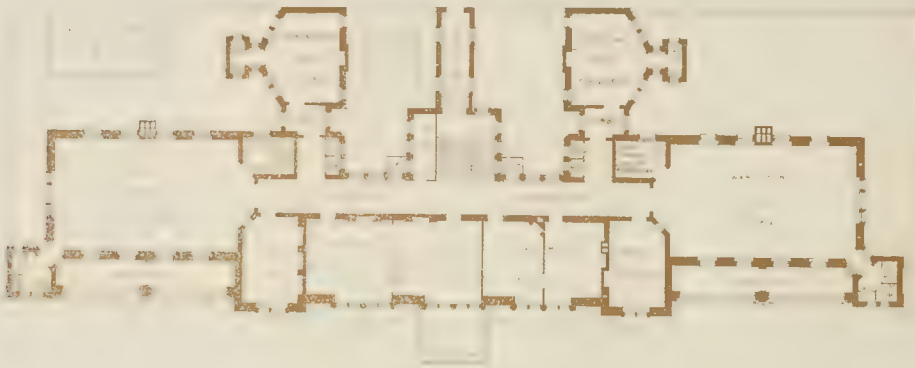
At the next meeting a paper will be read by Mr. Lawrence Harvey on "The late Professor Semper's Theory in Relation to Architectural Ornament."

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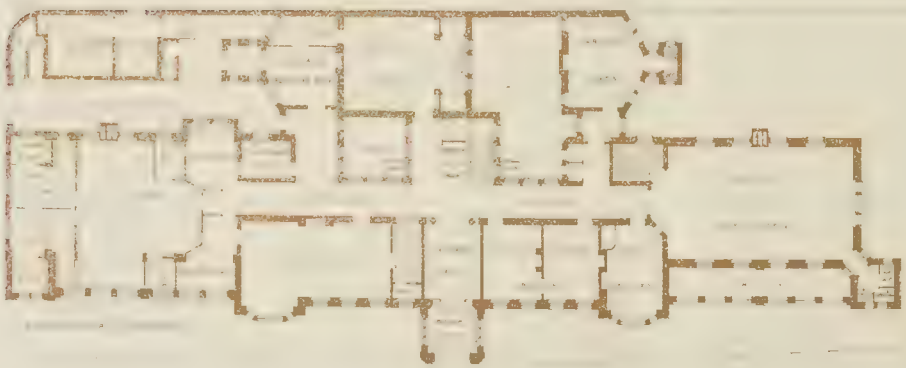
**The Drainage of Private Houses.**—The near approach of cholera has once more awakened public attention to the necessity of drainage improvements. The newspaper-reading community are called upon to "put their houses in order," and the assurance is given that then the cholera need not be feared. This advice, however, is far easier to give than to carry out. A great number of tenants in London and in many other large towns hold their houses on merely a three years' lease. It is not to be expected that they should incur any considerable expense for improvements which at the end of the short lease would enable the landlord to augment his rent and oust his tenants. On the other hand, the landlord almost invariably refuses to make the required improvements; nor do the sanitary authorities move in the matter unless the nuisance be of a very flagrant description. Finally, there is no fixed official standard as to what constitutes a well-drained house. In this respect the sanitary administration of Brussels is better organised than anything we possess on this side of the Channel. At the Hôtel de Ville of Brussels may be seen specifications given by the Service d'Hygiène of what the law imposes. If any lodger, tenant, or other person have reason to suppose that in any particular house the principles laid down by these specifications are not carried out, he has only to report the fact. An official inspection is at once made. If the landlord inquires from what source the complaint emanated, he is politely informed that that has nothing to do with the question. Either his house is in order, and if so there could be no objection to the fact being confirmed by the official inspector of the town; or the drainage is not in proper condition, and of course it would be only right that he should conform to the general regulations. Thus it is well known what should be done, who should do it, and how that person may be compelled to act, without the tenants or others being involved in any unpleasantness.—*Lancet.*



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PLAN OF FIRST FLOOR.



PLAN OF GROUND FLOOR.

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# South Transept Westminster Abbey

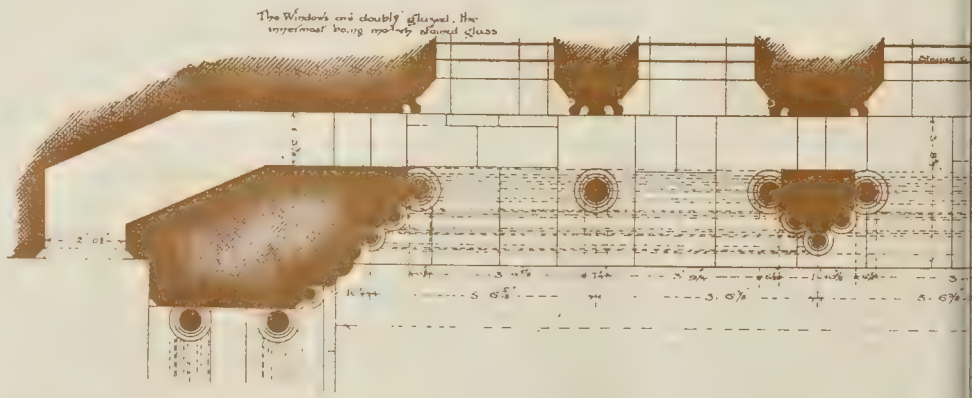
## Triforium of South Wall

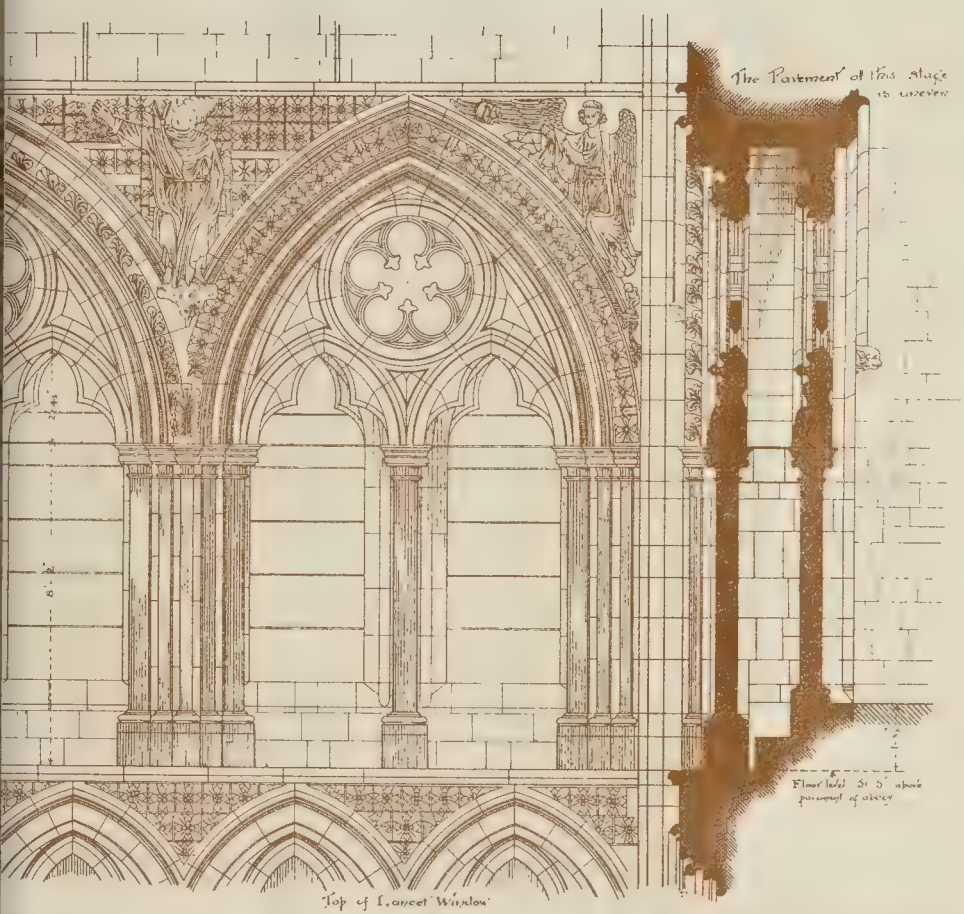


Arch mouldings of Main Nave Arcade

All Stone jointing taken from actual measurement

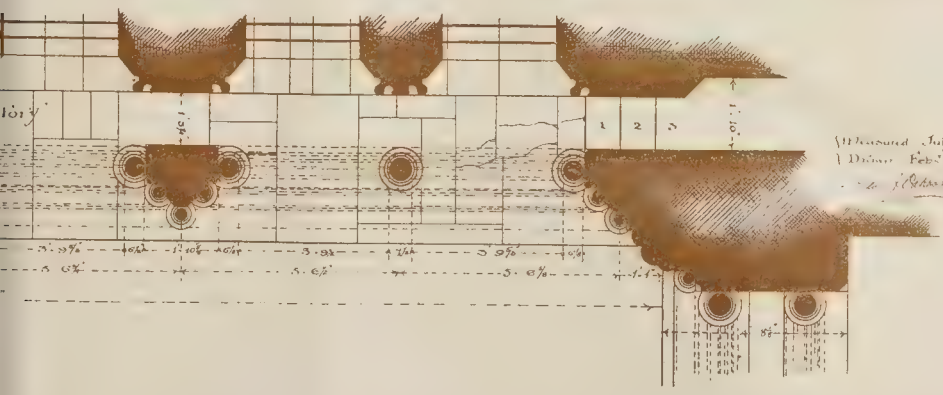
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The figures in East & West spandrils are in good preservation being of very hard stone
The caps. shafts & bases of columns are of Purbeck marble

Scale 0 1 2 3 4 5 6 7 8 9 10 Feet

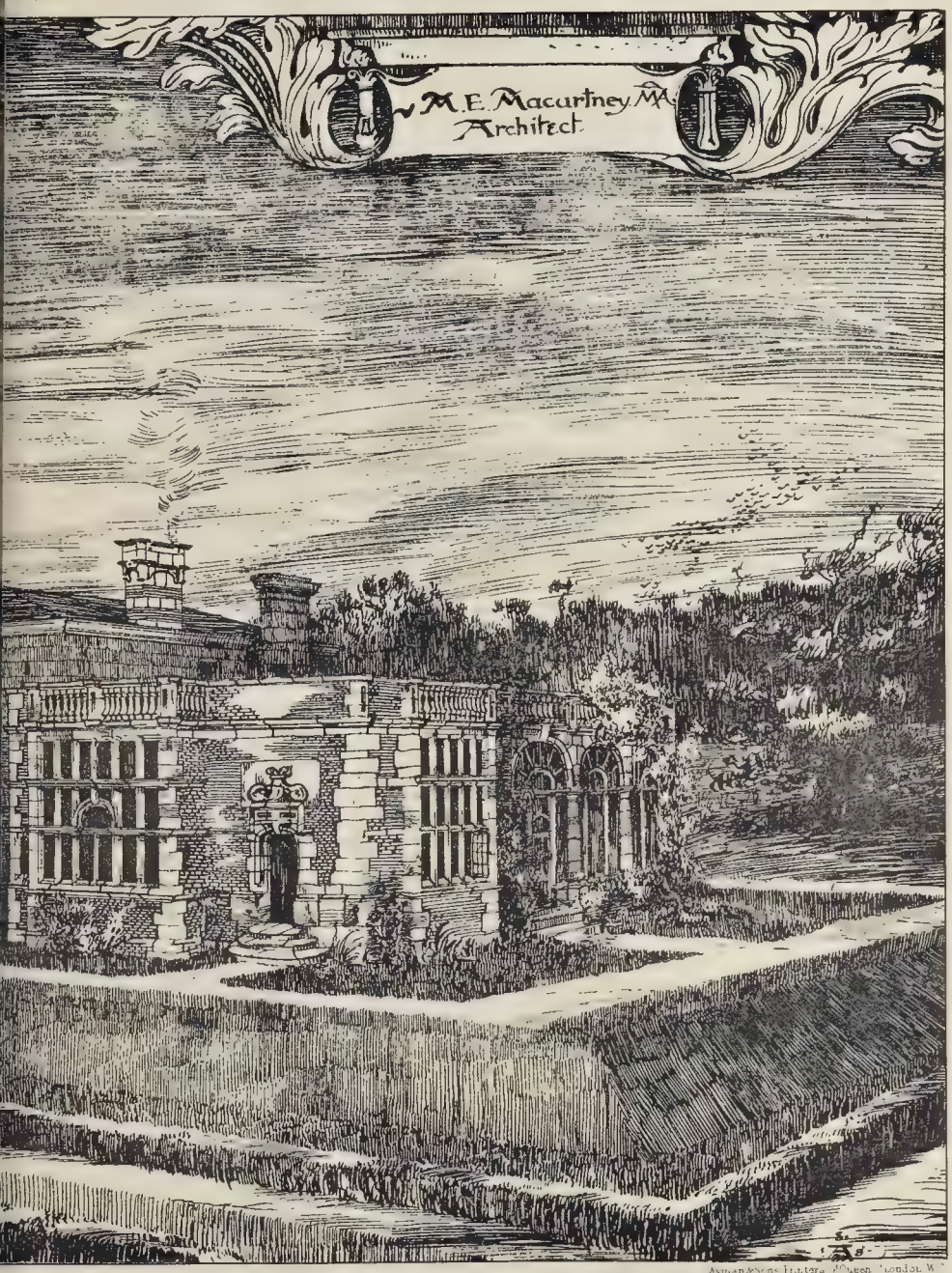



1 Thousand July 1882
1 Drawn Feb.y 1884

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# Additions to a House at Tunbridge Wells






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CHURCH OF LA MADELEINE, VÉZELAY.

BOSSES FROM THE VAULT OF THE ANCIENT SACRISTY.

Drawn by M Adolphe Guillon.

Wyman & Sons Photo Litho

C^t Queen St London WC



EAST SUSSEX, HASTINGS, AND ST LEONARDS INFIRMARY.—Messrs. Keith D. Young and Henry Hall, Architects.

## Illustrations.

### CARVED BOSSES FROM LA MADELEINE, VÉZELAY.

THESE bold carvings, representing the symbols of the Four Evangelists, are from the roof of the "basse-chapelle," which was formerly the sacristy of the great Romanesque Church at Vézelay. They are reproduced from pen-drawings by M. Adolphe Guillon, the painter, who makes his summer home at Vézelay, and has paid much attention to the history and details of the church. M. Guillon has kindly furnished us with some drawings of other carved work in the church, accompanied by some notes on them and on the building generally, which will appear in our next or in an early number.

### SHANDON COURT, TUNBRIDGE WELLS.

THE additions to this house, as well as the stabling and lodge, are being carried out in red brick and stone, with Westmoreland slating. The interior of the house has been entirely remodelled, the main feature being an oak screen and staircase. The work, which is still in progress is being executed by Messrs. Foster & Dicksee, of Rugby, under the direction of Mr. Macartney, the architect.

### TRIFORIUM, WESTMINSTER ABBEY.

THIS careful-measured drawing of an exquisite bit of architectural design was one of those which gained its author, Mr. G. J. Oakeshott, the Architectural Association Travelling Studentship earlier in the present year. Well known as the work is, a geometrical drawing of it to scale will not be thought a superfluous publication.

### EAST SUSSEX, HASTINGS, AND ST. LEONARDS INFIRMARY, HASTINGS.

THE design which we illustrate to-day is a modification of that submitted by Messrs. Young & Hall, in competition, two years ago, and which obtained the first premium. The original intention of the committee was to erect upon the site of the present infirmary a hospital, with accommodation for 100 beds, and an out-patient department; but in view of the very restricted nature of the ground, and the impossibility of extending it in any direction, it was decided to reduce the number of beds to seventy-five.

The principle frontage of the building faces the sea almost directly opposite the pier, and looks, therefore, almost due south.

The building is four stories in height, with a basement under a portion devoted to stores, cellars, &c.

On the ground-floor the out-patients' department is placed at the west end, advantage being taken of the road which runs at the end and back of the building, to obtain separate entrances and exits. Two rooms for each medical officer in attendance are provided, and in close communication with the waiting-hall are the secretary's office and the dispensary.

At the eastern end of the building is a ward for ten men, with ward scullery (or duty-room) adjoining. The central portion is devoted to the entrance-hall, house surgeon's rooms, and board-room. At the rear is a room for the reception of casualties or accidents, adjoining which is the operating-room. The latter is lighted and ventilated by a large lantern light, and has adjoining it a lavatory and store cupboards, for preparations, &c. In the casualty room is a large cupboard for instruments.

A projecting wing, corresponding to the casualty room, contains a separation ward for two beds, with water-closet and sink. This ward is isolated from the rest of the building by a cross ventilated lobby, and is intended to be used for doubtful cases, or those requiring isolation.

The mortuary and *post-mortem* room are placed in the north-west corner of the site.

The first floor contains a ward for ten men, a similar one for ten women, and two isolation wards as described above. The water-closets, &c., are placed in the angle towers, and cut off from the wards by cross ventilated lobbies. To each ward is provided a bath-room and lavatory, a food store, and cupboard for brooms, &c., and a ward scullery, or duty-room. The central portion of the front is occupied by the matron's rooms, and two day-rooms, one for each sex, which can be thrown into one for use as a chapel, or for entertainments. On this floor access is obtained to the road at the back.

The second floor is similar to the last, except that the central portion is devoted to two children's wards, with nurses' room between.

The top floor contains one women's ward and a separation ward, the kitchen, offices, and the nurses' and servants' sleeping apartments and day-room.

Balconies are provided to all the wards, except the separation wards.

The large wards will all be warmed by double ventilating grates, specially designed by Mr. D. O. Boyd, with glazed tile sides and descending flues. The smoke-flues and extraction-flues are all carried up on the exterior wall, and so arranged as to be swept from the outside. The corridors and passages, out-patient department, will all be warmed by hot-water coils, and the grates in all the smaller wards will be Boyd's Hygiastic Grates.

Two lifts are provided, one for the conveyance of coals from the basement to the several floors. This lift will be a framework of ironwork, without any enclosure, the other for the conveyance of stores from the basement to the kitchen. This will necessarily be enclosed, but will communicate with the basements and third floors only, thus avoiding any possibility of its being a shaft for the conveyance of air from one ward floor to another.

The principal front is intended to be faced with red brick and Portland Stone, and from its prominent position is designed in somewhat more ornate a manner than is generally the case with hospitals.

## THE PLUMBERS' COMPANY AND TECHNICAL EDUCATION.

MR. GEORGE SHAW, C.C, and the Wardens of the Plumbers' Company, entertained a large number of gentlemen to dinner at the Albion, Aldersgate-street, on Wednesday evening, in commemoration of the Company's recent action in regard to the technical education of plumbers, and with especial reference to the Plumbers' Congress, which was reported by us at some length a few weeks ago.* Many of the gentlemen who came from all parts of the United Kingdom to attend that congress were present at the banquet.

The Right Hon. A. J. B. Beresford Hope, M.P., in replying to the toast of "The Houses of Parliament," congratulated the Company upon its efforts to make the Guild a reality, and referred to the prominent part which the Master took, in conjunction with representatives of other City companies, in carrying into effect that piquant and delightful feature of the recent Health Exhibition, "Old London."

Among the other toasts was "The Plumbers' Congress," in proposing which the Master observed that for several years past the Company had given attention to the promotion of technical excellence on the part of workmen in the craft with which its name was identified, and had instituted a system of examinations for workmen, by passing which a man might become entitled to the freedom of the Company, and to receive a sort of diploma or certificate of competence. The Company had also assisted in the formation and support of the City and Guilds of London Technical Institute; and, lastly, under its auspices was held the very practical Congress of Plumbers, attended by representative craftsmen from all parts of the kingdom. At that Congress important resolutions were passed, and steps were now being taken to give practical effect to them. In this work he believed the Company would be able to take an active part, for some of the powers which had been conferred upon it by charter centuries ago were applicable to the circumstances of the trade in the present day, and if the Company could secure the co-operation of the Metropolitan Board of Works, and of other local bodies, it would be able to do much to ensure good plumbing,—one of the most important elements in a healthy house. The full official report of the Congress was now issued, and would be found full of valuable and suggestive matter. With the toast he had great pleasure in coupling the names of Mr. George Godwin and Mr. Philip Magnus. Mr. Godwin had done so much for many years past in furthering the main object of the Congress,—*i.e.*, in promoting the health of the people,—that it was only right to associate his name with the great cause of sanitary reform. Mr. Magnus was well known as the Director of the City and Guilds of London Institute.

Mr. Godwin, in the course of his reply, said it was impossible to over-estimate the importance of the deliberations of the Plumbers' Congress, just as it was impossible to estimate the damage and loss of health and life caused by bad plumbing. The late Serjeant Parry and his wife owed their death to a bad joint in plumbers' work. Plumbing was called an "art and mystery" when the Company received its charter, and certainly since that time the plumbers had contrived to keep their work a "mystery," by hiding it and covering it up to an extent that very often made it impossible to get at without incurring great expense. He trusted that the Congress would bear good fruit. The report of its proceedings was exceedingly valuable, and ought to be distributed all over the country. If any special fund were raised for that purpose, he should be pleased to contribute.

Mr. Magnus said that if there was any practical branch of industry to which the principles of science might be considered applicable, it was plumbing.

Mr. Digby Seymour, Q.C., in an eloquent speech, proposed the health of the Master of the Company, to whose energy were to be attributed the steps which had been taken by the Company in promoting technical education for members of the craft. It had been due to the elevation to the chair of the Company of so practical and experienced a plumber as Mr. Shaw that some of the powers which were conferred upon the Company by its charter had a good prospect of being revived, to the benefit, not merely of the trade, but of the public at large.

The Master, in proposing "The Plumbers' Company," quoted from a handbill which had been distributed by a man who expressed his willingness to undertake "plumbing or general house repairs," and to take "any old lumber in payment." Such offers as this showed the great importance to the public of the steps which had been taken by the Company to secure competent plumbers.

* See *Builder*, p. 553.

## BRITISH MUSEUM LECTURES ON ASSYRIAN ANTIQUITIES.

IN the galleries of the British Museum, Mr. W. St. Chad Boscawen commenced on Wednesday afternoon a series of six afternoon lectures on the history and antiquities of the Assyrian and Babylonian empires. The subject of the opening lecture was the "Origin, Development, and Decipherment of the Cuneiform Inscriptions," and in addition to the inscriptions exhibited, the lecturer had a number of maps and diagrams to explain the subject. Mr. Boscawen said that the inscriptions in the cuneiform character have carried us back to an antiquity so remote that it would seem as though we were within measurable distance of "the threshold of history." In the simple, once-pictorial, characters of the cuneiform syllabary we have a picture of the home of the inventor, his natural surroundings and animal companions. The lecturer then proceeded to show that the evidence afforded by the analysis of the character of the syllabary showed the inventors to be a people dwelling in caves in a mountain land where the pine and the vine grow, and where the bear and the wolf were the enemies of man; and where snow-capped mountains formed the resting-places of the gods. That this was not Babylonia was at once apparent. The lecturer then proceeded to show that it was a tribe called the Akkadians who first worked out the elements of civilisation in the mountains of Southern Kurdistan, and brought them thence to the fertile plains of Shinar, and founded the tetrapolis of Nimrod. Some indication of the great antiquity was afforded by the fact that the inscription of Sargon of Agadhe, the date of which is now firmly established as B.C. 3750, was written in phonetic characters, thus indicating centuries of growth and development prior to that remote time. Mr. Boscawen then described the way in which the cuneiform writing was borrowed by the Semitic people who had left their desert home to come and dwell in the cities of Chaldea. It was evident that trade had been the incentive, and that in adopting the writing they had exercised the same power of analysis and simplification as that which had enabled them to

develop the Phœnician alphabet from the hieratic of Egypt. It was for these early traders that the syllabaries and bilingual tablets, full of the phrases of the market and the law court, had been drawn up. The cursive writing found in the valuable commercial and legal tablets from Waska—discovered by Mr. Lofts—was evidently the basis of the script of Nineveh and of the later Babylonian Empire. Mr. Boscawen then proceeded to show how the writing was transmitted from one nation to another. The Semites who left Babylon took with them the writing which became the beautiful court-hand of Nineveh. The lecturer then proceeded to show how the great linguistic families were represented in the cuneiform literature.

The remaining five lectures of the course will be delivered on the following dates, viz., December 10, 17, and 31; and January 7 and 14,—each day at 2.30 p.m.

## ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—The first ordinary meeting of the current session was held at Queen's College on Tuesday evening, December 2nd. The vice-president, Mr. W. H. Kendrick, was in the chair. The hon. secretary (Mr. Victor Scruton) read the report and balance-sheet for the past session, and pointed out that the financial position of the Association had never been so satisfactory as at the present time. The following gentlemen were nominated for membership:—Mr. F. J. Yates as an honorary member, and Messrs. W. S. Midgley and S. Payton as ordinary members. A paper was then read by Mr. T. W. F. Newton, entitled "The English Villa." A discussion ensued, and, after a hearty vote of thanks to the author, the meeting terminated.

*Leeds and Yorkshire Architectural Society.*—At a meeting of this Society, held on Monday evening, Mr. T. Pridgin Teale delivered a "conversational address on fire-places." Mr. Teale said he had accepted the invitation to lecture in connexion with that society in the hope of enlisting the judgment, the sympathies, and the active help of a profession which could do more than any other body of men to further the object he had set before him. That object was to revolutionise the fire-places of the kingdom, whereby coal could be burned more effectively and economically as a producer of heat, and at the same time the production of smoke be very materially reduced. In the national work of smoke abatement the architectural profession could give most efficient aid, as in its hands rested almost invariably the designing of the fire-places of new buildings. He had discovered that nearly every existing fire-place could be made more effective, more perfect in the combustion of cinders, and more cleanly, without any structural alteration, by the simple expedient of closing the hearth chamber with a movable shield, which he had called an "economiser."

*Edinburgh Architectural Association.*—The usual fortnightly meeting of this Association was held in the Professional Hall on Monday night. The President, Mr. G. Washington Browne, was in the chair, and after some preliminary business, introduced Mr. James Anderson, who read a paper entitled "Roofing Slates and Slating." The lecturer, having treated of the geological nature of slate, proceeded to treat of slating, as to which he said the English and foreign style was to use slates of one size from eaves to ridge, fixed to laths, and pointed with lime inside, the slates being of the lightest description. The Scotch style was to use thick slates of various sizes, arranged before commencing, and fixed to sarking-boards. The largest slates were put on at the eaves, and then diminished in size to the ridge. The tile-stones, or grey slates of Forfar and Caithness, were those with which a large portion of Old Edinburgh had been slated. They were hung on laths, with pins of oak, pine, and other woods, as well as with the bones of small animals. There were three most important points to be looked to in slating,—the pitch of the roof, the cover, and the bond of the slates. The pitch should be as nearly square pitch as possible. The cover should be, on a good pitch, from 3 in. at eaves to 1½ in. at ridge. Should the roof be deep or the pitch flat more cover ought to be given. Sometimes 7 in. to 8 in. of cover was necessary at the eaves where the wall-head was broad. It was impossible to give short and thick slates more than about 2 in. cover, as the tails would be tilted. The bond was quite as important as the cover in keeping roofs water-tight, for, if the bond were insufficient the cover was of no avail. The bond on the slates should not be less than 3 in. or 4 in. at eaves to 2 in. at ridge. In conclusion, the lecturer said he would impress upon architects the necessity of providing easy access to chimney-heads and avoiding traffic on the slates. These accesses need not be unsightly to be efficient, and roofs so protected would not require repairs for many years.

## ROBERTS'S RAIN-WATER SEPARATOR.

We give a section of this clever contrivance for approximately separating the foul from the cleaner water of rainfall. The detailed description is as follows:—

A. Removable strainer with perforated plate to prevent rubbish passing into separator. B Outlet for water to pass to separator. C. Separator balanced on pivot. D. Small compartment into which the rain-water first falls. E. Small hole fitted with washer proportioned to size of roof. F. Larger hole to take the overflow from D during moderate rain. G. Discharge-pipe. In a storm the water fills the compartment D, and flows over the top of this pipe. H. Small holes at back of G between compartments. When the rainfall exceeds the discharging capacity of hole E, the water rises in compartment D, and passing through holes H, slowly fills compartment J. When the weight of water in J overbalances the separator, it is canted (as shown in drawing), and the water (by that time pure) directed by the discharge-pipe G into the storage-pipe K. L. Small hole at bottom of compartment J. M M. Auxiliary-pipe for keeping compartment J full after the separator is canted when the rain is leaving off, so that the last drop of rain may be stored. By raising the slide N a third and a fourth hole can be opened at H; this will cause the compartment J to fill more rapidly. The whole of the water passes through the discharge-pipe G which conveys it into the waste-pipe O so long as it remains uncanted. The length of time it remains in this position, running the water to waste, is regulated by the slide N to suit the smokiness of the locality. The dotted lines down the centre indicate the position of the iron frame to which the apparatus is attached, provided with holes for fixing to the wall.




*Section of Separator in action: Pure Water passing to storage.*

**The State of the Thames.**—The condition of the Thames at Twickenham has become very bad, and the Twickenham Local Board, dissatisfied with the steps taken by the Conservators, have unanimously resolved to request the Local Government Board to receive a deputation upon the subject, and to ask the county members and all other Parliamentary representatives interested in the matter to accompany them. Strong remarks were made upon the alleged apathy of the Conservators in allowing so great and dangerous a nuisance to exist, the vast accumulations of sewage mud on foreshores being specially referred to.—*Times.*

## MR. COMMISSIONER KERR ON ARCHITECTS' COMMISSIONS.

At a meeting of the St. Pancras Board of Guardians, held at the Vestry-hall on the 27th ult., on the question of warming the St. Pancras Infirmary at Highgate a desultory conversation occurred over the proposal to ask Mr. Bridgman, the Guardians' architect, to propose a plan for the new warming apparatus.

The Chairman (Mr. Commissioner Kerr), repeating an observation he has several times made respecting "the waste of the ratepayers' money in paying architects these commissions," said this job would probably cost 2,000*l.*, and five per cent. upon that would just put about 100*l.* into Mr. Bridgman's pocket, which might all be saved if the Board did as any private person would do, viz., lay out 5*s.* in an advertisement for plans and estimates, and they would get dozens without costing the parish a penny. (!)

Mr. Robinson and Mr. Drew thought it would be dangerous to let strangers come in and pull the workhouse to pieces without an architect's supervision.

Ultimately it was explained that though the Committee had given partial instructions to Mr. Bridgman, the parish would not be liable if the work was not done.

## ARAB ART.

Sir,—In your notice [p. 684, *ante*] of Mr. Reginald Stuart Poole's very interesting lecture on the domestic architecture of Cairo, you were kind enough to speak in terms of approval of some drawings of mine to which Mr. Poole referred in illustration of his remarks.

Fully conscious that these drawings, partly from smallness of scale, do not adequately explain the materials employed in the construction of the ceiling, and in the mural decoration of Cairo houses, I trust you will allow me to supplement them by a few observations tending to show that in strength and solidity they yield in no respect to European structures, and that they are, in many respects, more calculated to resist the vicissitudes of a Northern climate than our own dwellings.

I am fully aware of the difficulties which beset a layman in discussing questions relating to architecture; it is, therefore, with great diffidence that I venture to dissent from some of your remarks concerning the construction of Saracenic buildings in Egypt. The ceilings, so far as I can recollect, were never of plaster, but of solid wood, the beams being in some cases exposed to view, and richly decorated, or, in other instances, planked and enriched by thin laths nailed upon the surface in geometrical patterns. The stalactites and honeycombed recesses were also of wood, thinly plastered and then gilt. Good examples of this work are to be seen at South Kensington, in a collection the value of which it is to be hoped will some day be enhanced by sufficient space being allotted to it.

The use of tiles for wall decoration is by no means universal in Cairo; but where they occur their value in the general scheme of colour is incontestable, and the facility with which they admit of cleaning would render them peculiarly appropriate for use in our smoky cities.

The use of plaster for mural decoration seems to have been adopted by that branch of the Arab race which settled in the Barbary States and in Spain, where, as in the Alhambra, it is employed perhaps to excess, but with such exquisite taste that few could cavil at its adoption.

A style at once more manly and better adapted to domestic architecture prevails in Cairo, and it is with special reference to the conservation and the better understanding of that branch of the art that the promoters of the movement, with which I am glad to see you sympathise, now desire to call attention.

I trust that you will afford me the opportunity of bearing testimony to the soundness of Mr. Poole's views as to the value of the study of Saracenic art. Frank Dillon.

*** The value of the study we never questioned; only the application which seemed to be suggested.

**Letts's Diaries.**—The series for the year 1885 is now out, and fully sustains the character which this collection of business memorandum books has long enjoyed for constantly-increasing excellence and completeness.

## THE DOME OF ST. PAUL'S.

SIR,—If you are publishing the discussion which took place at the Institute on Monday last I should be obliged if you can find place for the following notes on Mr. Stannus's winding-up speech.

He dismissed the remarks I had made with the statement that I was unfair in my sweeping assertions and in quoting the examples I did, as his outline illustrations on the wall showed distinctly articulation, and that he had purposely kept out of the discussion Oriental domes, the question referring only to Occidental domes.

The examples quoted by me were all the largest and most important domes in the world, while of the few he had drawn with which to illustrate his supposed axiom, there were only two of any size or importance, and most of them articulate with the parts immediately under the cupola, and not particularly with the main subjacent divisions or axes, which is the real point of my argument, as I maintain this principle throws the cupola out of scale.

Again, whatever in principle applies to one large dome applies to another, but what applies to a small dome is absolutely inapplicable to a large one, whose effect depends upon its size.

Also to discard Oriental domes is absurd, and evidently a sign of weakness, for the principle applies equally to Oriental and Occidental domes, and the East has supplied us with infinitely more examples of broad domical treatment than the West. It is not a question of detail, but principle.

I may say I have been obliged to study the question of domes, having had to design three, which have been erected; and with the exception of four of the examples quoted, I have seen them all.

With regard to the drawing of eccentric circles on a black-board, put forward by Mr. Stannus as illustrating the effect of a zonal treatment, it was simply puerile, for without the most wonderful shading and aërial perspective, the effect of a dome could not be shown in that way at all; and without the subjacent parts,—which the eye cannot help seeing in a measure,—in reality, even the faintest true relative effect could not be obtained. This was clearly demonstrated by the clever water-colour drawing on the same principle exhibited in the room.

I feel constrained to put forward these few remarks, being sure that no one competent to judge can help feeling that Mr. Stannus's design is simply a bad emasculation of Stevens's, which latter, whether correct in principle or not, would at least be in scale with the cathedral, being divided into more parts.

It is a broad fact that if large figure subjects are introduced in connexion with false architectural lines, the dome will be utterly spoiled as to its grandeur, for the divisions must be too large and out of scale, and Stevens evidently felt this. WM. EMERSON, F.R.I.B.A.

## THE WATERLOO WELL, KILBURN.

SIR,—Many of your readers, in taking a trip by road to rural Willesden, will miss the Waterloo Mansions which extended along the high-road from Willesden to the Brewery, Kilburn. The mansions are fast disappearing, and the estate will soon be offered to the public for building purposes. They belonged to the Buckley family, of which the late Rev. — Buckley, vicar of St. Mary's, Paddington-green, was a prominent member, and were built about the Waterloo year and named after the victory that destroyed the power of Napoleon Buonaparte and established the *prestige* of England. Among the rest the well that specially commemorated the event and supplied the estate with water until superseded by the mains of the West Middlesex Waterworks Company, is doomed, and, in due course, is to be filled up. Can nothing be done to preserve a historical monument mentioned in "Old England"? Last week, Mr. Benjamin Barlow, Plaistow, and Mr. George Austin, London, the gentlemen superintending the demolition, descended the well to make a survey. To their courtesy I am indebted for the following information:—

The well throughout is built of brick and cement. It is 8 ft. in diameter and 400 ft. deep. From the surface to the level of the water the distance is 170 ft., while the water measures no less than 230 ft. to the bottom. At 330 ft. there is a bed of chalk. This had to be bored some 70 ft. before the spring was gained. The well was supplied with pumping machinery and a pump. The latter is fixed 50 ft. under the water. When originally sunk a man was appointed at 7*s.* the week to pump for the estate, and supplemented his income by charging ½*d.* to every visitor for water to the well, and 1½*d.* for distribution among the cottages in the neighbourhood. The well adjoins the pavement in the high-road, and is between the garden-wall of Nos. 3 and 4, Waterloo.

WILLIAM GEORGE DE GRUYTHER.

*Kilburn*, Nov. 26, 1884.

## LEASEHOLD AND FREEHOLD TENURES.

SIR,—It is very much the fashion to attribute the evils of modern housebuilding to the restrictions of leasehold tenure. After some experience of building estates, I have arrived at the opposite conclusion. Many years ago, hoping that freehold tenure might induce builders to erect a more substantial class of house, I advocated the adoption of that system. The result has proved that the builder, left to himself, even with restrictive covenants, runs up worse buildings on freehold than on leasehold land. He will build that which will produce the highest price at least cost to himself. *Caveat emptor.*

ARTHUR J. BAKER.

## STONE BRIDGES.

SIR, Would you, or any of your correspondents, kindly oblige me with information on the following points?

1. Which were the earliest *stone* bridges built in England and in Scotland?
2. Which are the oldest stone bridges now existing in England and Scotland?
3. What are the best books to consult regarding them? W. S.

## CHURCH BUILDING NEWS.

*Birmingham.*—The Bishop of Worcester has consecrated the first portion of the Church of St. Agnes, Moseley, near Birmingham, which has been erected on a site given by Mr. F. Willmot. The portion of the church now finished includes the chancel, clergy and choir vestries, organ-chamber, and about one-third of the nave. The style of the building is Gothic, of the Geometrical character, with somewhat elaborate ornamentation. The extension of the nave and aisles, and the erection of a north porch with tower and spire, are left to the future. The architect under whose superintendence the church has been carried out is Mr. William Davis, of Colmore-row, Birmingham, whose plans were selected in competition; the builder is Mr. W. Bloore, of Aston New Town.

*North Berwick.*—The Bishop of Edinburgh has laid the foundation-stone of the new chancel of St. Baldred's Church, North Berwick. The sum of 1,000*l.* having been collected by the incumbent, the trustees sanctioned the commencement of the work, which includes a chancel of 18 ft. 6 in. long, the widening of the old apse on each side, the construction of an organ-chamber and a clergy vestry on the north side of the chancel, and the moving of the belfry from the west to the junction of the chancel and nave. The whole improvements are to be carried out under the direction of Messrs. Seymour & Kinross, Edinburgh, and it is hoped that they will be completed by Easter.

*Pennycomequick (Devonport).*—A meeting of the parishioners has been held to consider the steps to be taken to provide church accommodation for the new population which has sprung up in the eastern side of the parish of Stoke Damerel. The Rev. W. St. Aubyn, the rector, presided, and explained that it was proposed to build in sections a new church on a site which would be given by Sir John St. Aubyn in the land opposite Stuart-terrace, on the Pennycomequick-road, and that he had funds at his disposal which would meet the greater part of the cost of the first section. Plans prepared by Mr. J. P. St. Aubyn were examined and considered. It was resolved that it was desirable that the proposed church should be built, and the first section proceeded with as soon as practicable.

*Birtley.*—Birtley Church, North Tyne, has been opened by the Bishop of Newcastle, after having been closed for six months for restoration. The total cost of the work executed has been 1,300*l.* Mr. Arthur B. Plummer, of Newcastle, is the architect; Mr. William Welton, of Birtley, is the contractor for the masonry, &c.; and Mr. William Knox, of Consett, for the carpentry. The east end has been entirely rebuilt, and Mr. Coppin has presented stained-glass windows by Messrs. Powell, of London, for the three lancet lights. A stained-glass window by Messrs. Wailes & Strang, of Newcastle, has also been presented by Messrs. A. & W. and Miss Robson for the nave. An aumbry and other ancient remains were discovered in the course of the work. The tiles in the chancel have been laid by Messrs. W. B. Wilkinson & Co., of Newcastle, and the ironwork is by Mr. Smith, of Hexham.

*Blackburn.*—The foundation-stone has been laid of a new church in St. Paul's parish, Blackburn, dedicated to St. Barnabas. The building will be in the Early English style of architecture, and will contain 722 sittings. The estimated cost is about 7,000*l.* Mr. Varley, of Blackburn, is the architect.

*Staverton.*—Staverton Church has been re-opened, after restoration. The cost of the work has been 900*l.* The present church consists of a fine and lofty tower, with a nave, north aisle, and chancel, erected probably about A.D. 1350-1370, some of the windows, however, being of an earlier, and some of a later date. The restoration has comprised a new nave roof, new wood and tile floors in the nave, and new stone floors in the chancel, open bench seats of pitch pine being provided for the nave in place of the old pews, and choir stalls of the same material for the chancel. The western gallery has been removed and the tower arch opened out, the ringers being provided for by an intermediate floor. The plastering of the walls has been removed, the masonry being neatly pointed instead, which gives a pleasant effect to the interior. A warming apparatus, by Porritt, of Leicester, has been fixed under the nave floor. The works have been carried out by Mr. Gee, of Daventry, under the superintendence of Mr. H. M. Townsend, architect, of Peterborough.

*Ongar (Essex).*—The old church of St. Martin, at Chipping Ongar, has just had a new south aisle added to it, from the designs of Mr. C. C. Rolfe, architect, Oxford. Much of the ancient edifice dates from a remote period, and the south wall, which was taken down to make way for the extensions, was over 3 ft. thick, and composed in the main of old Roman tiles, measuring 1 ft. 3 in. by 7⅓ in., and varying from 1¼ in. to 1½ in. thick, and flints, all so firmly concreted together that their tearing asunder was a work of great difficulty. The new aisle is Early English in character, and built of red brick, with Bath stone dressings. The windows are triple lights, and the roof is covered with sheet lead. A stone arcade now divides the nave from the new aisle. The roof is exceptionally massive in its construction, and entirely of English oak. It is ornamented by bosses, spandrels, and paterœ, carved in the solid wall-plates, and the sculptured oak angels, each projecting 4 ft. 6 in., and bearing shields on which are carved the emblems of the Passion, form a conspicuous feature. These figures, and the stone and wood carving generally, have been carried out by Mr. Harry Hems, of Exeter. The new seating is of oak, the bench ends having foliated terminations. Mr. F. Noble, builder, of Ongar, carried out the masonry and brickwork, and Mr. H. Barlow, of the same place, the woodwork.

*Aston Rowant.*—The parish church of St. Peter and St. Paul, which has been recently restored, consists of nave, chancel, and western tower, with short north and south aisles. The walls of the nave are of the twelfth century, and there are remains of the twelfth-century windows and a door. Previously to the restoration it had become much mutilated, and at the western end the walls were tied together with iron bars. There was a western gallery blocking up a very beautiful and early fourteenth-century arch leading into the tower. An interesting feature in the work was the discovery of the original altar slab with the consecration crosses thereon still visible. This massive slab of stone has been mounted upon an oak frame and now stands a "movable table," though weighing scarcely anything less than a ton. The walls of the church are mostly of flint, and some excellent work has been done in the way of faced flint work by the builders. The work to the chancel was done by Mr. A. Groves, of Milton-under-Wychwood, and the remainder by Messrs. Silver, Sons, & Filewood, of Maidenhead, the whole being from the designs and under the direction of Mr. Edward G. Bruton, of Oxford, architect, and surveyor for the diocese.

**Female School of Art.**—Her Majesty the Queen has shown her appreciation of the work done in the Female School of Art, Queen-square, Bloomsbury, by purchasing seven fans of original design painted on silk, which were included in the late Exhibition of students' works.

## DISSENTING CHURCH-BUILDING NEWS.

*Croydon.*—A Congregational church is about to be erected in the London-road, West Croydon, for the Rev. J. P. Wilson, from designs prepared by Mr. W. D. Church, architect, South-place, Finsbury. Accommodation is provided for nearly 1,000 persons. The building will be in the Early Decorated style.

*Edinburgh.* — The foundation-stone has been laid of a new church in Drumsheugh-gardens, for the congregation of Free St. Andrew's, which is to supersede the present church in George-street. The new church is to be Renaissance in style, from the designs of Messrs. Douglas & Sellar, of Glasgow. It will have an imposing frontage, rising to a height of 100 *ft.* Three arched gateways open into a large vestibule, from which branches off a corridor encircling the whole interior, affording ready access to all parts of the area. A large gallery is placed over the vestibule, and narrow galleries will pass along two sides. The interior is to be lighted by sixteen large windows, placed in a clearstory. The cost of the new building will be about 15,000*l.*

*St. Stephen's-by-Launceston.*—A new Wesleyan Mission Chapel has been opened at St. Stephens-by-Launceston. The walls are of local stone with Portland dressings, and the roof is covered with Delabole slate. The building has been erected by Mr. William Burt, contractor, from plans, &c., supplied by Messrs. Wise and Wise, architects, Launceston. The estimated cost is about 340*l.*

*Seacombe.*—The memorial stone of a new chapel for the accommodation of the United Methodist Free Church congregation at Seacombe has been laid. The total cost of the new chapel, including the price of the site, will be between 800*l.* and 900*l.* It will accommodate 300 worshippers, and is expected to be opened about February next. The contractors for the work are Messrs. E. and R. M'Gloch, Seacombe, the joiner work being entrusted to Mr. J. W. Clarke, Seacombe.

## STAINED GLASS.

*Upper Norwood.*—Two more two-light windows of a series of ten in All Saints' Church, Upper Norwood, have just been filled with stained glass. They illustrate the presentation of Samuel, David slaying Goliath, Elijah restoring to Life the Son of the Widow, and David in the Lions' Den. The artists are Messrs. Mayer & Co.

*Norwich.*—A new memorial-window has been inserted by Messrs. H. & F. Bullard in the east end of the chancel of the church of St. Michael at Coslany, Norwich. The window is of the Decorated period, and has been copied from the old stones found embedded in the wall during the recent alterations. The central subject is the Descent from the Cross, and above the lights are to be filled with the four Evangelists The glass has been prepared and fixed by Messrs. Heaton, Butler, & Bayne, of London. The architect for the work was Mr. E. Preston Willins, Norwich, the builder being Mr. Hubbard, of East Dereham.

*Bishopsbourne.*—The memorial window erected in Bishopsbourne Church to Richard Hooker, "that learned and judicious divine," has been unveiled. Richard Hooker was rector of Bishopsbourne at the time of his death in the year 1600; and the only known memorial of him was a very poor slab monument in the south wall of the church, erected in 1633 by Sir William Cowper. The idea of a memorial window originated with the present rector, the Rev. T. Hirst. The glass has been executed in accordance with the style of art prevalent during the fourteenth century. The window is a large one of five lights, and the subjects illustrate incidents from the latter part of our Lord's life, beginning, in the left-hand light, with the "Entry into Jerusalem," and continuing with "The Last Supper," "Agony in the Garden," "Bearing the Cross," "Crucifixion," "Taking down from the Cross," "Entombment," "Resurrection," "Descent of the Holy Spirit," and finishing in the upper part of the centre light with "Our Lord in Majesty." In the lower part of the window is a predella of smaller subjects, forming types of those above. The work has been designed and executed by Messrs. Lavers, Westlake, & Co., of London, at a cost of about £400.

*Loughor.*—A new window is to be placed in the church of Loughor, in memory of the late Canon Powell Jones, of Llantrisant, and some time of Loughor. The window, representing the Transfiguration, was executed by Messrs. Heaton, Butler, & Bayne, of Covent-garden, from the design of Mr. J. B. Wilson, of Swansea.

## PROVINCIAL NEWS.

*Exeter.*—The first section of the extension of the Devon and Exeter Albert Memorial Museum, which was commenced in August, 1882, is now completed. The extension necessary to complete the whole of the buildings will entail a cost of between 5,000*l.* and 6,000*l.*, but the outlay on the section just completed, which was all the Extension Committee felt justified in undertaking at the time, will be somewhat in excess of 2,000*l.* The buildings just finished complete the north wing, and consist mainly of two large rooms, one on the ground-floor, which will be used for the extension of the library, where space is much needed; while the first floor will form a fine-art gallery. Each of these two large rooms is 65 ft. 6 in. long by 29 ft. 6 in. wide, and both are admirably lighted, the ground-floor by means of side-windows, and the art-gallery from the roof.——A new building has been added to the Devon and Exeter Hospital, in the shape of an out-patient department. The building lies at the end of the hospital near Magdalen-road. The builders are Messrs. Scadding & Son, and the architect is Mr. Medley Fulford.

*Newcastle-on-Tyne.*—The new Branch Post-office on Newcastle Quayside has been opened for business. The new office occupies the lower part of a block of buildings occupying a site on which several old offices formerly stood. The block of buildings, in which the new post-office is placed, is the property of Mr. Thomas Harper, and the architect was Mr. J. C. Parsons, of Newcastle.

*Stockport.*—The new building for the Higher Hillgate Liberal Club has been completed and opened. It has a frontage 47 ft. in length to Charles-street, off Higher Hillgate. The outside walls are 17 in. thick, cavitied. Stock brick is used in the front, and stone dressings. The building has been erected from the designs and under the direction of Mr. George Atkinson, architect, of Stockport, who also devised the special arrangements for heating and ventilating. The contractor for the building was Mr. Barlow, and the sub-contractors Messrs. Froggatt & Briggs, timber and stone; Mr. Henry Torrington, plumbing; and Mr. Charles Clarkson, slating.

*Hastings.*—The foundation stone of a new concrete groyne for the protection of the Fishery, was lately laid by the Mayor. The cost of the work will be about 10,000*l.* Sir John Coode is the engineer. Messrs. Lee are the contractors.

*Birmingham.*—Before the alteration and extension of the Midland Institute buildings took place, some very useful and costly instruments for meteorological purposes had been made and presented to the Institution by Mr. Follett Osler, F.R.S. These consisted of self-registering gauges for wind and rain, the former showing not only its direction, but its force; and also a barograph, or self-registering barometer. This latter is a most peculiar instrument, having its inches and parts three times lengthened, so that very minute changes of pressure are easily recognised. The alterations to the buildings necessitated the removal of the whole of these instruments, and no place was found convenient in which to re-erect them, as the lofty new buildings overshadowed the vanes. No doubt this ought to have been foreseen, and provision made by the erection of a proper tower. This, however, was not done, and, excepting the barograph, which is an independent instrument, they have all been out of use since, much to the regret of many in the town. Recently it has been found possible to utilise the old monument in Monument-lane, near the reservoir, for the purpose of these instruments. It is hoped the curator will find it convenient to record the daily readings in Paradise-street in the very graphical manner in which they were formerly presented, and which was so much appreciated. Mr. Alderman White signalised his year of office as Mayor by placing a barometer and thermometer, in bronze metal case, at the side of the principal entrance to the Council House, and it would be a very useful addition to the conveniences of the town if some standards of length (from a chain downwards) were placed where our tapes, chains, and rules in every-day use could be readily tested.

# The Student's Column.

## IRON ROOFS.—II.

BOWSTRING trusses are commonly employed for roofs of large span, especially for those of railway stations. The *bow* consists of an arched *boom* or rafter of I-section generally formed of a wrought-iron plate *web*, to which another plate or *flange* is riveted at top and bottom. A roof of this kind is shown by fig. 5, where A, B, C, D, E is the *boom* or curved

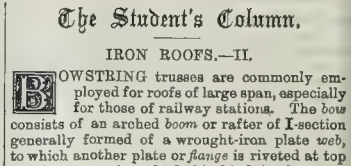



*Fig.* 5.

rib above described; B F, C G, D H, E K being struts of cast or wrought-iron of cross-section which are in compression, and are attachcd to the tie-rods A F, F G, &c., by means of couplings; the braces B G, C F, &c., are in tension and may be of round or flat bar iron.

One of the earliest roofs of this kind was that erected in the year 1847 over the Lime-street Station at Liverpool, which has a span of 153 ft., and a rise of 30 ft., the depth of the truss at the middle being 12 ft. The boom is of I-section 9½ in. deep and 10 in. wide; the cross-braces C F and D G are omitted in this truss. The trusses are placed 21½ ft. apart and the purlins are 12 ft. apart. The struts B F, C G are wrought-iron of I-section 7 in. deep, the tie-rods have a sectional area of 6½ in., and the cross bracing is of round iron 1¼ in. diameter.

A somewhat similar roof of much wider span was afterwards erected over the Birmingham station, of which the span is 212 ft. and the rise 40 ft.; the boom is of I-section 15 in. deep and 12¾ in. wide. The struts B F, C G, &c., are twelve in number and are all vertical, each being of cross-section formed of four L irons bolted together at top and bottom and made to swell out in the middle by pieces of cast iron inserted to keep them apart. The cross-bracing B G, C F, &c., is of flat bar iron ¾ in. thick and from 3 in. to 5 in. in depth. The tie-rods A F, F G, &c., are of round iron 4 in. diameter, and screwed into couplings at F, G, H, &c. The depth of the truss is 23 ft. at the middle.

The roofs of the Cannon-street and Charing-cross stations in London are good examples of the bowstring truss, the former having a span of 188 ft. with a rise of 60 ft., and a depth of truss at the centre of 30 ft. This roof has a boom 21 in. deep and 14 in. wide of I section; there are eight vertical struts of cross section formed of pairs of T-iron bars; the diagonal bracing is of flat bar iron, 6 in. deep and ⅜ to 1 in. thick. The tie-rods are of round iron 5¼ in. diameter.

The Charing-cross roof has a span of 164 ft., a rise of 45 ft., and the depth of the truss at the middle is 20 ft. The boom is 18 in. deep by 12½ in. wide. The vertical struts are of ½ in. T-iron, 6 in. by 3 in., and the diagonal bracing of ⅜ in. flat bar 4 in. wide. The tie-rods are of round iron, 4¼ in. diameter at the centre, and 4¾ in. at the ends next the wall.

The diagram of strains can be drawn for a bowstring truss in the manner described in the former article, by assuming the lines A B, B C, C D, &c., to be straight lines or chords of the arc, which will be quite near enough for all practical purposes.

In some cases the arched boom or rib is made of sufficient depth to dispense with the struts, a tie-rod being placed across from foot to foot of the rib, and held up by ties suspended from the rib. An example of this kind of roof is to be seen at the Victoria Station, London, where the roof of that over the Chatham and Dover Railway has the rib formed of lattice work with a span of 129 ft. and a rise of 41 ft.; the depth of the rib is 4 ft., and the tie-rod is 19 ft. below the bottom of the rib at the middle, being held up by fifteen oblique ties. The rib is built on the lattice principle, and is divided into thirty-two equal compartments by double struts of T-iron at right angles to the arch, between which are cross braces of flat bar iron riveted to the top and bottom booms, which are each formed of a pair of angle irons riveted together. The tie is formed of three bars of flat iron, 4 in. deep, placed side by side, and jointed where the

nsion-rods from the rib are attached. One d of the rib is supported on rollers to provide gainst the effects of changes of temperature. he roof of the Queen-street Railway Station, lasgow, is on this plan, the span being 170 ft. d the rise 44 ft.; the middle of the tie-rod is ft. above the springing, and is held up to the by six suspension rods. The rib is 4 ft. deep, d latticed with a single brace between each rut, on what is termed the "Warren" rinciple.

Sometimes the arched rib is employed for a oof without any apparent tie to prevent it from ursting out the supports, as in the case of the reat roof of the Midland Railway Station in ondon. Here the span is 240 ft., which is overed by a rib in the form of a pointed arch, aving a rise of 102 ft. The lower part of the b is shown by fig. 6, and is solid up to D E,

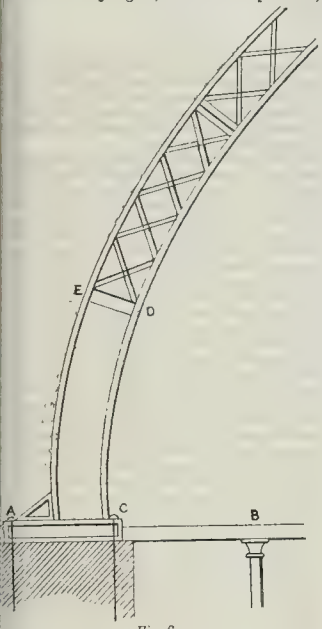



*Fig.* 6.

nd of open lattice work above, with a depth of ft., and width 1 ft. 4 in. The tie, however, in his case is obtained by means of continuous ron girders laid under the railway, and supported on columns in the basement story. These eing fixed to the feet of the ribs prevent any hrust from acting on the outer walls. The ase is fixed on an iron shoe, A C, bolted down o the bottom of the wall; the horizontal girder, C, which acts as a tie, being connected with his shoe.

When the metal of the rib in this roof xpands by heat the rib will rise at the centre, nd fall again as it gets cold. It is calculated hat the utmost pressure that can be thrown on his roof will not produce a greater strain than ½ tons per square inch of section of any porion. The main ribs are placed 29 ft. apart, ut there are three intermediate ones between ach pair: the purlins are 18 ft. apart and 4 ft. in. deep, formed with top and bottom of T-ron and bracing between; these being fixed etween the upper and lower flanges of the urved ribs serve to give them lateral support.

The roof over the St. Enoch station at Glasgow constructed on the same principle as the bove; the arched rib, which is elliptical and as a span of 198 ft., being held in at the feet y a base-plate 13 ft. long carried under the latform and held down by bolts. The rise of his arch is 80 ft. and its depth 5 ft., the conruction being that of a "Warren girder." nother roof of similar construction is that ver the Manchester central station, having a pan of 210 ft. and a rise of 85 ft.

*Arched roofs without horizontal ties* are frenently erected where sufficient strength of butment can be obtained to counteract the rust. The central roof of the Agricultural all, Islington, is a good example of this kind of roof and has a span of 124 ft., the ribs being formed of wrought-iron lattice-work and cast-iron struts with purlins of similar construction. Each rib is supported on two cast-iron columns to which the girders of the side galleries are attached and form an abutment for the central roof.

The roof of the Derby Market-hall is another specimen of the same form of arched roof, the span being 86 ft. and the ribs semicircular, their depth being 28 in. and consisting of a web of plate-iron perforated with quatrefoils, riveted to pairs of angle-irons at top and bottom. The purlins are 18 in. deep and of open lattice-work with top and bottom flanges formed of angle irons. The ribs rest on cast-iron columns, and the abutment is formed by cast-iron spandrels which support the side roofs on a level with the springing of the ribs.

The semicircular roof over the central transept of the Crystal Palace, which has a clear span of 104 ft., is so constructed as to cause little, if any, thrust on the abutments. The height of this roof above the ground-floor being over 100 ft. to the springing, and the situation being much exposed to the wind, it was necessary to give it great stiffness. This has been done by making the ribs 8 ft. deep, with double lattice bracing between the booms, which are formed of pairs of angle-irons riveted to a ½-in. plate, 10 in. wide. A portion of the rib is shown by fig. 7. The rib rests on the top of a pair of cast-iron columns at A and B, united together by a circular cast-iron frame, G, and strongly braced by the cast-iron girders H K, which carry the floors of the galleries. The struts at C D are of wrought iron, and those at E F, of which there are ten in each rib, are of cast iron, and have the purlins attached to them. The purlins are 6 ft. deep, and of lattice-work, similar to the ribs. The main ribs of this roof are 24 ft. apart, their great depth giving them all the stiffness of a girder, and the lateral abutments being only necessary in order to resist the action of the wind when blowing upon one side of the roof.

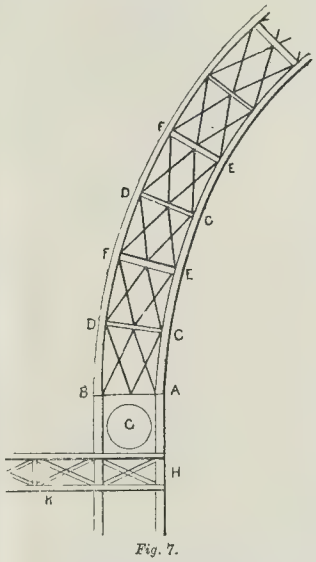



*Fig.* 7.

In the examples we have quoted of arched roofs, the ribs have had the same depth throughout. This is not always the case, however, the depth at the haunches being often greater than at the crown, which is the correct form of a rib, since the strain is least at the crown and greatest at the haunches. In the arched roof of the Dublin Winter Palace the depth at the haunches is double that at the crown, the span being 50 ft., and the depth at the crown 18 in. The arched ribs of the Paddington Station are also made deeper at the haunches than at the crown, the span of some of them being 102 ft.

Another kind of iron roof sometimes used for covering railway stations, is that formed of horizontal lattice girders thrown across from wall to wall, with longitudinal girders resting upon them. Upon this framework is constructed an ordinary ridge-and-furrow roof, covered with glass or slate. The largest roof of this kind is over the central station, Glasgow, of which the span is 213 ft., and the depth of the girders is 20 ft. A similar roof covers the Citadel Station, Carlisle, where the span is 154 ft., and the depth of the girders 15 ft. The pressure of the wind on a roof of this kind is much less than on one of high pitch.

An article on "Iron Roofs" will be found in the *Builder* for June 21 last, p. 883, vol. xlvi.

## RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

46, Improved Fireproof Building. E. L. Garbett.

The tubular bricks or courses which are here used are made in various curved patterns, and their resistance is strengthened by iron ties. The sections of the moulded brick-tubes are varied according as they are to construct stairs, a floor or terrace, a gabled or a hipped roof. The claims do not set forth any improvement in fireproofing, only dealing with construction according to the inventor's ideas.

2,377, Improvements in Chimney-pots. W. Beddows.

The improvement here is in the fixing of a stay fastened inside or outside of the chimney to which the chimney-pot is afterwards affixed. The security against damage by reason of high winds is very great, as the fastening, although simple, is effective. Projections or snugs are moulded on the ordinary terra-cotta chimney-pot, and holes or slots are made through these to receive the top of the iron stay, which is then either cottered or fastened by a bolt and nut. In building new chimneys the metallic stays can be built in as the work proceeds, the top ends being bent under from the inside to the position of the hole or slot in the snugs or projections on the outside. If the improvements are applied to existing chimneys the pots are placed on as usual, the metallic stays being fixed on the outside of the chimney. The lower ends of the stays are bent and driven into, and the brick or stone work being strengthened and fastened by nails in the various joints in the brick-work of the chimney.

153, Improvements in the Manufacture of Cement, &c. R. Stone.

The object is to effect improvements in the manufacture of cement by crushing and grinding the same while in a red hot state, and also to effect improvements in the machinery to be used in such manufacture. Kilns are built with air-chambers or reservoirs surrounding them. Into these reservoirs cold or hot air is pumped or forced by machinery. Special machinery is designed for grinding and crushing the material to a fine powder. Corrugated rolls are first used, then fine grinding rolls, and an adjustable bed plate. An improvement is also made in the form of the pestle and mortar; the mortar being formed of chilled cast iron, with grooves cut in. The pestles are of similarly hard material, solid or hollow spheres, and they work without the inconvenience of lower bearings and their lubrication is avoided.

APPLICATIONS FOR LETTERS PATENT.

*Nov.* 21.—15,324, G. W. Usill and W. Fyfe, Pipe Joints and Jointing.—15,325, W. Watson, Decorative and Ornamental Designs.—15,334, F. Hobbs, Set Cement for Lead Light Glazing.—15,335, T. S. Ellis, Wall Ventilator.—15,354, J. Holroyd, Construction of Sewers.—15,358, R. Imray, Joints for Lead or other Soft Metal Pipes.

*Nov.* 22.—15,375, J. Gilchrist, Water-closet Cisterns.—15,385, G. Perrott, Construction of Bakers' Ovens.—15,408, H. J. Haddon, Machinery for Sawing or Dressing Stone.—15,414, S. B. Thomas, Window Sash Fastenings.

*Nov.* 24.—15,432, A. Lamb, Steam Boiler Flue.—15,441, T. Bear and H. Ransom, Combined Circular Saw, Fret Saw, and Drill.—15,442, R. Walker, Cement Portland Tiles.—15,450, E. C. Murray, Room-to-room Communicator.—15,460, E. De. Pass, Preparing Tiles, Slabs, or Flags in panel form.—15,468, J. Rettie, Cutting and Dressing Stone, Marbles, &c.—15,469, E. Edwards, Slow-combustion Stoves.

*Nov.* 25.—15,488, Ch. Held, Connexion for Water-closets.—15,489, J. Fagan, Water-closet Cisterns.—15,503, J. M. Brydon, Automatic Sash Fastener and Lifter.—15,525, W. R. Lake, Water-closet Apparatus.

*Nov.* 26.—15,570, A. J. Ward, Drainage Pavings for Stables, &c.—15,586, E. V. Gardner, Manufacture of White Lead.—15,600, F. R. Baker, Improvements in Cooking Ranges.

*Nov.* 27.—15,610, W. Ellis and J. E. Ellis, Improvements in Frames.—15,613, F. T. Watts, Water-waste Preventers.—15,628, G. J. C. Marie, Colouring Stone, Marble, and other Materials for Building and other Purposes.—15,634, W. Cunningham, Lime, Brick, and Cement Kilns.—15,635, R. Chantry, Water-waste Preventer.—15,636, H. R. Hiorns, Manufacture of Pipes of Lead, Tin, Composite, and other Metals.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,213, A. Pimm, an Improved Pavement.—14,190, G. H. Lane, Stop for Dowelling Bits.—14,288, H. Swete, Ante-Vacuum Valve for Preventing the Suction of Sewer-gas into Water-pipes and Mains.—14,304, E. Pearson, Water-closets.—14,611, J. Howard, Automatically Regulating the Closing of Doors.—14,888, F. W. Willcox, Improvements in Ventilators.—14,906, H. Sykes, Improvements in Planes.—14,957, W. C. Morton, Improvements in Window Blinds.—14,984, W. Edwards, Improvements in Bolts.—14,125, G. C. Davies, Ventilating Grease Traps for House Sinks.—14,243, F. Herbert, Ventilators.—14,464, T. Birch, Weather Bars for Doors, Windows, &c.—14,721, H. E. Devaux, Manufacture of Cement.—14,918, R. Lawrence, Apparatus for Polishing Granite.—14,974, T. Fraser, Domestic Fire Grates.—15,014, J. Thompson and J. H. Bryant, an Improved Artificial Stone.—15,037, R. Anderson, Flushing Apparatus.—15,074, W. J. Brewer, Daylight Reflector.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

1,792, G. Brodie and J. D. Prior, Improvements in Fire Grates.—1,856, H. H. Lake, Improvements in Soil or Drain Pipes.—2,247, C. J. Lortzing, Manufacture of Asphalte.—2,686, A. B. Johnson, Preventing the Rattling of Window-sashes.—2,984, F. George, Connexions for Lead Pipes, &c.—10,393, C. Lawrence, Ventilating Apparatus.—13,260, H. J. Allison, Improvements in Brick Kilns.—350, H. Forrester, In-laying Wood.—1,960, S. Welman, Water-closet Apparatus.—2,110, A. Drummond, Sash Bars or Astragals.—2,528, J. M. Lamb, Ventilators and Chimney Cowls.—3,243, W. Vincent, Roofing Tiles.—14,239, H. J. Allison, Rendering Buildings Fireproof.—14,368, J. Holroyd and J. Lang, Automatic Flushing Syphons.

## RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

NOVEMBER 26.

By Walker & Runtz.

Wandsworth—St. Andrew street, ground-rent of 5*l.* 10s., reversion in 80 years ..... £115
Crichton-street—Ground-rent of 129*l.* 15s., reversion in 8 years ..... 2,802
Westbury-street—Ground-rent of 53*l.*, reversion in 80 years ..... 1,150

NOVEMBER 27.

By Worsfold & Hayward.

Dover—271 and 272, Londonroad, freehold ..... 630
27, Biggin-street—Freehold business premises ... 3,200
Alkham—Two freehold cottages ..... 190

By Walker & Runtz.

Wandsworth—Westbury-street, ground-rent of 137*l.* 10s., reversion in 80 years ..... 2,570
Battersea—Plough-road, ground-rent of 134*l.* reversion in 82 years ..... 2,998
Benham-street—Ground-rent of 109*l.* 2s., reversion in 82 years ..... 2,195
Stockwood-street—Ground-rent of 43*l.*, reversion in 82 years ..... 875
Tritton-street—Ground-rent of 41*l.*, reversion in 82 years ..... 820
Wayland-road—Ground rent of 66*l.* 10s., reversion in 82 years ..... 1,340
Croydon—Pawson's-road, &c., ground-rent of 81*l.* 2s. 6d., reversion in 79 years ..... 1,735

NOVEMBER 28.

By Edwin Smith & Co.

Old Bond-street—No. 38, term 50 years, ground-rent 5*l.* ..... 7,050

By Jenkins & Son.

Deptford—49-60, Butcher's-row, and 1-7, Glebe-court, freehold ..... 1,375
Brockley—18, Brighton-terrace, 86 years, ground-rent 8*l.* ..... 300

By Murrell & Scobell.

Harpenden, Herts—Laburnum Villa, two cottages and 5a. 0r. 1p. ..... 1,170
Belgrave-n—2, Chichester-street, 49 years, ground-rent 9*l.* ..... 1,090
St. John's Wood—Ground-rent of 21*l.* a year, term 53 years ..... 450
Islington—12, Bemerton-street, 56 years, ground-rent 8*l.* ..... 650
Russell-square—21, Montague-street, 14 years, ground-rent 11*l.* 10s. ..... 640

By Robert Reid.

Old Kent-road—305 and 307, East-street, and 15-23 odd, Albreton-street, 114 years, ground-rent 80*l.* 580
Lambeth—18 and 19, Pleasant-row, Duchy of Cornwall lease ..... 120
Kingsland-road—250 and 252, 23 years, ground-rent 9*l.* ..... 705
Barbican—Ground-rent of 154*l.* a year, reversion in 74 years ..... 4,200
Bermondsey—25, Spa-road, freehold ..... 1,370
Notting-hill—30 and 32, Ladbroke-grove, 37 years, ground-rent 20*l.* ..... 1,000

DECEMBER 1.

By G. A. Wilkinson.

Milton, Kent—1-5, Glenview-road, and 1 and 2, Parrock-road, and 2 acres of land, freehold ..... 6,150
St. John's Wood—42, Finchley-road, 35 years, ground-rent 16*l.* ..... 1,780
Forest-green—Coldtail Lodge, freehold ..... 770
Barnsbury-square—West Lodge, 24 years, ground-rent 4*l.* ..... 395

By R. Tidey & Son.

Islington—61, Oakley-road, 57 years, ground-rent 5*l.* 10s. ..... 500
76, Upton-road—38 years, ground-rent 4*l.* ..... 465

By Parsons & Sons.

York—One-sixth share of 423*l.* 1s. 9d. arising from fee farm rents ..... 1,010

By Phillips & Webb.

Kensington—No. 3, Notting-hill-grove, 39 years, ground-rent 10*l.* ..... £570

By Collett & Collett.

Notting-hill—70, Bevington-road, 82 years, ground-rent 7*l.* ..... 300

By Pettitt, Son, & Byrne.

Haymarket—No. 44, the lease, 19 years ..... 520

By Baker & Sons.

Stratford—Victoria Docks, near, 79 plots of freehold land ..... 3,325

DECEMBER 2.

By W. Weatherley.

Holloway—57, Durham-road, freehold ..... 305
Hammersmith—1, 2, and 3, Waterworks-place, copyhold ..... 340
Southwark—1, Richmond-street, freehold ..... 900

By Rushworth, Abbott, & Stevens.

Regent-street—The lease, goodwill, and plant of 36 and 37, King-street, and 4, 6, 7, and 8, Little Marlborough-street, term 5 years ..... 800

By A. & A. Field.

Mile-end—Ground-rent of 8*l.* a year, reversion in 24 years ..... 405
Ground-rent of 25*l.* 10s. a year, reversion in 22 years ..... 1,115
Spitalfields—1, Quaker-street, freehold ..... 610
Victoria Park—172, Sewardstone-road, 73 years, ground-rent 3*l.* 15s. ..... 290
Mile-end—116, Jamaica-street, 27 years, ground-rent 4*l.* ..... 290

By Debenham, Tewson, Farmer, & Bridgewater.

Kennington—104-124, even, Upper Kennington-lane, freehold ..... 5,340
127, 129, and 131, Vauxhall-street, freehold ..... 2,220
1-4, Pledges-place, freehold ..... 650
117-125, odd, Vauxhall-street, and 1-5, Cottage-place, freehold ..... 2,100
Newburn-street—The Rising Sun beerhouse, freehold ..... 650
63-85, odd, Newburn-street, freehold ..... 2,090
1-11, Norfolk-street, and 6-13, Cottage-place, freehold ..... 3,020
96 and 98, Newburn-street, freehold ..... 600
85-115, odd, Vauxhall-street, freehold ..... 5,600
2-16, even, Malmsey-place, freehold ..... 1,390

DECEMBER 3.

By Hobson, Richards, & Co.

Kentish Town—Oakfield-crescent, a plot of freehold land ..... 95

By C. A. Richards.

Islington—15, 19, and 21, Brewery-road, 68 years, ground-rent 15*l.* ..... 1,005
27, Brewery-road, with forge, stabling, &c., 69 years, ground-rent 10*l.* 10s. ..... 880

By Grogan & Boyd.

Marylebone—16 and 17, Barrett-street, freehold ... 2,040
8, Bird-street, freehold ..... 1,010
15 and 16, Gray's Buildings, freehold ..... 1,000
10 and 34, Somerset-street, freehold ..... 5,240
2 and 5, Duke-street, freehold ..... 3,530

DECEMBER 4.

By Richard J. Collier.

Enfield—An enclosure of freehold land, 7a. 2r. 24p. 900
Dalston—69, Albert-rd., 66 years, ground-rent 5*l.* 5s. 415
Lower Sydenham—Ground-rent of 31*l.* a year, reversion in 97 years ..... 630
Laurel-terrace, ground-rent of 23*l.* a year, reversion in 97 years ..... 505
Albert-terrace, ground-rent of 19*l.* a year, reversion in 96 years ..... 420

## MEETINGS.

MONDAY, DECEMBER 8.

*Surveyors' Institution.*—(1) Resumed Discussion on Mr Shaw's paper on "Farm Tenancy Agreements in relation to the Agricultural Holdings Act." (2) Paper by Mr E. Smyth on "The Arithmetic of Compensation for Agricultural Drainage." 8 p.m.

*Parkes Museum.*—Mr Ernest Hart on "National Precautions against Cholera." 4·30 p.m.

*Society of Arts (Cantor Lectures).*—Mr. Harold B. Dixon, M.A., on "The Use of Coal Gas." II. 8 p.m.

*Inventors' Institute.*—Discussion on the Patent Act, 1883. 8 p.m.

TUESDAY, DECEMBER 9.

*Institution of Civil Engineers.*—Discussion on Steam Tramways. 8 p.m.

*St. Paul's Ecclesiological Society.*—Mr. J. D. Sedding "On Modern Ecclesiastical Art." 7·30 p.m.

*Anthropological Institute.*—8 p.m.

WEDNESDAY, DECEMBER 10.

*British Museum.*—Mr. W. St. Chad Boscawen on Assyrian and Babylonian Antiquities. 2·30 p.m.

*Parkes Museum.*—Dr. W. B. Beatson on "Sanitation at a Health Resort." 7·30 p.m.

THURSDAY, DECEMBER 11.

*Parkes Museum.*—Mr. W. Eassie on "The Systems of Treating Water in Basements for draw-off and other up-stairs purposes." 8 p.m.

*Society of Antiquaries.*—8·30 p.m.

*Society of Arts (Howard Lectures).*—Mr. W. Anderson on "The Conversion of Heat into Useful Work." III. 8 p.m.

*Society of Telegraph-Engineers and Electricians.*—Mr. W. H. Preece "On Electricity in America, 1885." 8 p.m.

## Miscellanea.

**Highbury.**—A parish room for Christ Church, Highbury, has recently been built by Mr. Nightingale, of Lambeth, from the designs of Mr. J. Douglass Mathews, of Dowgate-hill. It consists of a hall to seat 300 persons, with large class-room in rear, and scullery, &c. The interior, as well as the exterior, is faced with yellow bricks and red brick bands. The roof is open-timbered and boarded, with ventilation chamber in upper portion. The total cost will be about 1,400*l.*

**The New Railway to Gravesend.**—The new line of railway which will give the London, Chatham, and Dover Company direct access to Gravesend has just been completed, and is intended to be opened for traffic at the commencement of the new year. The railway leaves the Company's main line at a point between the Farningham-road and Fawkham Stations, about twelve miles from Rochester, passing for a considerable distance through a chalk cutting, the remaining portion of the line to Gravesend being, for the most part, on embankment. There are three stations on the line, namely, Southfleet, Rosherville, and the terminal station at Gravesend, which is situated within about 150 yards from the margin of the river. In connexion with the line a strong pier has been constructed. It extends out into the river for a distance of 200 yards, where the depth of water is about 20 ft. at low tide, and where vessels of 5,000 tons' burthen will be enabled to come alongside. The pier is opposite the new Tilbury Docks, now in course of construction. The works have been carried out under the superintendence of Mr. Charles Douglas Fox, the engineer, Mr. G. B. Bruce, jun., being the contractor.

**Novel Method of Strengthening a Bridge Pier.**—When the Chestnut-street Bridge over the Schuylkill river, at Philadelphia, was built a score of years ago, the foundations of the land piers were laid on piling, and not upon the bed rock, which at this point is about 50 ft. below the surface. The soil is a clayey mud, and almost from the very beginning this slippery mass slid gradually year by year, carrying with it the piles and heavy stone pier above. The stonework shows cracks and fissures, and the settling of the ironwork is apparent. In the hope of preventing any further sliding, a novel plan has been adopted, which consists in sinking four cylinders at an angle of 45 degrees and extending from the rock to the foundation of the pier. These cylinders are of ½-in. wrought-iron, 8 ft. in diameter, and, when completed and in place, they will be filled up solid with concrete. They are built underground, each segment being about 3 ft. long and 2 ft. high, backed by heavy angle iron on all sides to allow of bolting together. The scene of operations underground is reached through an iron shaft leading to the surface and covered by an air lock. Operations have to be carried on in compressed air, to prevent the influx of water.—*Iron.*

**Antwerp International Exhibition 1885.**—The Lords of the Committee of Council on Education have received information through Her Majesty's Principal Secretary of State for Foreign Affairs that Her Majesty's Consul at Antwerp has been appointed British Commissioner for the International Exhibition which is to be held at Antwerp next year, and that Mr. P. L. Simmonds has been appointed by the Executive Council of the Exhibition at Antwerp their Agent-General for Great Britain and Ireland. The Exhibition in question is a national undertaking under the immediate patronage of His Majesty the King of the Belgians and of the Belgian Government. The President of the Exhibition is H.R.H. The Count of Flanders, and the Vice-President the Minister of Agriculture, Industry, and Commerce. The office of the Agent-General is at 35, Queen Victoria-street, and communications from intending exhibitors should be addressed to him there.

**A National Park for New South Wales.**—The Government of New South Wales have reserved one of the finest and most picturesque portions of the colony for a national park. It is situated in the Illawara district, and embraces an area of 36,000 acres, having a frontage of 7½ miles to the Pacific Ocean. The park generally may be described as high table-land, from which, at numerous places, excellent and extensive views are obtained of the ocean, Port Hacking, Botany Bay, Sydney, Randwick, &c., with deep gorges, and rich flats covered with beautiful foliage, bordering running streams of the purest fresh water. The high table-lands to some extent consist of comparatively barren stony heaths and of fair to good land, the latter in areas suitable for formation of recreation, review, and encampment grounds, or of plantations of ornamental trees, &c., situated at elevations of from about 350 ft. to about 900 ft. above high-water mark. The park will be made easily accessible from Sydney by the Illawarra Railway, now in course of construction.

**The Rowland Hill Benevolent Fund.**—The Lord Mayor makes a special appeal to the public on behalf of the Rowland Hill Benevolent Fund, of which he is a trustee, and which has for its object the relief and assistance of Post-office *employés* distressed from poverty, age, or infirmity, and of their widows and orphans throughout the United Kingdom. When it is remembered that the number of persons employed in the Post-Office is over 53,000, and that cases of distress are very frequent and pressing, the absolute need of some such organisation as this becomes apparent. As a memorial of the late Postmaster-General, it has been determined to set apart a limited portion of the Fund,—to be called "The Fawcett Memorial Fund,"—for the benefit of those *employés* or their widows or orphans who may be afflicted with blindness. Subscriptions for this special purpose should be sent to the Lord Mayor, at the Mansion House.

**Bedford.**—New class-rooms in connexion with the Harpur Trust Grammar School have been opened by Earl Cowper, the Lord-Lieutenant of the county. The new building contains a useful suite of class-rooms, which have been in use since the beginning of the present year, and provides accommodation for about 300 boys,—a necessary provision for a school that has risen under the present headmastership from 270 in 1875 to 584. Mr. Basil Champneys, the designer of the new schools for girls on the Bromham-road, was the architect of the new class-rooms, and the work was successfully carried out by Mr. Samuel Foster, of Bedford and Kempston.

**Tramway Depot at Camberwell.**—The skating Rink in Camberwell New-road, which has been closed and standing idle for some four or five years since the skating-rink mania collapsed, has just been purchased by the London Tramway Company, who are about to erect an extensive carriage depôt and stables on the site. The property, which adjoins the London, Chatham, and Dover Railway, covers an area of about three acres. The materials of the buildings on the site have been sold during the present week. The new buildings will include stabling for about 100 horses.

**Ward & Lock's "Technical Journal."**—We have received an advance copy of Part I. of this periodical, which is to be a kind of encyclopædic journal of technical science and industrial arts and processes. It promises a great variety of technical information in a popular form. We hope the promoters will not fail by attempting too much. They give with the first number a folding supplement sheet containing "about fifty types of different styles of domestic architecture." These are very bad, and had much better have been omitted. The letterpress seems fairly written.

**Exeter.**—The Church of the Sacred Heart, Exeter, erected from designs by Messrs. Leonard Stokes, of London, and Charles Ware, of Exeter, was opened on the 18th ult. It is built of Westleigh stone; and for the internal facings Bocombe stone has been principally used. The windows are filled with tinted glass, and the heating is supplied by a Musgrave patent stove. The floors throughout are laid with wood blocks on the patent system of Messrs. Geary & Walker, of Manchester. Exclusive of the site the cost has been about 10,000*l.*

**"Old Japanese Art."**—This was the subject of a paper read on Tuesday evening by Mr. Robert M. Young, architect, before the members of the Belfast Natural History and Philosophical Society. The subject was discussed by Mr. W. H. Patterson, M.R.I.A. (hon. secretary), Rev. Canon Grainger, Mr. J. J. Murphy, and the Chairman, all of whom expressed the indebtedness of the society to Mr. Young for his interesting paper.

**A New Process of Photographic Printing.**—Messrs. Marion & Co. have just introduced a new photographic printing-paper, by means of which prints can be obtained from a negative during the winter in a few seconds, which would require by the ordinary photo-bumen paper process at least half a day. Thus the new paper puts a new power into the hands of photographers.

**Widnes.**—A new Catholic day school for boys, in connexion with St. Bede's Catholic Chapel, Appleton, Widnes, and capable of accommodating 400 scholars, has been opened. The school is two stories in height, substantially built, and provided with several class-rooms. The style is Gothic, and the architect is Mr. Scholow, of Liverpool and St. Helens.

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Additions to Vestry Hall Buildings | Chelsea Vestry | 100 guineas, first<br>50 ,, second<br>30 ,, third | Feb. 23rd | i. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Portland Cement | Director - General of Stores, India | *Official* | Dec. 9th | ii. |
| Construction of Concrete Pier at Newlyn | Newlyn Pier & Harbour Commissioners | J. C. Inglis | Dec. 13th | xx. |
| Works and Materials for one year | St. George, Hanover-sq | G. Livingstone | do. | ii. |
| Erection of Inland Revenue Office, Portsm'th | Commissnrs. of Works | *Official* | do. | i. |
| Works, &c., and Supply of Building Materials | War Department | do. | Dec. 15th | ii. |
| Fittings | Central Technical Coll. | A. Waterhouse | do. | ii. |
| Works and Repairs | Lon. & S. W. Ry. Co. | Engineer | Dec. 16th | ii. |
| Formation of Footpath at Hackney Downs | Met. Board of Works | *Official* | Dec. 17th | ii. |
| Repairs to Roads and Paths, Finsbury Park | do. | do. | do. | ii. |
| Enlargement of Huddersfield Passenger Station | Lon. & N. W. and Lan. and Yorks. Ry. Co. | Engineer | Dec. 18th | ii. |
| Sewerage Works | Darlaston U. S. A. | E. Pritchard | do. | ii. |
| Alterations to Assize Courts, Hertford | County of Hertford Magistrates | Urban A. Smith | Dec. 19th | ii. |
| Forming and Laying-out of Cemetery, at Bowling | Bradford Corporation | J. H. Cox | Dec. 22nd | ii. |
| Boiler-House and Chimney-Shaft | Railway Servants' Orphanage, Derby | A. A. Langley | do. | xx. |
| Sewerage Works | Tottenham Local Board | Mr. De Pape | Dec. 23rd | ii. |
| Sewerage | Swansea U. S. A. | R. H. Wyrill | Dec. 31st | ii. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Surveyor | Skipton Local Board | Not stated | Dec. 16th | xviii. |
| Surveyor | Swindon New Town Local Board | 180*l.* | Dec. 17th | xviii. |
| Surveyor | Bury St Edmund's U.S.A. | 250*l.* | Dec. 21st | xviii. |
| Architectural Draughtsman | Civil Service Com. | Not stated | Dec. 24th | xviii. |

## TENDERS.

For the erection of proposed artisans' dwellings situate Chatham-gardens and Nile-street, City-road, for the Joint Estate Trustees of the Joint Parochial Charities of St. Giles's Without, Cripplegate, and St. Luke's, Middlesex. Messrs. Woodthorpe & Hammond, architects. Quantities supplied by Messrs. Franklin & Andrews :—

| | |
|---|---|
| Dove Bros. | £53,750 0 0 |
| Geo. Shaw | 52,697 0 0 |
| Holland & Hannen | 51,745 0 0 |
| Thos. Rider & Son | 50,488 0 0 |
| Wm. Shurmur | 49,986 0 0 |
| W. G. Larke & Son | 49,700 0 0 |
| Colls & Sons | 49,637 0 0 |
| Martin, Wells, & Co. | 49,190 0 0 |
| John Mowlem & Co. | 48,438 0 0 |
| Ashby & Horner | 47,300 0 0 |
| L. H. & R. Roberts | 47,043 0 0 |
| Edward Conder | 47,018 0 0 |
| John T. Chappell | 46,976 0 0 |
| Wm. Brass | 46,777 0 0 |
| Kirk & Randall | 46,728 0 0 |
| Ashby Bros. | 46,200 0 0 |
| E. Lawrence & Sons | 45,204 0 0 |

For pewterers' work at The Royal Standard, York-road, Battersea, for Messrs. Sansom & Ewington. Mr. H. I. Newton, architect, Queen Anne's-gate, Westminster :—

| | |
|---|---|
| Heath | £133 0 0 |
| Davidson | 125 10 0 |
| Kemble (accepted) | 117 0 0 |

For new public-house, The Compasses, Upper Kingstreet, Norwich, for Messrs. Steward, Patteson, Finch, & Co. Mr. Arthur J. Lacey, architect. Quantities by the architect :—

| | |
|---|---|
| J. Hurn, Norwich | £1,060 10 0 |
| Wilkin & Wilkins, Norwich | 1,050 0 0 |
| W. A. Brewster, Norwich | 1,015 10 0 |
| G. E. Hawes | 1,000 0 0 |
| H. Lacey | 992 3 0 |
| S. Sendall (accepted) | 947 0 0 |

For new mission hall, St. Thomas, Heigham, Norwich. Mr. Arthur J. Lacey, architect and surveyor :—

| | |
|---|---|
| R. W. Bennett, Norwich | £1,125 0 0 |
| G. Hammond, Norwich | 1,050 0 0 |
| W. E. Bailey, Norwich | 1,037 10 0 |
| J. Hurn, Norwich | 998 18 0 |
| Downing & Son, Norwich | 993 0 0 |
| G. E. Hawes, Norwich | 950 0 0 |
| J. Youngs, Norwich | 945 0 0 |
| H. Lacey, Norwich | 938 0 0 |
| Wilkin & Wilkins, Norwich * | 920 0 0 |
| S. Sendall, Norwich | 917 0 0 |
| R. Dawes, Norwich | 899 9 6 |

* Accepted.

For making and draining, with sewer and surface-water drains complete, certain new roads on the Grove Estate, Muswell-hill, for the Imperial Property Investment Company, Limited, 57, Moorgate-street, E.C. Mr. G. H. L. Stephenson, surveyor :—

| | |
|---|---|
| Pizzey, Hornsey | £5,476 0 0 |
| Bell, Tottenham | 4,000 0 0 |
| Wilson, Walthamstow | 3,992 0 0 |
| Dunmore, Crouch End | 3,329 0 0 |
| Adams, City (accepted) | 3,440 0 0 |

For new house at Moseley, Worcestershire, for Mr. Walter Clarke. Mr. T. W. F. Newton, architect, Waterloo-street, Birmingham. Quantities by Mr. Henry Clere, Bennett's-hill :—

| | |
|---|---|
| Barker & Sons | £2,689 0 0 |
| F. T. Briley | 2,664 0 0 |
| Sapcote & Sons | 2,599 0 0 |
| T. Rowbotham | 2,559 0 0 |
| J. Bower (accepted) | 2,497 0 0 |

For block of four seven-roomed cottage villas, with iron fencing and Stafford blue brick paving, at Cheshams, for Mr. A. Hinson. Mr. T. Foster Woodman, surveyor, St. Albans :—

| | |
|---|---|
| C. Monk | £774 0 0 |

For new mahogany and plate-glass double shop-front to premises in the Old London-road, St. Albans, for Mr. T. Hunt. Mr. T. Foster Woodman, surveyor :—

| | |
|---|---|
| Harris | £115 0 0 |

For forming a hard road with grips at Betlow, Tring, for the executors of the late Mr. H. Cox. Mr. T. Foster Woodman, surveyor :—

| | |
|---|---|
| Rowland Bros. | £245 0 0 |

For the erection of Wesleyan Chapel, Ashbourne-road, Derby. Mr. John Wills, architect, Derby. Quantities by Mr. Robey E. Carpenter, Horninglow-street, Burton-on-Trent :—

| | |
|---|---|
| W. Fletcher | £4,504 0 0 |
| Edward Wood | 3,900 0 0 |
| Isaac Porter | 3,900 0 0 |
| Thos. Bakewell | 3,850 0 0 |
| John Wood | 3,831 0 0 |
| Walker & Slater (accepted) | 3,586 0 0 |

For erection of Wesleyan Chapel, Five Crosses, Frodsham. Mr. John Wills, architect, Derby. Quantities by Mr. Robey E. Carpenter, Horninglow-street, Burton-on-Trent :—

| | |
|---|---|
| J. Littler (accepted) | £1,400 0 0 |

For the erection of two houses in Pemberton Gardens, St. John's Park, Upper Holloway. Mr. Marshall N. Inman, architect, 7, Bedford-row, W.C. :—

| | One house. | Two houses. |
|---|---|---|
| W. Sayers | £995 0 | £1,888 0 |
| Horner | 836 0 | — |
| G. Pearce | 775 0 | — |
| G. Stephenson | 760 0 | 1,431 0 |
| Price & Stephenson * | 750 0 | 1,370 0 |

* Accepted.

For the restoration of Cannington Church, Somerset. Messrs. Down & Son, architects, Bridgwater :—

| | |
|---|---|
| Pearce, Minehead | £1,625 12 0 |
| Kitch, Bridgwater | 1,600 0 0 |
| H. W. Pollard, Bridgwater | 1,480 0 0 |
| Merrick & Son, Glastonbury | 1,475 0 0 |
| Harris & Tapscott, Bridgwater | 1,467 10 0 |
| Spiller, Taunton (accepted) | 1,450 0 0 |

Accepted for new shop-front for Mr. Alfred Hays, New Bond-street :—

| | |
|---|---|
| F. Sage & Co. | £210 0 0 |

Accepted for new shop-front and fittings at shop under the Royal Exchange, for Messrs. E. Dent & Co. :—

| | |
|---|---|
| F. Sage & Co. | £118 10 0 |

For the erection of warehouse and stabling for Mr Robert Seely, Bailgate, Lincoln. Messrs. Bellamy & Hardy, architects. Quantities supplied:—

| | | | |
|---|---|---|---|
| Codd & Esberger | £580 | 0 | 0 |
| Cowen & Lansdowne | 465 | 0 | 0 |
| J. Greenwood | 457 | 0 | 0 |
| M. W. Hampshire | 439 | 0 | 0 |
| Binns & Co. | 425 | 0 | 0 |
| Martin & Sims | 419 | 0 | 0 |
| J. M. Harrison | 408 | 0 | 0 |
| S. & R. Horton | 401 | 0 | 0 |
| H. S. & W. Close | 400 | 0 | 0 |
| J. Guy | 386 | 0 | 0 |
| J. B. Harrison (accepted) | 372 | 0 | 0 |
| Crosby & Sons | 372 | 0 | 0 |

For erecting new mission hall and schools, Mere-road, New Evington, Leicester. Mr. W. S. Burton, architect and surveyor:—

| | | | |
|---|---|---|---|
| E. Walker | £967 | 15 | 0 |
| J. Ellingworth | 943 | 0 | 0 |
| J. Marston | 937 | 0 | 0 |
| Tyers & Yates | 924 | 0 | 0 |
| J. Priddett | 921 | 0 | 0 |
| R. H. G. Barnett | 920 | 0 | 0 |
| Duxbury & Son | 913 | 0 | 0 |
| T. C. Tyers | 910 | 0 | 0 |
| J. Mason | 907 | 0 | 0 |
| Cunningham & Palmer | 905 | 0 | 0 |
| J. Holmes | 887 | 12 | 0 |
| A. Woodcock | 886 | 0 | 0 |
| T. Johnson | 883 | 0 | 0 |
| Richardson & Son | 870 | 12 | 0 |
| J. Stephens | 868 | 0 | 0 |
| N. Elliott | 865 | 0 | 0 |
| J. J. Hallam | 859 | 17 | 6 |
| C. Bass | 8 | 7 | 0 |
| C. Wright (accepted) | 800 | 0 | 0 |

For town-hall and market-place, Carlow. Mr. William Hague, architect, Dawson-street, Dublin. Quantities prepared by Mr. Frederick Morley, Commercial Buildings, Dublin:—

| | | | |
|---|---|---|---|
| Patrick Nolan, Monahan | £3,740 | 0 | 0 |
| J. Pemberton & Son, Dublin | 3,300 | 0 | 0 |
| Wm. Dodd, Beckett, & Co., Dublin | 3,220 | 0 | 0 |
| Bernard Brady, Bray | 3,168 | 3 | 0 |
| Thos. & J. Pemberton, Dublin | 2,898 | 0 | 0 |
| Geo. J. Crampton, Dublin | 2,853 | 0 | 0 |
| Thos. Tighe & Son, Dublin | 2,790 | 0 | 0 |
| John Redmond, Wexford | 2,681 | 8 | 9 |
| Daniel Carbury, Athy | 2,550 | 0 | 0 |
| Michael Robinson, Carlow | 2,486 | 0 | 0 |
| Wm. Connolly & Son, Dublin* | 2,327 | 0 | 0 |
| Breslin Bros., Dublin | 2,300 | 0 | 0 |

* Accepted.

For the erection of dwelling-house and shop in Regent-street, New Swindon, Wilts, for Mr. Coroner Baker. Mr. William Drew, architect, Swindon. Quantities by the architect:—

| | | | |
|---|---|---|---|
| Barrett | £385 | 0 | 0 |
| Williams | 370 | 0 | 0 |
| Wiltshire, Swindon (accepted) | 360 | 0 | 0 |

For works to be done in fitting-up new loose boxes, &c., at Stratton St. Margaret, near Swindon, Wilts, for Mr. Edward Burrow. Mr. William Drew, architect, Swindon:

| | | | |
|---|---|---|---|
| Williams | £210 | 0 | 0 |
| Phillips | 205 | 0 | 0 |
| Barrett | 195 | 0 | 0 |
| Colborne | 195 | 0 | 0 |
| Wiltshire | 174 | 0 | 0 |

For the erection of new house, &c., Ladyswood, Shenton, Wilts, for Sir Thomas Dancer, bart. Mr. W. Ravenscroft, architect, Reading. Quantities supplied by Messrs. Cooper & Sons, Reading and Maidenhead. General work, including deal dado in hall and vestibule:—

| | | | |
|---|---|---|---|
| Searle, Reading | £5,911 | 0 | 0 |
| Rider & Son, London | 5,618 | 0 | 0 |
| Higgs, Goring | 5,550 | 0 | 0 |
| Smith & Light, Chippenham* | 5,410 | 0 | 0 |
| Barrett, Swindon | 5,118 | 12 | 0 |
| Margetts, Reading | 5,109 | 0 | 0 |
| Brock & Bruce, Bristol† | 5,090 | 0 | 0 |

* Received too late.
† Accepted subject to a few modifications.

Accepted for the reconstruction of Buecker's Hotel, Finsbury-square, for Mr. G. Hohly. Mr. J. Groom, architect, 1, Broad-street Buildings:—

| | | | |
|---|---|---|---|
| J. R. Hunt | £2,650 | 0 | 0 |

[No competition.]

For making up two roads for the Wandsworth District Board of Works, including channelling, kerbing, and pathways. Mr. J. T. Pilditch, C.E., surveyor:—

| | Beaufoy-street. | | Wickersley-road. |
|---|---|---|---|
| Bedall Bros. | £648 0 | £577 | 0 |
| Treherne | 620 0 | 550 | 0 |
| Turner & Son | 615 0 | 540 | 0 |
| J. Neal | 615 0 | 540 | 0 |
| B. Cooke & Co. (accepted) | 604 0 | 533 | 0 |

Accepted for new shop-fittings, alterations, and repairs to No. 42, Clapham-road, for Mr. W. S. Chapman:—

| | | | |
|---|---|---|---|
| W. Wilson (late Wilson & Exton), Aldersgate-street | £434 | 0 | 0 |

For alterations to the Ranelagh Arms, Old Ford-road, for Mr. N. Argent. Mr. Edwd. Brown, surveyor, Hanbury-street, Spitalfields:—

| | | | |
|---|---|---|---|
| N. Nast | £495 | 0 | 0 |
| Kiddle & Sons | 495 | 0 | 0 |
| J. Hughes | 430 | 0 | 0 |
| C. Marr | 405 | 0 | 0 |
| S. Hawkings (accepted) | 379 | 0 | 0 |
| A. Smith | 342 | 10 | 9 |

For alterations at the Salmon and Compasses, Dorrington-street, Leather-lane. Messrs. Rayment & Webb, architects. Quantities by Messrs. Batstone Bros.:—

| | | | |
|---|---|---|---|
| W. S. Burt | £1,100 | 0 | 0 |
| F. & F. J. Wood | 1,035 | 0 | 0 |
| W. Oldrey | 980 | 0 | 0 |
| Burch & Co. | 863 | 0 | 0 |
| Jackson & Todd | 930 | 0 | 0 |
| Dixon & Jones | 895 | 0 | 0 |
| J. Walker | 849 | 0 | 0 |

For enlargement of Schools at Laystall-street, Gray's Inn-road, for the London School Board. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| D. Kearley | £10,236 | 0 | 0 |
| J. Williams | 9,926 | 0 | 0 |
| F. & F. J. Wood | 9,917 | 0 | 0 |
| W. Bangs | 9,435 | 0 | 0 |
| G. S. Pritchard | 9,397 | 0 | 0 |
| W. Shurmur | 9,387 | 0 | 0 |
| Turtle & Appleton | 9,357 | 0 | 0 |
| J. Goodman | 9,333 | 0 | 0 |
| Holloway Bros. | 9,253 | 0 | 0 |
| Lathey Bros. | 9,233 | 0 | 0 |
| J. H. Johnson | 9,193 | 0 | 0 |
| T. Evans | 9,166 | 0 | 0 |
| Wm. Brass | 9,120 | 0 | 0 |
| Kirk & Randall | 9,080 | 0 | 0 |
| H. L. Holloway | 9,079 | 0 | 0 |
| Wall Bros. | 9,035 | 0 | 0 |
| Stimpson & Co. | 9,008 | 0 | 0 |
| E. C. Howell & Son | 8,975 | 0 | 0 |
| Scrivener & Co. | 8,950 | 0 | 0 |
| T. Oldrey | 8,893 | 0 | 0 |
| Atherton & Latta | 8,851 | 0 | 0 |
| C. Wall | 8,801 | 0 | 0 |
| C. Cox | 8,800 | 0 | 0 |
| S. J. Jerrard | 8,579 | 0 | 0 |

For erection of new schools at Ecclesbourne-street, Islington, for the London School Board. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| R. Kirby | £14,276 | 0 | 0 |
| Dove Bros. | 13,906 | 0 | 0 |
| W. Downs | 12,693 | 0 | 0 |
| W. Brass | 12,622 | 0 | 0 |
| J. H. Johnson | 12,422 | 0 | 0 |
| J. Grover | 12,373 | 0 | 0 |
| J. Goodman | 12,222 | 0 | 0 |
| Scrivener & Co. | 12,138 | 0 | 0 |
| T. Oldrey | 12,100 | 0 | 0 |
| H. L. Holloway | 12,093 | 0 | 0 |
| Wall Bros. | 12,042 | 0 | 0 |
| W. Bangs & Co. | 11,998 | 0 | 0 |
| J. R. Hunt | 11,995 | 0 | 0 |
| W. Shurmur | 11,970 | 0 | 0 |
| H. Clark | 11,957 | 0 | 0 |
| Kirk & Randall | 11,944 | 0 | 0 |
| W. & F. Croaker | 11,934 | 0 | 0 |
| Stimpson & Co. | 11,924 | 0 | 0 |
| C. Wall | 11,891 | 0 | 0 |
| E. C. Howell & Son | 11,837 | 0 | 0 |
| W. Tongue | 11,819 | 0 | 0 |
| Atherton & Latta | 11,695 | 0 | 0 |
| S. J. Jerrard | 11,589 | 0 | 0 |

For fitting-up the new wing of the Chelsea Infirmary, Cole-street, Chelsea, with hot-water, warming, and supply apparatus, &c., for the Guardians of St. Luke's, Chelsea. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied:—

| | | | |
|---|---|---|---|
| Pennycook & Co. | £548 | 3 | 0 |
| Clark, Bunnett, & Co. | 500 | 0 | 0 |
| W. G. Cannon | 498 | 10 | 0 |
| W. S. Fraser & Co. | 475 | 0 | 0 |
| J. & F. May | 447 | 0 | 0 |
| Strode & Co. | 430 | 0 | 0 |
| R. Crane | 427 | 0 | 0 |
| Clements, Jeakes, & Co. | 266 | 13 | 0 |
| J. Knight | 407 | 7 | 0 |
| Goddard & Massey | 398 | 5 | 6 |
| Kinnell & Co. | 360 | 0 | 0 |
| Bradford & Co., High Holborn* | 296 | 14 | 0 |

[Architect's estimate, £500.]
* Accepted.

For alterations and additions at Green-hill Farm, Harrow. Mr. E. Tyler, architect. Quantities by Mr. W. Barnett:

| | | | |
|---|---|---|---|
| Rider & Son | £2,900 | 0 | 0 |
| Stimpson & Co. | 2,886 | 0 | 0 |
| J. Chappell | 2,861 | 0 | 0 |
| E. Lawrence | 2,792 | 0 | 0 |
| J. O. Richardson | 2,659 | 0 | 0 |
| W. Shurmur | 2,434 | 0 | 0 |

For stables, &c., Laburnum-street, Kingsland. Mr. G. Smith, architect:—

| | | | |
|---|---|---|---|
| Chessum | £1,542 | 0 | 0 |
| S. Hayworth | 1,374 | 0 | 0 |
| Allard | 1,300 | 0 | 0 |
| Forest | 1,287 | 0 | 0 |
| Stimpson & Co. | 1,249 | 0 | 0 |
| T. Boyce | 1,245 | 0 | 0 |
| W. Shurmur | 1,179 | 0 | 0 |

For the erection of the Shipwrights' Arms public-house, Bermondsey. Mr. G. Treacher, architect:

| | | | |
|---|---|---|---|
| Harber Bros. | £2,973 | 0 | 0 |
| W. Shurmur | 2,941 | 0 | 0 |
| Hill | 2,909 | 0 | 0 |
| Canning & Mullins | 2,890 | 0 | 0 |
| J. Beale | 2,798 | 0 | 0 |
| G. S. Pritchard | 2,695 | 0 | 0 |
| Jackson & Todd | 2,684 | 0 | 0 |
| Parker | 2,479 | 0 | 0 |

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## TO CORRESPONDENTS.

C. S.—E. F., Düsseldorf.—Dr. H.—H. H.—C. L., Paris (thanks).—T. C. M.—Ex-Architect (the matter has got quite beyond the stage at which your letter was written).—M. P. B.—A. B. & Son.—J. F.—C. W. (we cannot advise, especially without knowing all the circumstances of the purchase of the bricks, &c. It is a legal question really).—G. H. A.—J. M.—J. B. Y. (too exclusively parochial).—W. F. P. (somewhat wide of mark).—D. R. D.

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# The Builder.

VOL. XLVII. No. 2184. SATURDAY, DECEMBER 13, 1884.


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### *Unpublished Documents on the Baths of Agrippa.*



LAST week we drew attention to the publication by Baron de Geymüller of facsimiles of the original architectural sketches and studies of Leonardo da Vinci. From the same author we have the small but interesting publication, the general subject of which is indicated above.* The work includes also some details and sketches relative to the Pantheon, which of course, strictly speaking, is included in the subject of the Baths of Agrippa, to which it was the entrance-hall, and also some old sketches of portions of the Baths of Diocletian.

It was during the winter of 1881-82 that the author was engaged in examining, at the Uffizi at Florence, the various original drawings and sketches by Italian architects which are preserved there, and in turning over a portfolio of drawings by Baldassare Peruzzi, his eye fell on the words "Therme Agrippine," scrawled in a red-ink autograph, of which he gives a facsimile, on a large sheet containing no other drawing or writing except the words "Per il conte di Pitigliano," in Peruzzi's hand. The portfolio apparently, however, contained only some plans of a palace for the Count Pitigliano, and Baron de Geymüller began to think the words "Therme Agrippine" were an accidental scribble meaning nothing, when he lighted on a part of a plan drawn lightly in red ink, whereon he saw an *exedra* partly supported on four columns arranged on a segment of a circle, in the manner so common, in one form or another, in the plans of the Roman Baths. Examining this further he found some of the lines of the plan coincided with those of the projected plan of Count Pitigliano's palace, and it flashed upon him that the palace was to be built on part of the site of the Thermæ; and the comparison of the sketch plan of the palace, of which a facsimile is given, leaves no manner of doubt that this was the case. The portion of the plan of the baths included in the red-ink sketch is rather more than half of the central buildings on the axis of the Pantheon, and at the opposite end from the Pantheon. The circular and, apparently, domed hall, indicated as a probability in this portion of Canina's restoration of the plan, is drawn here distinctly in the red-ink plan, and is adapted as a special feature in the plan of this portion of the projected palace, which was, in fact, evidently intended to be built in part on the very walls of the ancient baths. In this circular hall is shown an internal circular colonnade of coupled columns, which would, no doubt, have carried the drum of the cupola.

In regard to the real interest of this drawing, the important question arose, did Peruzzi, in his red-ink outline (the walls are only outlined, and not shaded up) intend to represent what was actually existing of the baths at that time, or was he partly making a drawing of the actual remains, and partly trying upon it here and there the lines of the proposed new structure? Of course, in the former case the value of the red-ink plan is made greater, as an archæological record, than in the latter. In the completed plan of this portion of the palace parts of the walls are shaded in bistre, and parts, to quote the author's words, "foncées d'une couleur lie de vin." These latter portions are evidently intended to distinguish those portions of Peruzzi's new plan, in which he intended to make use of the old remains of the baths; there can be no doubt of this on comparing the two. But are all the columns shown on the red-ink plan representations of columns existing in Peruzzi's time? If so, we now know positively that at the opposite end of the baths from the Pantheon there was a circular hall with an interior colonnade. Baron de Geymüller regards the columns, however, as doubtful, because three of them in another part of the plan do not seem as if they would unite properly with the adjacent portions if the plan were completed; and regards them as only a tentative suggestion for the new work, put on the plan of the old. We may observe, however, that on the plan of the palace these columns are coloured in the same way with the rest of the old work, which was to be incorporated in the new. Then in the palace plan Peruzzi shows in the circular hall the internal colonnade of coupled columns on one side of the plan only, the other side showing an alternative arrangement of solid piers with two pilasters and a niche between. Baron de Geymüller's argument is, if Peruzzi was utilising as much as he could of the old work, would he have proposed this alternative design of piers and pilasters if the colonnade had been still standing? We see no reason why he should not. It would have been a matter of casing the columns, the outlines of which are in fact shown on the palace plan, within the new piers; and one reason for doing this, as the author himself suggests, might have been to give scope for the use of coloured marbles in the new building; besides, of course, that the columns, though *in situ*, may have been too much damaged to be retained in their then condition. The *exedra* which first attracted the author's attention to the drawings is merely shown in line on the palace plan, in the same position as on the red-ink plan, but not adopted in any way in the new building. We can hardly believe, however, that it would have been inserted by Peruzzi except from actual fact, though it probably did not conveniently suit the new plan.

In brief, our impression is, from our study of the facsimiles published by Baron de Geymüller, that he has been more sceptical than he need have been; though that is a fault in an archæological student as admirable as it is rare. The comparison of the two plans leads us to the conclusion that what Peruzzi put down in red ink were facts obvious in the plan of the baths as existing in his day, as we cannot otherwise see any sufficient reason for their appearing on the red-ink sketch at all. This is especially the case in regard to the aforesaid *exedra*, as this was not any part of the Pitigliano Palace plan, and can only have been put on the drawings because it was there in fact, or sufficient remains of it: and as it is shown in just the same way as the older columnar features on the red-ink plan, this would lead to the conclusion that all these details were equally genuine.

The Baron de Geymüller does not attempt restoration in this volume; he leaves that to those who have more time and more capacity, as he says, for that class of work, and has aimed at stating his facts with great brevity, mindful of the time of others as well as of his own. The effect of the Peruzzi plan, if accepted, would be to modify Canina's plan in several important points: more particularly, the apartments with apsidal ends, which on Canina's plan are shown at right angles to the axis of the Pantheon, must obviously, whatever their precise shape and proportions, have been placed parallel with the axis of the Pantheon and of the centre line of the bath buildings. On the other hand, Canina's central circular hall, intermediate between the Pantheon and the opposite end of the axis, seems confirmed by the remains of two jambs shown on Peruzzi's red-ink plan at some distance from the rest of the walls, and coinciding almost exactly with the position of the door in Canina's plan.

The remarks in regard to the Pantheon in Baron de Geymüller's book refer to certain sketches attributed to Philibert de l'Orme, and in the possession of M. Chevignard, of Paris. Whether by De l'Orme or not, they are studies of his period by some architect making memoranda of the remains of Classic architecture in Rome. These sketches have special reference to the great circular light in the top

* Documents inédits sur les Thermes d'Agrippa, le Panthéon, et les Thermes de Dioclétien. Par le Baron Henry de Geymüller, architecte. Lausanne: Georges Bridel. Paris: J. Baudry. 1883.

of the dome, and furnish the evidence which was evidently at that time existing as to the former treatment and decoration of this portion. They show the section of a cornice of four principal members; an ovolo with a leaf ornament at the top, next a dentil course, beneath that an egg-and-tongue moulding on a convex section, and below a common form of fluted ornament on a concave section. All this is executed in metal (bronze, of course), as shown on the section, where the thickness of the metal is indicated. Below this is the place where there *were* the plates of a decorative frieze, but of which there was only left, at the time the sketch was made, a set of upright metal bars at regular distances, with hooks or pins welded on them at the sides, evidently for the purpose of attaching the plates. The same hand gives a rough perspective sketch of the opening, but quite out of proportion; the external outline of the whole dome is roughly scrawled on this sketch. The successive bars for attaching the frieze are also shown in a still slighter sketch by Antonio Sangallo, of which a fac-simile is also given. There is a fac-simile of another sketch, also attributed to De l'Orme, at all events by the same hand, whether his or not, which made the others,—showing the bronze covering of the roof of the dome externally. Part of the sketch shows the step arrangement of the exterior surface, but carried much further up the dome, and in a greater number of steps, than we now see it; and another portion shows it covered with a ridge-and-furrow arrangement of metal in convex curves or waves, with a fillet at the crest and trough of each undulation. It seems difficult to determine whether this was made from any indications then existing, or whether it is an imaginary restoration by the sketcher. But the careful and realistic manner in which the bronze supports of the frieze before mentioned are shown, indicates plainly that they were drawn with the object before the eye, and it seems hardly likely that the same hand in a sketch made at the same time should have treated the matter in such a different way, and jumped immediately from realistic to imaginary sketching.

The volume concludes with the reproduction of some sketches by an Italian architect, somewhere between 1450 and 1520 (the author does not tell us how he fixes the date), of the Baths of Diocletian, of more elaboration than any other of the sketches given, but of which the chief interest lies in the insertion of a solitary column in the plan, forming the centre of the great semicircular sweep in the outer boundary, which is a characteristic of the Baths of Diocletian. This column is found in no other representation of these baths. Palladio, who (born in 1518) came in the period immediately following that to which these sketches are ascribed, gives not a hint of it in his restoration. It may have disappeared in the interim. It is a probable enough feature in itself; it is given *with measurements* by the unknown architect, who must have had something to measure; and the probability is that it did exist, and that either Palladio overlooked it, or that some one had "looted" it before he came upon the scene.

Take them as we will, the facsimiles in the volume, and the suggestions thrown out, are of great interest to students of classical architecture. The book in which they are given, with its large type and wide margins, forms an addition to the architect's library, which, though small in bulk, is to be valued both for its contents and the setting in which they are framed.

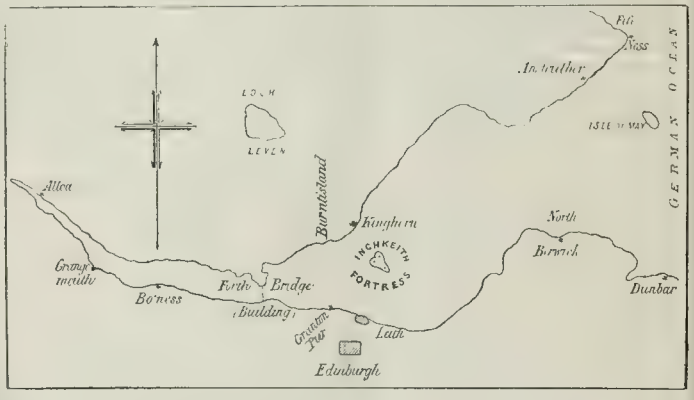
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**The Hospitals Association.**—The session of 1884–5 was opened with a *soirée* at the rooms of the Medical Society of London, on Saturday evening last, when, notwithstanding the inclement weather, a large number of guests responded to the invitation issued by the Council. There were present the lady superintendents and secretaries of most of the principal hospitals in the metropolis, besides other guests, and a very successful and enjoyable evening was spent.

## THE DEFENCES OF THE FORTH ESTUARY.

### INCHKEITH FORTRESS.

PUBLIC anxiety has of late been in rather an acute stage with regard to the great question of coast defences, and this anxiety, as we have seen, has given birth to solicitude and action on the part of the Government. The cry is somewhat vehemently raised that the British Navy has fallen away from its former high estate of arbiter of the seas, and that as now constituted its power of attack or defence is no greater than, if so great as, that wielded by at least one other of the world's Imperial naval armaments. The partial alarm thus created, while calling us to a closer examination of the actual relative condition of our Navy, is inciting us also to a more solicitous scrutiny of our second line of island defence, represented by combined land fortification, and floating battery, gun-boat and torpedo services. Time was when it suited the British fashion to hold the inner defensive *ceinture* as but of light consequence; but times and armaments and modes of ship propulsion have changed, and the national estimate with regard to the several offensive and defensive values have changed with them. We have grown in solicitude, especially of late, with regard to the efficiency of stationary batteries round the coast, and have come to a tacit admission of the possibility of some such contingency as that of having to rely upon these alone for the "guarding of our native shores." Various new works have been executed from time to time, and these, under the present accentuation of anxiety, not to call it alarm precisely, we are examining somewhat crucially, while seriously contemplating extensions and additions in various quarters.




Perhaps the most important of those coast defence works which are of more recent construction is that series by which the entrance to the inner section of the Firth of Forth is now guarded, and to which in August last, as may be remembered, was applied the very novel test of a bombardment from the guns of a friendly ironclad. The island of Inchkeith, on which the main portion of the defensive work is constructed, lies twenty-five miles within the wide channel of the outer Firth, at the very throat of which the Isle of May stands sentinel-wise and lonely. It is distant from the port of Leith rather less than four miles in a direction almost right across the estuary. From Kinghorn Ness, on the Fife-shire coast, it lies about three miles nearly due south, occupying a portion of the mid-section of the estuary, with the rather narrower passage channel, though much the deeper of the two, bearing to the north. It extends about a mile in length, by an average breadth of one fifth, its rocky coast line enclosing in all 70 acres of pasture land, which formerly was so much prized for grazing purposes by the Gallic allies of the Scots as to give rise to the French christening of "*L'Inchkeith chevaux*." Spring water is abundant and of excellent quality, coming as it does from strata of the coal formation, the same as those found on the neighbouring mainland of Fife. It was largely from this source, at one time, that, when weather permitted the approach of small boats, the vessels brought up in Leith Roads used to procure their watering. The island is barely five miles distant from the city of Edinburgh, off whose various points of elevated vantage it is distinctly and familiarly descried whenever the atmosphere is unobscured, the white tower of the lighthouse and the dark brown heath and rock showing by day, and the ever-recurring flash of the powerful reflectors taking up the signalling by night. Between nine and ten miles higher up the Firth, at the ancient Royal or Queen's Ferry, are situated the massive engineering works under the slow but sure operations of which the wide estuary itself is being spanned by a high-level mast-freeing railway bridge, in two principal arches of about one-third of a mile each in stretch, and representing one of the most gigantic engineering enterprises of any time. It will form part of the defensive functions of the new Inchkeith fortress to hold this great structure scathless from the enemy's guns in time of war.

Inchkeith has figured as a place of a certain mark from very early times. The ancient northern trunk ferry route from Leith to Kinghorn grazed the coast-line of the rock, which thus became a subject of constant notice on the part of the frequently passing traveller. It owes its present name to the old family of the Keiths, upon whom it was bestowed by Malcolm II. Towards the close of the fifteenth century it figures as a lazar refuge for the city of Edinburgh, during a prevalence of the pest. Protector Somerset of England, after routing the Scottish army at Pinkie in 1547, had his eye caught by the commanding position of Inchkeith, and ordered the erection of a temporary fort there. On retiring he left it but lightly garrisoned, and the island was soon thereafter recaptured by the allied Scottish and French. The English initiative was followed forthwith however, and improved upon; Somerset's temporary works being thrown down and regular and permanent—as then designed—fortifications erected, under the direction of competent French military engineers. These consisted of several bastions of powerful model, as estimate of power then went, connected by a strong wall of circumvallation, which at stated points attained a height of 20 ft. In 1560 the place was attacked by the English fleet unsuccessfully. At the peace which was soon afterwards concluded three score French artillerymen were appointed to the permanent care of the works; but the Scottish subsequently became jealous of this arrangement, dismissed the garrison, and destroyed the fortifications, to make sure, as they stated, that there should be no further temptation there for the stepping in of the foreigner to seize and possess. Only one fragment of the original ashlar masonry remained above ground after this rather drastic cure had been applied, and

the same was to be seen by the few visitors to the rock down to the beginning of the present century, with the monogram of Queen Mary lettered on one of the blocks. In 1639 the Marquis of Hamilton, an adherent of Charles I., sailed into the firth and landed on Inchkeith the raw and sickly English soldiery (lads mostly) he had brought with him. These were almost directly reshipped and sail made south home again, with no incident except that of landing on the dismantled rock alone; and after this, Inchkeith figures not at all in the annals, until eighty years ago when it became chosen as a lighthouse station. The highest point of the rock stands 180 ft. above high-water mark. Upon this, in the year 1803-4, a tower was erected, and a light first exposed. Ten years subsequently the original conception was improved upon, and a revolving light from powerful lenses began, and still continues, to flash all around at a height of 235 ft. above sea level.

Athough no attempt was actually made towards the erection of a successor in kind to the French fortification of the sixteenth century, the subject remained one of stock talk and speculation over the whole of the 300 years, periodical scares from time to time galvanising the topic into a fevered though unsustained activity. An instance in point is the descent of that daring renegade Scot, Paul Jones by adopted cognomen, in 1779, the year after he had surprised the port of Whitehaven on the west coast, captured two forts with thirty guns, and set fire to the shipping there. At the head of a squadron in the year named, he entered the Firth of Forth with a special and even previously avowed eye on the port of Leith and city of Edinburgh, and had actually brought to under the lee of Inchkeith and lowered and manned his flotilla of cutting-out boats, when a vicious land squall descended from the south-west, compelled instant re-embarkation, and literally blew the hostile fleet from the narrow waters out to sea, upon which a few days afterwards, off the Yorkshire coast, the daring Jones fought and captured the English frigate *Serapis*, thus showing that the menace from which the Forth ports and towns had been preserved was no empty one. The call for defensive works was loud at this crisis from all points of the coast; and especially loud from the neighbourhood of Edinburgh when the fact of its miraculous escape became known; but the peace came, and the Scottish estuary had for a further term to put up with such a defensive show as that furnished by a shore battery and Martello tower at Leith, together with whatever floating armament might for the time be in commission towards the safeguarding of this particular part of the coast.

To the Cabinet immediately preceding that now in power fell the actual initiative with regard to the works thus so long talked of, and, after the final resolution was framed, it cannot be said that, whether in the case of the late Government or that of their successors, there has been other than all due diligence in the prosecution of the design. The island of Inchkeith, which anciently, after the termination of the Keith possession, reverted to the Scottish Crown, and subsequently fell to the proprietorship of the noble family of Buccleuch, was once more acquired by the Crown as a first step. Works were commenced, and the difficulties of construction proved from the outset far from contemptible. The steepness of the acclivities upon which the fort works were to be raised was found so great as to preclude the employment of horses for draught or carrying purposes, and compelled recourse to mule power exclusively. The only available landing also was found in a high degree insecure, opportunities of favouring tide and weather requiring assiduous watching, even after the erection of a new jetty of considerable size and strength. The defensive works resolved upon consisted of three separate forts on the island itself, conjunctly with one on the mainland at Kinghorn Ness, fully three miles to the north. Once entered upon, operations continued unceasingly for several years, attracting but trifling public notice until towards Midsummer of 1881, when the forts were announced as almost in readiness for the heavy guns with which it had been decided they were to be armed. The island in map shape has the appearance of a roughly lined isosceles triangle, with the sharp angle pointing south and by east in the direction of Leith generally; the others bearing to the right and left on the north and pointing generally in the direction of the Fife coast, the separating channel—and the favourite one for shipping, as the deeper—running at this point to a breadth of about three miles. A fort of combined earthwork, stone, brick, and concrete now occupies each of these island angles. They are in principle the same, though differing slightly in detail, being constructed on what may be termed a modification of the polygonal system, features of the bastion type being admitted into and incorporated therewith. The emplacement for the gun is of concrete, and takes the form of a turret on the Moncrieff system, the firing being on the barbette principle,—that is, not out of an embrasure, but right over the parapet itself, an arrangement possessing the immense advantage of allowing the gun an unimpeded sweep of nearly half a circle. The parapet is cut with a slope downwards on the outside to admit of firing at extra close or depressed range. A trench within the concrete pediment of the turret runs round the emplacement of the gun, affording shelter to the gunners when in action. The magazines, floored with wood, furnished with lifts and speaking-tubes, and lighted under strictest precautions, are all casemated and bomb-proof; the covered ways and inside chambers are of the strongest masonry, and earthworks surround the whole; the ditches of these being under the extra defence of intramural casemated vaults pierced with musketry loopholes. The forts are numbered one to three, north-west, north-east, and south respectively, the last being turreted for two guns (as is also the case with the mainland fort on Kinghorn Ness) and the others for one each. Towards the close of 1881 the armament for the new Forth estuary defence works arrived from the arsenal. It consisted of six 18-ton muzzle-loading 10 in. rifled guns of wrought-iron with steel tubes, and of power equal to sending a 400 lb. shot through a 12 in. wrought-iron plate at 1,000 yards. They were forged in 1868 and are sighted up to 4,800 yards of a range,—three miles nearly, though destructively effective at a greater distance than that. These monsters,—in Scotland there are no other guns approaching them in calibre,—as settled now in permanent position, are found mounted on wrought iron sliding carriages working upon an iron platform, and set in motion by the action of four movable trucks with winch handles. The altitude of the three Inchkeith batteries varies considerably, No. 3, over against Leith and Edinburgh and furnished with two guns, standing at 39 ft. only; No. 2, on the north-east, at 85·5; and No. 1, on the north-west, at 122·75 above high-water mark.

The efficiency of guns and emplacements, as above described, was first tested in September of last year, in presence of Major-General Alastair McDonald, Commander of the Forces in North Britain; Sir Andrew Clark, Inspector-General of Fortifications; Col. C. H. Ingolby of the Royal Artillery; and others, when, from the throat of the 18-ton gun on No. 1 Battery, came the roar of a blank-cartridge salvo, forming the first artillery report sounded from off that rock for over 300 years. On that occasion each of the four guns on the island fired three rounds, the charge consisting of 44 lb. of pebble powder. The action of the guns under this partial test was held as satisfactory. Towards midsummer of the present year the island armament was for the first time tested with ball firing, the missile used being a 400 lb. Palliser shot under a charge of 70 lb. pebble powder. The result was also in this case satisfactory. Contrary to expectation it was found that the lighthouse suffered not at all, either from concussion or from any other cause. At about this time a proposal had been afoot for the utilisation of the fortress in volunteer big-gun practice, the suggestion finally falling through for the time, though possibly under the present revival of coast defence discussion in its acute stage, the matter may come up for reconsideration, and with better prospects of a more practical result. Last August the new works were subjected to the severe test of an actual bombardment from floating battery-guns of various powerful types, a thing altogether without parallel in the history of the country's progress in the science of attack and defence. The passively defensive qualities of the Inchkeith fortifications were pitted against the actively exerted destructive forces of a ship-of-war of the first rank, the *Sultan* being the vessel chosen thus to make trial of her powers. War Department experts were present in considerable force, taking careful notes of firing results, the operations being understood to rank as of the highest importance in the official mind, although, of course, the sum of the conclusion finally arrived at has not been given to the public. The opening of the bombardment was fixed for August 7th, previously to which date all conceivable precaution had been taken against possible mistake or disaster of a serious kind. The lantern of the lighthouse was strongly sheathed in timber, but in case this might not suffice for the prevention of damage of an extensive description, an iron lighthouse of temporary construction was held in reserve, and ready for entering upon the necessary service of the night in the event of the permanent tower or its lantern, or revolving machinery, becoming disabled. No. 2 battery was that selected for the attention of the *Sultan*, that vessel taking up position in the deep water of the channel to the north. The men of No. 2 battery retired within the lines of its neighbour, No. 1, their places being supplied with wooden dummies, so as to test the probable loss of life incidental to such an attack as that arranged. The lighthouse people were received in temporary quarters at the southern battery. The object of these hold experiments was, according to common belief, to ascertain the effects produced by the discharge of machine and rapid-firing guns on a 10-in. rifled muzzle-loading 18-ton gun, mounted *en barbette*, but probably the ends of experience and test aimed at were more general in their scope. Operations lasted over some days. In the earlier part of the assault the machine guns tried their powers of swift firing at 1,000 yards, and subsequently came the heavy metal firing at from 1,500 to 3,500 yards. The authorities have been wisely reticent with regard to the impression they carried away, but it is held as accepted that the fort in its *rôle* of passive resistance gave fair satisfaction. The turret sustained trifling damage only, considering the masses of projectiles of all kinds hurled against it, while only six of the dummy gunners were put *hors de combat*. The lighthouse sustained no hurt at all. The counterpart or complement of the experiments of August last would be the mooring of an ironclad two miles off in the deep fairway channel, and letting the 18-ton gun of Battery No. 2 have its will of her; but the greater scope for wholesale destruction of costly war material, involving possibly the total loss of one ironclad, with armament and furnishings complete, bars the way to a cut-and-dry realisation of the kind, and the sleeping lions on Inchkeith must bide their time. The menace they silently hold out may happily prevent that time from ever maturing.

## NOTES.

THE thirteenth Report of the Local Government Board, 1883-84, has just been issued. It forms no exception to the rule of the annual increase of the importance of the portion of the national progress that comes under the purview of the Board. As on former occasions, the Report is divided into the three heads of the Administration of Laws relating to the Relief of the Poor, the Administration of Laws affecting Local Government and the Public Health, and Local Taxation and Valuation; followed by a copious appendix. Under the first head it is satisfactory to learn that the number of paupers, both in-door and out-door, in England and Wales, is less, absolutely than, in any year since 1879, and less, relatively to the number of the population, than in any year

of the decade, except 1877 and 1878. The year 1849 is the first year for which the actual number of persons receiving relief on a given day can be returned. The largest number ever since then tabulated was in 1863, when a total of 1,142,624 paupers, or 55·6 in every 1,000 of the population, is recorded. In 1883 the total number was 782,422, or 29·6 in every 1,000. The lowest number on record was in 1877, being 719,949, or 29·4 in every 1,000 of the population. But while there is a reduction in the number of paupers, the reverse is the case as to the cost of their support. The sum expended in relief in 1863 was 9,325,071*l.*, or 8·19*l.* per pauper. The sum expended in relief in 1883 was 8,353,292*l.*, showing a steady annual increase since 1876, and being at the rate of 10·67*l.* per pauper, against 10·45*l.* in 1882. The incidence of the poor-rate on the population in 1883 was at the rate of 6s. 4d. per head, or of 1s. 2·2d. in the 1*l.* of rateable value. The number of paupers in the metropolis was larger than in any year since 1875, being 102,193; or 26·2 in every 1,000 of population. Each of these paupers cost 21·33*l.*, making a charge of 1s. 6¾d. in the 1*l.* on the rateable value.

THE expenditure of the local authorities throughout the country shows an increase which, considering the utter want of guidance as to the principles and details of expenditure which is so peculiar a feature of our legislation, can only be called alarming. In 1874-75 these bodies borrowed 11·9 millions sterling. In 1881-82 they borrowed 15·3 millions sterling. The amount of loans outstanding in 1874-75 was 92,820,100*l.* In 1881-82 it had risen to 151,704,640*l.*, or by 63 per cent. in seven years. The proportions of national and local debts were as follow:—

| Year. | National Debt. | Local Debt. | Total. |
|---|---|---|---|
| 1872 | ... £789,198,837 | ... £89,259,839 | ... £878,458,676 |
| 1882 | ... 763,045,640 | ... 151,704,640 | ... 914,750,640 |

In the former year the total debt was 8·7 per cent. of the National Debt. In the latter it was 19·8 per cent. The rates made and expended by these local authorities show an increase corresponding to the activity of their borrowing powers. For the year 1871-72 they amounted to 17,977,866*l.*; for the year 1881-82 they amounted to 27,959,953*l.*,—an increase of 55·8 per cent. in ten years. The comparison with the imperial revenue is as follows:—

| Year. | Imperial Revenue. | Local Revenue. | Total. |
|---|---|---|---|
| 1872 | ... £74,708,314 | ... £17,977,866 | ... £92,686,180 |
| 1882 | ... 85,832,282 | ... 27,959,953 | ... 113,792,235 |

Thus, while the imperial revenue for the last-named year is at the rate of 2*l.* 9s. per head of the population, the incidence of rates and taxes together is raised, for England and Wales, to close upon 3*l.* 9s. per head, more than a third of the imposition on the pages of Rates and Taxes being thus withdrawn from Parliamentary control.

THE increase in the rateable value of property in the decade 1872-1882 very closely follows the remarkable and important law (*Builder*, vol. xlvi., p. 922) that national wealth, in so far at all events as it is measured by rental or by the rateable value of property, is proportionate to the square of the density of population. The rateable value of all England in 1872 was 109·4 millions sterling; in 1882 it was 141·4 millions sterling. The corresponding totals of population were 23·0 millions and 26·4 millions. The increase in the rateable value will thus be seen to tally very closely with the increase of the square of population; which, as the area of the country is fixed, is the same thing as the increase of the square of their density on the ground. It was shown in the article before cited that a comparison between the relative densities and rateable values of urban and rural districts gave results of the same nature as comparisons of the same values, in the same districts, at different periods. This last calculation is fully borne out by the figures now given by the Local Government Board.

AT the last meeting (before the recess) of the Westminster Hall Committee on Friday, the 5th inst., Mr. Pearson brought forward a new design for making a ground-floor cloister lower than the first one (8 ft. high only), and an upper range of rooms 16 ft. high. The ground-floor cloister he "had not appropriated to any special purpose." The whole building would be about 6 ft. lower than the former one, and would allow the flying buttresses to be seen; "the buttresses," the *Times* report gives it, but evidently the sense is that the flying buttresses would be left visible, and not cut across by the roof. This is an alteration entirely in the direction we have been advocating: in favour of architectural effect rather than mere archæology. Messrs. Waterhouse, Ewan Christian, A. W. Blomfield, J. Oldrid Scott, and James Brooks gave evidence mainly in support of Mr. Pearson's scheme. Mr. Christian spoke contemptuously of the proposal to place "a trumpery post-and-pan work screen before the wall"; but was it proposed by any one to do this as the *permanent* settlement of the point? If so, that would never do. We understood Mr. Stevenson's proposal of this nature to be for protecting the exposed Norman wall for the time, pending the question of new buildings. Mr. Ayrton was called as a witness at the opening of the sitting, as a former First Commissioner, in order to state that other First Commissioners, himself included, had not thought it necessary to entertain the idea of completing the Houses of Parliament according to Sir C. Barry's design. He began, however, to give more evidence than the chairman wanted, being indiscreet enough to talk about not wishing Westminster Hall to be unduly exposed, and also admitting that if more room was really wanted, Sir C. Barry's scheme was the best. Upon this he was promptly suppressed, in accordance with the tactics which seem to have been carried on throughout, as far as the chairman is concerned.

IN the report of the same committee meeting we read:—

"Mr. C. Barry, recalled, stated that since he had expressed his belief that the floor of Westminster Hall had not been raised within the memory of man he had received a letter from a Mr. Adams, some sixty years ago a clerk in the Office of Works or Woods and Forests, stating that Sir Robert Smirke had raised the level of the floor 2 ft. or 3 ft., for the reason that the tide used sometimes to enter the Hall, obliging barristers to use boats to get to the Courts. This was some years before the fire in 1834."

The memory of Mr. Adams must have deceived him. The statement of the matter in Sydney Smirke's communication to the Society of Antiquaries on February 4, 1846 ("Archæologia," vol. 26), is as clear as anything can be:—"In forming the new pavement it has been necessary to remove the ground everywhere to the depth of at least three or four feet below the level of the Yorkshire flagstone floor laid at the latter end of last century: about 1 ft. 4 in. below that level another floor of Purbeck stone was found, the level of which appears, from the door-jambs finishing down to it, to have been that adopted in Richard II.'s time. This level has, therefore, been fixed for the new pavement, and the addition thereby given to the walls of the Hall much improves its architectural effect, at the same time that the original proportion of the building is restored." Mr. Butterfield, in a letter commenting on the same fact, says:—"I am not sorry to see, as this document of Mr. Adams's implies, that people are ready and anxious for still further height by some means. They will not get it, however, by internal excavation, if Mr. Smirke's account is the true one; nor will they get light as well as height by going downwards, and light is more needed than height. They can only get it by lifted roof and lengthened windows, as I have proposed."

WE are glad to learn that Mr. G. J. Symons, to whose persistent energy we owe most of our definite information as to British rainfall, is turning his attention to the collection of data with reference to the damage annually caused by lightning. Our want of any systematic observation as to a class of misfortunes which are to a great extent preventible, contrasts very disadvantageously with the careful investigations that have been carried on in some other countries. The notes now brought forward only extend over about three months, but they include some 600 cases, in which buildings of different kinds, haystacks, men, or animals have been struck by the electric fluid, and the damage thus caused is estimated at upwards of 30,000*l.* Most of these fire-strokes, moreover, occurred in two days out of the three months; of which the 12th of August last was the most disastrous. The frequency of fatal thunderbolts in England and Wales is far less than in many other parts of the world,—even limiting the comparison to the continent of Europe. Yet from 1861 to 1871 one person out of every million of our population has been annually killed by lightning. The instances have been most numerous in the counties of Leicester, Rutland, Lincoln, Nottingham, and Derby, in which 18 persons out of every 10,000,000 were annually killed. In the metropolitan district the annual rate was as low as 2·92 per 10,000,000 per annum. The proportion of cases on record is much higher from 1871 to 1878 than from 1861 to 1871; but it is most probable that this is due to a fuller record being kept in the later period than in the former.

SOME fifty scientific men enjoyed a very pleasant excursion, on the 6th current, to visit the Brighton Water-works. With the terms of admiration as to the success of these works, and the skill and happy forethought of the engineer, in which the reporter of the *Times* indulges at some length, we are disposed very candidly to agree. There is, however, more to be said on the subject. The cost of the works and the cost of water to the inhabitants of Brighton are as essential points to ascertain as either the purity or the copiousness of the supply. The cost of the works, per million gallons (taking the figures for 1879) was 38 per cent. higher than the cost of the water-works which supply London. And although the working cost at Brighton, owing in great part to the careful utilisation of differences of level, is 27 per cent. less than the average in London, the price of water to the inhabitants is the same, within one pound in the million gallons; while the proportion of the water-rate to rateable value of houses is 18 per cent. higher at Brighton than in London. Another point overlooked in the account is this. Situated as Brighton is on the verge of the chalk cliffs, she is in an unusually favourable position for the interception of the subterranean outflow to the sea. The places are few in which such results are attainable. With regard to London,—as, of course, everything said as to water-supply is at once read in this light,—the nearest parallel is to be found in the locality of those springs which, in the neighbourhood of Grays and some other spots, escape into the Thames. That a valuable supply of water may there be intercepted is not improbable. But the first lesson to be borne in mind is the need of an adequate hydraulic survey of the country. In the absence of this no proposal for improved water-supply can be much more than guesswork.

THE Railway and Canal Freighters' Association received a reply from the railway companies last week to their application for reductions in rates to and from the Midland district. Various concessions are made,—notably the removal of hoop-iron from the "damageable" class, the reversion to the old charges for returned empties, and reductions in the rates for cut nails, iron-ore, coke, pig-iron, and cinders, from various places. The applicants are still very dissatisfied, however, in consequence of the railway companies not yet being prepared to give them an answer as regards the rates to ports,—Hull, Liverpool, &c. They also decline to make any alteration in the "private siding" system, or in the charges for "smalls" (a subject which, it will be remembered, was recently treated of at length in our columns), and the traders appear to consider the reply, taken as a whole, to be unsatisfactory. It is, however, a sign that the railway companies are prepared to give com-

plaints their consideration, even though the result may be somewhat disappointing. It was hardly to be expected that each of the thirteen points embodied in the requisition would be conceded, however reasonable they might have been. The companies would be very chary of exhibiting such wholesale graciousness, as a precedent would thereby be created which would result in their being flooded with similar applications from all quarters, and the traders may be wrong in their assumption that the deferring of the most important question (which, it must be remembered, is a momentous one to both parties) is an evasive way of shelving it altogether.

THE collection of seven works by M. Bouguereau, now on view at the gallery of Messrs. Boussert, Valaston, & Co. (late Goupil), in New Bond-street, should be visited by those who enjoy splendid technique in painting, and who wish to see the other side of the work of an artist who is chiefly known in this country as a painter of rustic figures. M. Bouguereau is, in fact, two artists. He is by turn a painter of rustic idylls, of very refined and expressive type, and one of the most learned draughtsmen and colourists of the day in the painting of the nude figure. His great picture in Bond-street (great in material dimensions) is "The Youth of Bacchus," a canvas the size of the room, with a number of life-sized nymphs and satyrs, and old Silenus, and all the rest of them,—a thoroughly pagan subject in idea, with the defect in treatment that it is not pagan enough. It is respectable and academical. The painter's higher powers are shown in the single-figure painting called "Byblis," a masterpiece of drawing, and not without poetic sentiment. Opposite to this is "Les Baigneuses," a purely realistic work, but of the most wonderful realism; the two figures seem full of life and warmth,—as Blake said (not quite truly) of his own figures, "the blood is seen circulating in them"; and this is all got by genuine solid painting: there are no tricks of any kind. Among the works exhibited is also an exquisite little painting by *the other* Bouguereau, "Ma Leçon difficile," a seated figure of a child with peculiarly expressive countenance. As far as the higher ends of painting are concerned, this is the best thing in the collection; but we must remember that the technical difficulties surmounted are not nearly so great as in such a work as "Les Baigneuses."

THERE is a move in Liverpool for having a gallery of historical casts of sculpture and architectural ornament, to which the lower rooms of the Walker Art Gallery would be devoted. Mr. J. P. Seddon, in his capacity as honorary secretary to the Architectural Museum at Westminster, has been speaking in support of the movement at Liverpool, both at the annual dinner of the Architectural Society of that city, and also in a special lecture given in the Free Library lecture-hall, and which seems to have attracted much interest. Mr. P. H. Rathbone, who has done so much to awaken and revive artistic interests in Liverpool, is also interesting himself in the matter, and previously to Mr. Seddon's lecture before named, Sir James Picton spoke in favour of it, mentioning that the Town Council had set aside a fund for enlarging the building, but this having been rendered unnecessary by the liberality of Sir A. Walker, who had defrayed the whole cost of the new buildings, it was desired to employ the sum that had been set apart in promoting further the usefulness of the institution, and they proposed to do so by forming the commencement or nucleus of this historical museum of casts. The money, certainly, could hardly be better or more appropriately employed, and we hope the new idea will be successfully carried out.

MR. MILLAIS'S "Waif," to be seen at Mr. White's King-street Galleries, is a painting of a little chubby-faced comfortable child seated on a doorstep, whose countenance, in its well-fed healthy rosiness, contrasts oddly with the rags in which she is dressed and with the idea conveyed by the title of the work. We should very much doubt the figure having been painted from any child of the social order and conditions indicated; it looks as if painted from an upper-class child, and then named and clothed according to the painter's fancy. The face, however, is one of the most admirable things we have had from the artist. Mr. Orchardson's "Her First Ball," in the same gallery, portrays, in his well-known style, a scene where a very shy young girl, looking still more awkward from the pinched up and ungainly dress she wears, is preparing to go through a minuet with a most dashing and exuberant young gentleman, whose manners are intended as a foil to hers. In the background are spectators, in each of whose countenances there is expressed some sort of interest in the performance about to take place, running the gamut from spite to mere curiosity or idle indifference. The painting is an excellent example of the painter's peculiar technique, and in action and expressive grouping it is not inferior to some of the best of its predecessors.

ANOTHER new theatre is proposed to be built in London, in the rear of No. 121, Regent-street, on the site of the unsuccessful Military and Naval Stores, with entrances from Regent-street and exits into Heddon-street. The theatre, which will be of rather unusual construction, will consist of a ground-floor which will be entirely devoted to stalls, with a balcony over, and will accommodate about 800 persons. The architect is Mr. J. M. Brydon.

HAMMERSMITH Bridge, which is about to be replaced by a bridge of much less graceful design, was designed and built by Mr. Tierney Clark, engineer to the West Middlesex Waterworks Company, who have extensive works at Hammersmith. The cost of the present bridge was 45,300*l.*, or a little more than half the cost of the proposed new structure. We can ill afford to lose a well-proportioned bridge, and it is a pity some means cannot be devised to make use of the present bridge upon another site, as was done with Hungerford Bridge, which is now at Clifton.

ACCORDING to a Liverpool paper, Mr. B. H. Thwaite has proposed a new system of dealing with the Pluckington Bank, which is causing so much trouble in the Mersey. He objects to the sluicing system that, when the greatest head or elevation of the flushing water is obtained, the ebb current of the tide is almost terminated and has not sufficient velocity to carry away the silt, which is not held in suspension, except with a certain minimum velocity of flow. His expedient is the use of a heavy pressure of water produced by turbines and led through pipes to immediate contact with the silt, so as to drive it into the tide current at the time when that is strongest and most able to carry away the silt. We gather that it is proposed to try this at Liverpool. We never had much faith in the efficacy of the sluicing system as proposed there, and, in fact, were somewhat surprised that it really had for a time exercised an appreciable though apparently not a permanent, influence on the bank.

**The Sea Defences at Hove, Brighton,** consisting of a sea-wall and groynes, for which Sir John Coode and Mr. Ellice-Clark are engineers, were put to a severe test on the 4th inst., when a heavy gale occurred concurrently with a high spring tide. The sea was very rough, and caused considerable damage at other parts of the coast, but the Hove works did not sustain the slightest injury, although the work is in a "green" state, and the filling has not yet been covered with the bituminous concrete which is to form a kind of deck to receive the weight of water which falls on the Esplanade in great force when the seas strike the wall. These works have been pushed on with great rapidity during the past fine summer, upwards of 30,000 concrete blocks having been made and fixed, and 16,000 cubic yards of concrete masonry fixed *in situ*. The Hove Commissioners are to be congratulated upon having their works so far completed as to have successfully resisted the trial of Thursday week.

## ROYAL ACADEMY PRIZES.

THE medals and prizes awarded by the Council of the Royal Academy were distributed to the successful students on Wednesday evening last, December 10th, by Sir Frederick Leighton, the President. This being the off-year, in which the prizes are of less value and importance, there is no special address given. Sir Frederick remarked, however, that the drawings exhibited in competition in these off-years are deemed by the members of the Academy to be of great importance, as they indicate more clearly the training through which future Gold Medallists have to pass. Some of the competitions this year are of unusual excellence,—that for the painting of a figure from the life being so good that an extra medal has been awarded.

The competitions in modelling again come to the front, showing that the students value the reorganisation in the School of Sculpture, which took place three years ago, and in one of the prize subjects, "The Model of a Design," an extra reward has been given. The Armitage competition was also a little above the average. In architecture the Travelling Studentship was not so well competed for this year, and it is probable that some change will have to be made in the regulations to cause this prize to be more keenly contested.

The President then awarded the following medals and prizes:—

*Painting and Drawing.*

Creswick Prize, Landscape Painting in Oil. Subject,—"A Village Common." Prize, 30*l.*, E. T. Lingwood.

Painting of Figure from Life. First medal, Arthur J. Foster; second medal, H. S. Percy; extra, J. E. Breun.

Painting of Head from Life. First medal, T. E. Garvie; second medal, Theodora J. Noyes.

Copy of an Oil Painting. Subject,—"Portrait of an Old Woman," by Rubens. Silver medal, T. L. Hughes.

Copy of Landscape. Subject,—"The Lock," by John Constable, R.A. Silver medal, Frederick Everett.

Cartoon of Draped Figure in Chalk or Charcoal, Life-size. Subject,—"Virgil reading to Augustus and Octavia." Silver medal and 25*l.*, H. S. Percy.

The Armitage Prizes. Design in Monochrome for a Figure Picture. Subject,—"The Return of the Ark." First prize, 30*l.* with bronze medal, C. D. Richardson; second prize, 10*l.*, J. L. Davis.

Design in Water-Colour for the Decoration of a Portion of a Public Building. Subject,—An allegorical illustration of Poetry. To form part of a contemplated series of eight designs for the lunettes in the central Octagon Hall of the Exhibition Galleries; four of these designs to be allegorical figures or groups, representing respectively the Arts and Poetry, and the other four illustrative subjects. Size of lunette, 12 ft. 6 in. wide by 6 ft. 6 in. high. Prize of 40*l.*, W. S. Paget.

Drawing of Figure from Life. First medal, J. E. Breun; second medal, W. H. Margetson.

Set of Six Drawings of Figure from Life. First prize, 50*l.*, A. T. Nowell; second prize, 25*l.*, W. H. Margetson; third prize, 15*l.*, Sidney Paget; fourth prize, 10*l.*, H. S. Percy.

Drawing of Head from Life. First medal, Nelly Erichsen; second medal, Minnie J. Shubrook.

Drawing of Statue or Group, with Head, Hand, and Foot. First medal, W. F. Littler; second medal, Victor Hobson.

Drawing of Statue or Group. Prize of 10*l.*, T. L. Hughes.

Perspective Drawing in Outline. Subject: "Entrance to the Exhibition Galleries, as seen from the Door of the General Assembly Room, and Specimen of Sciography." Silver medal, F. C. Robinson.

*Sculpture.*

Model of a Design in the Round. First prize, 30*l.*, C. O. Richardson; second prize, 10*l.*, F. W. Pomeroy; extra, 8*l.*, A. G. Walker.

Restoration of a Mutilated Statue. Subject: "The Torso." Silver medal; no competition.

Set of Three Models of a Figure from Life. First prize, 60*l.*, F. W. Pomeroy; second prize, 20*l.*, H. A. Pegram.

Model of a Statue or Group. First medal not awarded; second medal, W. H. T. Venner.

Model of a Statue or Group. Prize of 10*l.*, W. G. John.

Model of Figure from Life. First medal, G. J. Frampton; second medal, A. G. Walker.

*Architecture.*

A Travelling Studentship of 60*l.* for a Design in Architecture. Subject: "A Block of Three Houses." Prize of 60*l.*, Fredk. Simpson.

Set of Architectural Measured Drawings. Subject,—"The Church of St. Stephen, Walbrook." First medal, E. H. Sedding; second medal, H. D. Walton.

Set of Drawings of an Architectural Design (Upper School). Prize of 25*l.*, J. A. Slater.

Set of Drawings of an Architectural Design (Lower School). Prize of 10*l.*, E. Guy Dawber.

Perspective Drawing in Outline. Subject,—"The Choragic Monument of Lysicrates, and a Specimen of Sciography." Silver medal, S. B. Russell.

There were only two competitors for the English travelling studentship this year. Considering that 60*l.* is offered, and that it is only expected three months should be devoted to travelling, it seems strange so few should come forward. The possible cause lies in the fact that the drawings must be made during the day-time, in a period of three weeks, and the class of students who could compete are perhaps in that position that they cannot be spared from their office duties. It is to be hoped, therefore, that the changes in the regulation which the

President spoke about may be a return to the old rule which obtained in the case of the Gold Medal, for which prize students were allowed to work out their designs at home, as is still the case with the painters and sculptors In No. 282,—Mr. Simpson's design, to which the prize has been awarded,—the author has endeavoured to give a distinctive character to each of the three houses. The area given was 90 ft. frontage and 150 ft. depth, of which it seems 40 ft. might be taken off for stabling at the back. Mr. Simpson's plans are of the ordinary London type, in which the staircase is placed at the back. On one side there is a novel and pleasing feature in the design, viz., the introduction of a reception-hall on the ground-floor, in the place of the usual morning-room facing the street. The dinner guests, therefore, would not have to go upstairs to the drawing-room. This arrangement was a favourite one in the houses of the beginning of last century. There is one defect in it: the coming guests have to run the gauntlet of those already assembled before they can get to the cloak-room. The introduction of a covered balcony on the first floor, obtained by setting back the wall, destroys the drawing-room for dancing purposes, though for other reasons it might possess advantages. The elevations of the three houses are designed in the Early English Renaissance of the beginning of the seventeenth century, and contain many pretty features. The author has been fairly successful in reproducing what a seventeenth-century architect, with very imperfect knowledge of the Classic orders, might have designed. How far a nineteenth-century student is justified in such reproduction, wilful or otherwise, is perhaps a matter of sentiment.

In the other design, No. 281, its author has treated the three houses as one block, and from an academical point of view (not Royal Academical, however,) his design is the most studied, and shows a more correct knowledge of architectural proportions. The plans of the three houses are similar. The staircase in each is placed in the centre and is lighted by an internal area, the dining-room being placed beyond and a morning-room or library in the front by the side of the entrance-hall. The author has made what seems to us to be a great mistake in the plan of the centre house by insisting on placing the door in the centre for the sake of the symmetry of his elevation; the library is thus confined to a narrow space with one window only, and much space is wasted on vestibule and passage. The ground-floor, as treated in the elevation, would not have suffered by the entrance doorway, the centre house being out of the centre. The elevations are designed in the style of the French Renaissance of Francis I.'s period, and are well drawn and composed.

The measured drawings of St. Stephen's, Walbrook, do not call for any special remark, except that they are well drawn by students who have caught the feeling of the work of that period.

Looking at the designs submitted in competition by the students of the Upper and Lower School for the 25*l.* and 10*l.* premium respectively, there is no doubt that the latter, as a whole, and (taking the three best) separately, are much better designs than those of the former and upper school, which speaks well for the future of the Academy school. Nos. 301, 299, and 298, might either of them have taken the 25*l.* in preference to the one selected.

Mr. Slater's design (No. 286) is picturesque but incongruous, carelessly drawn, and clumsy in its details. The capitals of the piers or columns in the front view are not the same as shown in the section, and neither agree with the wall antæ. The author's attention seems to have been mainly devoted to the design of a piece of Byzantine or Early Persian tapestry, which is not architecture. The arrangement of the plan is picturesque and good, and one is disappointed it should not have been worked out in a more reasonable and better style of architectural design.

No. 887, "Design for a Lodge and Gates," in the Early Italian Renaissance, is well designed, the monumental character given to it being possibly due to the author's intention that it should be in keeping with the mansion to which it forms the frontispiece.

No. 289, "Design for a Railway Station," must have been prepared for a very rich railway company. The carriage-drive runs under a magnificent peristyle of Ionic columns, flanked by wings, with large niches and fountains, surmounted by Michelangelesque figures. The whole design is carefully studied, of good proportions, and well drawn, and the only exception we have to take is to the clock turret, which is poor, and unworthy of its neighbour the peristyle.

Mr. Guy Dawber's design (to which the 10*l.* premium is awarded) is for a gateway and bridge, forming an entrance to a town. The bridge, of three arches, spanning the river, and the gateway with its octagonal staircase-turret, are all admirably designed in brickwork in the Flemish style, and show considerable acquaintance with the best types of Late Gothic brickwork in Belgium.

No. 300 is a design for the same subject, in which the author has treated his gateway as a triumphal arch. He has given too much importance to the first floor, in which on one side of the arch is the residence of the gatekeeper, and so far has destroyed the monumental effect. The cornice of the ground-floor becomes the impost moulding of the great arch, and he has made this ground-floor the podium for an order which flanks this arch,—an incongruity which is entirely out of keeping with good Classic design.

No. 299 has a well-designed bridge of two arches with a good characteristic fifteenth-century gateway. The octagonal turret at the angle on the ground and first floors might, we think, have been omitted with advantage, and the staircase carried up in the tower.

No. 298 has apparently been unable to complete his drawings; the detail of his elevation, in fifteenth-century Flamboyant Gothic, is well designed, though we must take exception to the heavy mass of brickwork above the arch, which should have been decorated with panels unless the windows, which are now at the back, had been brought to the front.

No. 289, also for a gateway and bridge, is in the Francis I. French Renaissance, and of fair design

## DR. JOHNSON'S HOMES IN LONDON.

"Nam quis iniquæ
Tam patiens urbis, tam ferreus, ut teneat se?"
Juvenal.

"Mais moi, vivre à Paris! eh! qu'y voudrais je faire?
Je ne sais ni tromper, ni feindre, ni mentir."
Boileau.

On the morning of Tuesday, the 2nd of March, 1737, an ex-schoolmaster, and one of his only three pupils, started from Lichfield to try their fortunes in London The latter, grandson of one of the cathedral vicars, purposed to qualify for being called to the Bar; but following his genius into another field, and having first acted at Ipswich under the pseudonym of Lyddal, drew the whole town (October, 1741), to see David Garrick as *Richard III.* at Giffard's theatre in Goodman's-fields.* The former, his wife's little fortune lost in the unsuccessful venture at Edial, had no other resources than an unfinished play and his fellow-citizen Gilbert Walmesley's letter to the Rev. John Colson, in whose school at Rochester his companion was to be placed.

This was not Samuel Johnson's first visit to London. He was taken thither in his infancy to be touched by the sovereign,—and ever retained a solemn recollection of the Queen's diamonds and black hood,—for a disorder whose congenital symptoms darkened all his life. On this second occasion his first lodging was a garret in Exeter-street, Strand, at one Norris, a stay-maker's: his customary resort, the Pine Apple in New-street, Covent-garden. As originally planned, Exeter-street ran behind Exeter-change, from the northern end of Burleigh-street to Katharine-street; Wellington-street being of much later date. The oldest map wherein it assumes its present form is Bowen's, published 30th of August, 1738. The western extension, cut off by the former garden wall of Bedford House, together with the return southwards into the Strand, was then styled Denmark-court. We next hear of Johnson at Greenwich, under date and address of 12th July, 1737, next door to the Golden Heart, in Church-street. He writes to Cave, of St. John's-gate, Clerkenwell, proposals for translating, from the Italian, Paul Sarpi's "History of the Council of Trent." Here he laboured with the last two acts of his Eastern tragedy. This same summer he returns to Lichfield, stays there some weeks, and finishes his play.* Johnson then brings his wife to town, settling first in Woodstock-street, next westwards of New Bond-street (where there are a few houses of that date), and then at No. 6, Castle-street, Oxford-market. The latter is now Castle-street East. The Market House, built by the second Earl of Oxford, in 1731, was replaced three years ago by Oxford Mansion.

We next trace Johnson from Castle-street to his lodgings (in the order given) in Boswell-court, Fleet-street; "The Black Boy," opposite to Durham-yard in the Strand; Bow-street; Holborn; and Fetter-lane; though the dates severally applicable to these migrations cannot with certainty be given. The interval is a fairly busy one; it is marked by various Lives, histories, translations from the French, a beautiful epitaph on Philips the musician, an ode to friendship, with a masterly albeit unremunerative account, in Latin, of Lord Oxford's library. The collection of Robert and Edward Harley, first and second Earls of Oxford and Mortimer, had been stored in the house which is at this day occupied by Messrs. Tilbury, High-street, Marylebone. Osborne, the bookseller, having purchased the library for 13,000*l.*, employed Johnson in preparing a catalogue. The book with which Johnson is said to have knocked Osborne to the ground for insolence was a copy of the "Biblia Græca Septuaginta," fol. 1594, Frankfort. Mr. Leslie Stephen says it lay in a bookseller's shop at Cambridge in 1812. The Government debates, under the guise of the Senate of Lilliput, ran from November, 1740, to February, 1743. In 1744 appeared one of his greatest biographical achievements,—the "Life of Richard Savage." But about this time absolute poverty compelled him not only to ask Cave for a guinea in advance,† but to keep in the streets by night, his wife the while, says Hawkins, finding shelter with a friend by the Tower. For the opening of Drury-lane Theatre by Garrick as joint manager and patentee (1747) he composed one of the two best prologues in our tongue. This same year he addresses from the Golden Anchor, Holborn-bars, to Lord Chesterfield his plan for a Dictionary of the English Language. Robert Dodsley, the Longmans, and other booksellers, agreed to pay him 1,575*l.* to cover all the author's expenses. Singularly enough five of the six amanuenses came from beyond Tweed-side. When we are reminded of their employer's prejudice against the Scots let it not be forgotten that amongst his numberless objects of charity were included these, even long after their labours for him had concluded.

For the better progress of his enterprise he removes (1747) to the house, No. 17, which forms the western side of Gough-square, Fleet-street.‡ In the three garrets on its third floor he endured for nearly eight years the drudgery of dictionary-making. A resident here, he made acquaintance with Reynolds. They met at the Misses Cotterell's, in Castle-street, Oxford Market (a street also memorable as the home of Barry), when Reynolds fixed Johnson's attention by remarking that the death of a person to whom these ladies professed great obligations would, at any rate, remove the burthen of gratitude.

Reynolds is commonly stated to have permanently settled in town in the year 1752, in a house opposite to May's-buildings, St. Martin's-lane. Mrs. Thrale, however, says that Johnson composed the fine "Rambler" on Procrastination (No. 134) in Reynolds's parlour, the printer's boy waiting for the copy. That paper bears date Saturday, 29th June, 1751. In Gough-square he provided a retreat for Dr. Levett and the blind Anna Williams, and could reckon amongst his intimate visitors such men as Garrick; Dr. Hawkesworth; Lord Southwell, F.R.S.; the Earl of Orrery, author of the "Life of Swift"; Strahan, the printer; the "very good hater," his dear Dr. Richard Bathurst; together with the no less beloved Bennet Langton and Topham Beauclerk. In 1748 he founded a club at the King's Head beef-steak house in Ivy-lane, where, according to Hawkins, he at once, and by common consent, presided as symposiarch. The tavern was burned twenty-five years ago, but the extensive cellarage remains beneath No. 4, Alldis's dining-rooms, on the eastern side. The year following Garrick, Barry, Mrs. Cibber, and Mrs.

* On the northern side of Great Aylie or Aylliffe street, between Zoar Chapel and Half Moon-yard. The Tenter ground or fields lay to the south of the street.

* The original MS., with various readings, &c., was presented by Bennet Langton to George III., and is deposited in the King's Library, British Museum.

† Letter to Cave, August, 1743.

‡ Distinguished by a Society of Arts' plaque. For papers *ad hoc* see the *Builder* for 1864.

Pritchard lent all their art to gain popularity for "Irene," enriching its author with about 300*l*. Nevertheless the necessity which he was always ready to alleviate in others is still no stranger to him, and on one occasion (1756) he is indebted to Richardson's loan of six guineas for release from a sponging-house.

Johnson's removal from Gough-square was due to the completion of his "Dictionary" and the breaking-up of his household by the death of his wife, than which latter, however hard her blows, Fate could deal him none heavier. Though the "Dictionary" brought him little profit its publication gained him many friends,* amongst them Dr. Burney. Continuing to publish the "Idler" in Payne's *Universal Chronicle* (April 15th, 1758—April 5th, 1760), he, after a brief sojourn in Gray's Inn, took rooms on Friday, March 23rd, 1759, in Staple Inn.† Here he set about and finished in six evenings his "little story book," as he called it ("Rasselas"), wherewith to defray the funeral expenses with some small debts of his aged mother, who had died in January of this year.

In 1760 he migrates to No. 1, Inner Temple-lane;‡ is busy more or less with an edition of Shakspeare, forms acquaintance with Murphy (who edited his works), and warmly espouses Gwyn's scheme for semicircular, as opposed to Mylne's elliptical, arches in the construction of old Blackfriars Bridge. The accession of George III. opened a new and brighter prospect, says Boswell, to men of literary merit who had been honoured with no mark of royal favour in the preceding reign. At the instance of several of Johnson's friends, amongst whom Thomas Sheridan and Murphy claimed to have taken, *ad hoc*, the initiative, Mr. Wedderburne (since Lord Loughborough) recommended him to Lord Bute, with the result that Johnson was compelled to acknowledge that for once a Scotchman (besides Buchanan) had written well, when Lord Bute signed his order for the pension. His circumstances thus rendered easy by the award of an income exceeding 600*l*. a year at the present time, Johnson could surrender himself to the allurements and more solid delights of society. Henceforward, of course, his career is only to be followed in the pages of Boswell. Him he first met in Tom Davies's shop, Russell-street, Covent-garden, on the evening of Monday, the 16th of May, 1763. The house is No. 8, on the southern side, adjoining what was Button's; and, lately known by a strange coincidence as the Caledonian Coffee-house, is now a fruiterer's. A few evenings later they supped together for the first time at the Mitre, Fleet-street; and on the night of Thursday, the 21st of July, at the Turk's Head, Strand (since rebuilt), the idea was first mooted which has given us one of the most delightful books of travel: the journey to the Western Islands of Scotland. It was in Greenwich Park on Saturday, the 30th of July, that Johnson avowed his preference for Fleet-street over all the charms of a rural prospect. In 1764 he and Sir Joshua Reynolds founded the club, named, at Garrick's funeral, the Literary Club, at the Turk's Head, Gerrard-street, Soho. The sign alone survives at No. 48, corner of Little Newport-street. The club has occupied in turn Prince's, Sackville-street; Telier's, Dover-street; Parsloe's, St. James's-street, one of the earliest of West End hotels; and (1799) the Thatched House, St. James's-street. A former home of the Dilettanti Society, the Thatched House, together with the two adjoining houses on its northern side, has since given way to the Conservative Club. On the 8th of July, 1765, Johnson is voted the unsolicited academic distinction of their LL.D. degree by Dublin University; but though he received similar honours from his own University, it does not appear that he at any time assumed the style of "Doctor." About this period morbid melancholy more than usually marked him for her own. There exists a painful picture of the distressing mental condition in which the Thrales found him one morning in his chambers (1765). Literally closing his lips, they carried him to Streatham forthwith, where for several years he found grateful distraction from the ills of life. In 1765 he leaves Inner Temple-lane for No. 7, Johnson-court (not, however, named after him), in the small paved yard that lies between Gough-square and Fleet-street. Unless, indeed, the numbers have been changed, this is the white house on the eastern side of the yard, and occupied by the servants of Anderton's Hotel, Fleet-street. Yet in J. Smith's view, engraved for Bohn's edition of Croker's Boswell (10 vols. 12mo. 1848), the figures are pointing to the corner house on the southern side, which is now numbered 8. The proprietor of the hotel informs the writer of this article that the unnumbered premises between Nos. 6 and 8 is the house in question. Having lived here for eleven years,—an interval chiefly memorable for his friendship with Goldsmith, his interview with the King in Buckingham House library, his tours in Scotland, Wales, and France, and a visit to Burke at Beaconsfield,—he changed in March, 1776, to No. 8, Bolt-court, hard by, where he wrote his "Lives of the Poets." The present Stationers' Company's School is generally pointed out as the house in question. At his death the house passed to a son of the printer Bensley, who carefully preserved it, and re-roofed it in 1817. A fire that broke out in 1807 did not injure any of Johnson's rooms. But in 1819 another fire consumed the whole premises, and no building has since been erected over the precise spot. The freehold of what had been four houses and a large garden was sold by the Bensleys to the Company some years ago, who, pulling down the offices erected after the fire, built the existing school-house, being No. 6 in the court. It was to No. 8, Bolt-court that Samuel Rogers came one day, but could not summon up confidence to await the opening of the door; and here too the elder Disraeli, having sent a poem for approval, called just a few hours after Johnson's death.

Here, in the back room on the first floor, on Monday evening, this date exactly 100 years ago, Samuel Johnson died, his last articulate utterance delivered to Miss Morris, daughter of his old friend. Thence by the very thoroughfares wherein, like to Charles Lamb, he loved to feed his humour, in sympathy with their multitudinous moving picture, his remains were carried to the southern transept, West Minster, there to lie beside the grave of Garrick at whose interment he had stood bathed in tears. Boswell cites his satisfaction when, to his inquiry on this point, Sir John Hawkins, his executor, replied, "Doubtless in Westminster Abbey." Yet in Hare's "Walks n London" (1878) occurs this passage:—"He was buried here by his friend Garrick, contrary to his desire that he might rest at Adderley, in Shropshire, which belonged to his friend Lady Corbet, cousin of Mrs. Thrale." In 1851 a tablet was placed against the pillar by his pew (No. 18), in the northern gallery of St. Clement Danes. The inscription omits to mention his abounding charity and earnest piety. Much will be said and thought this day of Johnson as a scholar, a moralist, and a poet; of his courage and sturdy self-reliance; much could be said of his tender heart, his affection for his friends, his great humour, his genuine enjoyment of honest sport. That he did not on all occasions cultivate the *leniores virtutes* which lend a grace to social intercourse, may assuredly, with his bodily afflictions, at this distance of time be overlooked; for, as he himself writes of Goldsmith to Bennet Langton, "Let not his frailties be remembered; he was a very great man."

* As also a diploma as M.A. of his University, dated the 10th of February, 1755, and the offer of a benefice.

† See his letter of that date to his step-daughter, Lucy Porter. The writer fails on careful inquiry to identify his rooms at Staple Inn.

‡ Pulled down 1857 now site of Johnson Buildings.

## JAPANESE ARCHITECTURE AND ORNAMENT.

ARCHITECTURAL ASSOCIATION.

THE fourth ordinary meeting took place on Friday, the 5th inst., Mr. Cole A. Adams, president, in the chair.

About seventy new members were elected, and Mr. James Brooks was elected a member of the Association by acclamation.

Dr. Dresser, Ph. D., F.L.S., delivered a lecture an "Some Features of Japanese Architecture and Ornament." Japanese architecture, he said, was in part native and in part foreign. Japan was very similar to Great Britain in the fact that it consisted of three parts. The northern division is inhabited by a simple, kind-hearted race, having the most primitive of manners, whose dwellings are of a rude character, and whose temples are scarcely of a more advanced nature. The aloe temples consist simply of trunks of trees fixed into the ground, more or less vertically, on which are arranged horizontal members, arranged for forming a sort of roof. These members are covered with a very rude thatch. The main feature in this building is the roof, which is intended to give shelter from sun and storm, and is supported in a number of uprights. This was the anti-type of all the Japanese dwellings, because the most highly finished edifices consist of little more than uprights of some description, tie-pieces, and very elaborate roofs. Japan derived a great portion of its architecture from the continent of Asia. At an early period direct communication existed between Japan and Corea, the latter being made tributary not long after the commencement of the Christian era. Some of the Japanese architecture was brought from India by Buddhist missionaries. A temple about twelve miles from Kioto, was decidedly Indian in character, and the priests who had charge of it said it was built by Indian Buddhist missionaries about six centuries ago. As all the nobility studied the works of Confucius, great Confucian temples have been erected, but the greatest of these, built on a Chinese model, has now been converted into the National Library. Here they got Chinese influence brought to bear directly on Japanese architecture. Chinese architecture had two sources. The Chinese had resided in boats from time immemorial, and he would point to an example of a Chinese building which showed its boat-like architecture. The other source was the tent, and there were some Chinese buildings which consisted of right lines. The Japanese, so far as he knew, had never adopted the junk-like architecture, but they had adopted the tent-like form in many instances, while in not a few they had adopted the right-line character also. There were many proofs to show that the architecture of Japan was derived to a great extent from China. The columns of many of the temples were intertwined with dragons, and the same lattice work was used in both countries. The pagoda was also common to both China and Japan. It was said by many Europeans that the Japanese had invented nothing, but had improved in everything they had derived from other sources. [The lecturer here showed several photos of the central shrine of the Shinto religion. This, the oldest structure in Japan, was erected more than 1,800 years ago; and although the buildings composing it were razed to the ground periodically, yet exactly similar ones were erected in their places.] The next most ancient building was composed of huge triangular logs, and had for more than 1,200 years contained the treasures of the Mikado. An inventory made 1,200 years ago was said to represent the things now in this building, many of which were certainly from Central Asia. Style in architecture is influenced by religion, climate, and material. The mirror is the great symbol of the Shinto religion, the idea being that everything should be capable of being revealed to the world, as one's image is reflected in a mirror. A great deal in Japanese architecture was due to this religion, enjoining as it did the most perfect workmanship, and no "scamping." The Mikado is the god incarnate of the Shinto church. In every house there is a little altar or dais for the Mikado, with a shelf for a flower or vase. This niche is treated with the greatest reverence, and constructed with the utmost care. Even in the poorest houses the wood, which is without lacquer or colouring, is so beautifully smooth that he used to delight in stroking it. Dr. Dresser next referred at some length to the sun and fire worship, to Phallic worship, and to the worship of heroes. The Shogoon, with whom Great Britain made a treaty, was a Buddhist, and under his power the most gorgeous Buddhist shrines had been erected and maintained throughout the land. Buddhism introduced the greatest harmony between man and all created things, and this would explain the influence such a religion had brought to bear upon Japanese architecture and art. As to climate there was a wet season, with a continuous downpour lasting some six weeks. In the south the climate was tropical; in the middle, semi-tropical in summer, with great cold in winter; and in the north the cold in winter was intense. The Japanese climate, therefore, demanded a roof over one's head; at the same time it was a land of earthquakes, which was one of the greatest difficulties the Japanese architect had to overcome. He (Dr. Dresser) was the first to enunciate the plan on which the Japanese pagodas were built. The central upright, he found, was not continuous, but, like the clapper of a bell, it was really dependent from the top,

so that when an earthquake took place it swung always keeping the centre of gravity within the base. For this reason no pagoda had ever been known to be upset by an earthquake. Japanese houses were not fixed to the ground, but were built of uprights, horizontal tie-pieces, a roof and a floor, so that, in case of an earthquake, the houses rocked about and then settled down again. Then they had the rain to deal with. The Japanese only built their castles of stone, in enormous blocks, leaning inwards, and fitted together in a peculiar manner. As the ordinary buildings, therefore, were of wood, they had to be protected from water, and the lower part of every wooden column was encased in bronze, so that the water should not get into it. The walls, palings, and even clothes-props had roofs to protect them from the weather. The material used for building was, as he had said, chiefly wood, but the English in Japan had been trying to persuade the people to use brick. If they did so he believed the first big earthquake would bring them down. It was difficult to understand the nature of Japanese architecture because there was an etiquette in it. If a man wished to build a house, he had to go to the master of the ceremonies for a plan, which bound him down to the number of doors, &c. There were a great many different kinds of roofs. The lecturer here referred to the photographs exhibited on the wall, drawing special attention to a thatch roof with a curious bit of gable, similar to the houses of Sumatra and Java. Roofs are in some cases covered with thatch, and in others with tiles. The thatch consists chiefly of rice-straw, and in the great temples the inner bark of a coniferous tree is used, the little plates of bark forming an exquisite thatch. The roofs are of various kinds, but the pitch is never very high. There is the right-line roof and there are curious curved roofs. Roofs are supported by a system of bracketing. The roof is brought out gradually by brackets, and in some cases the brackets used are of a simplicity and correctness which are really charming. In other cases this is carried to such a degree of complication that it is almost impossible to understand it. The ceilings are generally coffered, some being of great beauty. The ceilings of the temples are of a coffered character, sometimes richly decorated with flat ornamentation, and in other cases with carved woodwork. Circular columns are most general, but there are also octagonal and many-fluted columns. The columns are occasionally enriched by a dragon twining round them, or by sprays of the blackthorn or other plants. In other instances the columns are covered with very fine diaper-work in relief. The walls used were to be especially noted, one example being formed of tiles placed one on another, covered with cement, and topped by the roof. Some roofs consisted of stone at the bottom, then came uprights with tie-pieces, and below these were carvings of water-fowl. Walls were often enriched by carvings, especially in the upper part, where they were sheltered by the roof. Dr. Dresser then gave a graphic description of the great shrine of Niddo, which is approached by an avenue, forty miles in length, of coniferous trees. With regard to ornament as springing out of the architecture of the country he could say very little indeed. Japanese ornament was of a peculiar kind, and they had a distinct conventional ornament which did not consist simply of the representation of natural objects. Dr. Dresser showed several circular ornaments in imitation of crests, and others which sprang from fire. He also exhibited a series of drawings he had had made in Japan by a native artist. There were surface drawings, but the carvings they depicted were as highly coloured as the drawings. The Japanese in their temples used a high colouring, owing to the fact that the roof very much overshadowed the building, while the floor was polished black, all the light the decoration received being reflected from the black floor. Water was the decoration used on most of the columns. Some time ago the *Builder*, in devoting six columns to a review of a work of his,* made the following remark,—"What could be more absurd, more contrary to the whole meaning of ornament as applied to architecture, than to sculpture conventional water all over a wooden column? The author seems to have some difficulty in swallowing this water." Well, this was what the *Builder*, 1878, page 635, said, speaking of some terra-cotta piers in the Natural History Museum at South Kensington:—

"The design of these piers is certainly novel and pretty. They are oblong in plan, the longer side parallel with the length of the room, and consist of a kind of pedestal about three-fourths the height of the room, the remaining portion breaking into four pilasters square on plan, and with foliage ornament on the outer faces and the capitals: the pedestals in the room devoted to marine fossils are decorated in a very pretty and piquant manner by very low reliefs of fish and other aquatic creatures, worked on various blocks here and there in an accidental sort of manner, and as if from the inspiration of the moment in working the material, the general face of which is relieved also by waving lines symbolical of water, with an ornament of conventionalised aquatic plants delicately modelled in very low relief just over the plinths. The effect of this treatment is very refined and unusual, and gives a picturesque interest to what would otherwise be surfaces of bare jointed terra-cotta."

He might say that he did not swallow the water. He had intended to say a few words about the beautiful poetry of Japanese art. There was a poetry and meaning about almost everything the Japanese did, and there was scarcely a thing in a Japanese building which did not remind the people of something they loved. There was nothing in connexion with the great shrines which was not lovely in colour and harmonious in its general effect.

The Chairman, in opening the discussion, said it was interesting to trace in Japanese art, as in all other arts, the influences which had given rise to, and formed it. The beauty and care which the Japanese bestowed upon their art, making it a part of their religion, was a proof of the likeness between Japanese and Greek taste. In Japanese art they could see that precision of hand and eye which gave it a certain fellowship with Greek art. The Japanese, while approaching nature, yet preserved an exact conventionalism. The old Greeks, like the followers of the Shinto religion, believed that the gods saw everything that was done.

Mr. H. H. Statham rose to propose a vote of thanks to Dr. Dresser for his interesting lecture. He did this with the greater pleasure as he had spent several hours with Dr. Dresser, looking over his photographs and inspecting many of the interesting objects for which the Association had been unable to find room. One thing which had particularly struck him was the remarkable way in which the Japanese made use of the products of nature close to their hand. Whatever was round about them they seemed to lay hold of, turning it to the best artistic use, and putting upon it a finish which was most extraordinary. They showed an example of thoroughness and painstaking which was difficult to find in any other art of the present day. One or two of the objects he had looked at reminded him of a very excellent sentence of John Stuart Mill's, who said that if he were asked to define art he would term it the endeavour after perfect execution. If a man had done a thing in the very best possible manner, although a less complete way would have answered for practical purposes, that man had worked as an artist. Dr. Dresser had shown him a minute butterfly-cage, bound round with little tie-pieces of bamboo, turned round, cut, and joined, and had defied him to tell where the joint was. This was a most extraordinary instance of perfection in workmanship, for the sole purpose of doing it well. On the other hand, there was something curious and extravagant in the manner in which the Japanese artist had got up the coloured drawings. These were intended purely to show the construction and method of decoration, but the painter could not be satisfied with simply doing that. He could not see a column going up one side of his paper without putting in something perfectly irrelevant for the purpose of balancing the work. That showed a sort of illogical mind, and appeared to be the one defect in Japanese art, with all its beauty, its finish, and its exquisite fancy. It was not the logic which belonged to Greek art; and was hardly a thing for people to be always imitating. Ornament should have some connexion with the member in which it was placed, and the position in which it was. Dr. Dresser had called attention to this in bringing forward the coloured ornament with the diaper on the beam so exactly fitted to it. He was bound to notice the lecturer's little reference to the *Builder*. The water decoration upon the walls of the Natural History Museum at South Kensington was, he believed, put in the Fish Museum, as symbolical. All ornament ought to have a meaning, and if the Japanese water ornament was in a fish museum it would be excellent; otherwise it had no meaning. A column was a thing to support a weight, and should be made to look as strong as possible. The Greek artist did this, by fluting it up vertically, to give it nerve and sinew, while the Japanese artist amused himself by drawing water-lines upon it; therefore, the Japanese artist made a mistake in that way. Mr. Waterhouse, or whoever did the decoration at South Kensington, seemed to have wished to emphasise the fact that it was a fish museum. He (Mr. Statham) could see no reason for water on the Japanese column, and until he could he would maintain he was right.

Mr. Osborne Smith remarked that the wave-like marks upon the piers at South Kensington were not in the Fish Gallery.*

Mr. Stannus thought that the decoration of water might have had its rise through a poetic and imaginative people owing so much of their safety to columns going down into the water. Mr. Statham had referred to the want of logical ornament; there was also a want of reticence in Japanese ornamentation. The Japanese artist never knew where to hold his hand, whereas the Greeks put the ornament in its proper place. This temperance, as he might term it, was a virtue which was lacking in Japanese art, lovely and interesting as it was. He had much pleasure in seconding the vote of thanks to Dr. Dresser.

Mr. Burrows inquired if the Japanese went in for quarrying at all? Also if the central staff of the pagoda was free?

Mr. A. B. Pite remarked that Mr. Stannus's idea of the derivation of the water-decoration was a charming one, but, at the same time, slightly far-fetched. As to the application of ornament, Dr. Dresser had already said that architectural style was not only influenced by people and climate, but also by material. It would not do, therefore, to judge Japanese wood-work by the same rules of decoration and support which would apply to the marble architecture of Greece and the granite architecture of Egypt. They could not apply the European orders of architecture to the Buddhist element, which was beyond the pale of modern civilisation, and, until some wonderful being had compiled a grammar of the whole thing, they would not be able to apply any rules of logic to it.

Mr. H. D. Appleton (hon. sec.) wished to know whether the Japanese prepared plans for the erection of their buildings at the present day.

The vote of thanks having been carried by acclamation,

Dr. Dresser, in replying, said that when Mr. Waterhouse designed the water-columns, which were both pretty and piquant, it had not been settled which rooms were to be devoted to the different classes of creatures. He contended that nothing had been said about beauty and appropriateness in the *Builder*. As to appropriateness, the water was not a general decoration in the case of columns. The temple in which he had seen it had been, he believed, dedicated to the fish god, hence they would see the appropriateness at once. He had no knowledge of quarrying taking place in Japan. Some of the stones used in the construction of the large castles had been brought over 200 miles, and the curious thing was how this had been done when there were no roads. The central rod of the pagoda was absolutely free, with a considerable space round it. The Japanese plans for the temples and large buildings were carefully drawn. They drew elevations, but put in little bits of perspective to help them out.

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**Art Union of London.**—The Art Union have sent us an impression of the line-engraving by Mr. Willmore, from Mr. Brierley's picture of the "Attack of the *Vanguard* on the Starboard Wing of the Spanish Armada." The work, which is the print for 1885, is a spirited one, and Mr. Brierley has studied the historical aspect of the subject thoroughly; but it has the old fault of being over large, as are most of the engravings issued.

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* See *Builder*, Nov. 25, 1882.

* The fact that the specimens were not ultimately deposited in accordance with what appeared to have been the original intention does not much affect the argument. But it is odd that *all* the speakers seem for the moment to have forgotten the essential distinction between the two cases: the visible surfaces in Mr. Waterhouse's building are only an ornamental fire-proof terra-cotta screen for the iron columns. The parallel case would be, if the terra-cotta screen were removed, and the *iron column and girder* painted over with conventional water. That we should call an absurd style of architectural decoration, whether it were done in England or Japan. The treatment of a mere screen surface does not strike the eye as absurd in the same way, though we are not particularly concerned to defend it.—Ed.

## A CASTLE SKETCH.

WITH what sublime indifference and superiority does not the material man for the most part regard the antiquary! To him walls are a mere patchwork of bricks and plaster, and arches mere heaps of stone piled together in certain conventional shapes. A Saxon window has no charms for him, and the mystic B. S. H. M. is in his eyes a cypher, and nothing more. He cares for none of the enjoyments that spring from even the most superficial study of history, architecture, or natural surroundings; his thoughts are centred, perhaps, on a dinner prospect, or, more probably, on the self-satisfaction which he feels at having seen something, though what that something is it matters little.

The antiquary's spectacles, again, are often the subject of derision; not only are they charged with possessing a pinkish hue, but even of being tinted with that brighest of all colours, —imagination. Still, what an additional amount of pleasure do they not bestow upon their wearer! They should, indeed, rather be said to consist of that sombre and dignified dark glass through which things are to be seen steadily, in their true aspect, and without the glare and dazzle of deceiving sunlight. Many an old building may be seen to advantage through them; for they not only facilitate a sketch of its contour, but are of immense use in reading the history and true life of the most ancient pile of bricks and mortar, and in imagining its past scenes and surroundings.

Of all the Welsh castles to which the antiquary's glasses may be applied with the greatest advantage, Carnarvon is the most imposing and the most worthy a sketch, whether mental, or pictorial, or descriptive. There is so much to think about when we look at this mass of masonry surrounded by a glorious landscape, and rich with the legends of bards and warriors. A thought is but a sketch, and where the one is tossed off into the sketch-book or on to the canvas, the other is painted, with the colours of impression, on the mind: so that the genuine antiquary, who should have in him a touch of the poet and the artist as well as of the historian and the old-world lover, will have before him as good an opportunity for the contemplation of the landscapes of art and the vistas of history, as of the angles of architecture and the mazes of romance.

Viewed from various points,—from the streets of the town itself, from the shore, and from the Menai Straits,—the fortress of the Arvon presents an equally grand appearance. Externally in a most complete state, its ramparts and walls, with many towers and turrets, look as if they still had some of those duties to perform for which they were originally intended. To take in the idea of the size of the building and the extent of ground it covers, a walk around its base, down the street that leads to the quay, and then round the north side of the building, is sufficient. Though not possessing as much grace as Conway Castle, and deprived of as favourable a situation, it nevertheless surpasses it in stateliness, and may be taken as the best specimen of the Edwardian style of Gothic. The great difficulty in a building of this kind,—the difficulty of giving beauty to massiveness, and useful decoration to so strong and vast a piece of military architecture,—has been overcome in a masterly manner by the pentagonal, hexagonal, and octagonal turrets that surmount its towers, and by the irregularity of its plan, as well as by the grace of its windows, whose form, among many other things, was, no doubt, suggested to Edward I., its founder, on his travels to the Holy Land, where he much admired the castles of other countries, and brought home fresh ideas which found expression in the building of such fortresses as Beaumaris, Conway, Harlech, and Carnarvon.

Turning from the contemplation of the larger effects, to a sketch of the more prominent and noteworthy of the isolated bits for which the castle is famed, we might take, for instance, the Eagle Tower, which our friend the antiquary would select at once as the most prominent feature of the building, and the most interesting point in his series of sketches. Viewed from the quay, it is to be seen to the best advantage; and the skill with which the architect has made such a mass of square stone appear light and graceful is especially to be admired. This lightness is due to the three angular turrets that rise from the summit of the towers, and to the little statues of eagles that are placed here and there on the parapet, and give their name to the edifice. Below, at its foot, is a small watergate, and, breaking the line of square-cut stones that runs from the summit to the base of one of the angles, is a small group of fisher hamlets built up against the wall. On the ramparts are the stone heads of cross-bowmen, that look as if they were peeping over the parapets: a strange device for misleading enemies, and a detail in the building which, though strikingly out of place amid the dignity of its other surroundings, still recalls forcibly the character of the man who placed them there,—a character in which sublimity of soul was blent with the cunning of the fox. Then, again, there is the Queen Eleanor's Gate, a handsome circular arch, which used, in all probability, to serve as an entrance or postern to some drawbridge, connecting this portion of the castle with a row of outworks. It is seen at its best some distance off on the other side of the water, from which we also get a view of the expanse of the whole southern side of the building. This is the favourite view of Carnarvon Castle, and the one most aptly chosen by artists as conveying the best impression as well of the beauty and lightness as of the massiveness and strength of the building. Among its rows of towers, pierced with small long windows and outlets, the Eleanor's Gate shows with wonderful effect on the eastern side, and seems to spring straight from the ground and rise to within some 20 ft. or 30 ft. from the summit of the tower.

The series of mental sketches that spring from the contemplation of these different points is almost as varied as the string of natural details and art adornments that surround the building. We think of Edward the "Longshanks"; of his conquest of Wales; of the pride and valour of the conquered Welsh, whose devoted historians even to this day insist on tracing the pedigree of Victoria through Lewellyn the Great, Constantine the Great, Lud, King Lear, through Æneas of Troy, Jupiter, Saturn, and Uranus, to Gomer, Japhet, and Noah, the forefathers of the Cymry. We think of the beloved Eleanor in whose honour the gate is named, how she visited Carnarvon when the castle was being built, and of the cunning fraud of the king, who held his baby up before the Welsh princes, presenting to them a lord who was born in Wales, who was innocent of all treason, and who could not speak a word of English. Then, again, we glance at the tower on our left,—the Dungeon Tower,—where the redoubted author of the "Histrio-Mastrix" was confined by the bigotry of Land and Charles I., and whence he was borne amid the joy of vast multitudes, to London on the triumph of the Parliament, with the "stigmata Laudis" branded on his cheeks. Or another historical side-light shows us the last of the Welsh heroes, so hardly handled by Shakspeare, —Owen Glendower, for the last time calling to arms the hardy mountaineers of Wales, and by the fire of his eloquence and the greatness of his boasts igniting again the slumbering embers of hatred against the Saxon.

The portion of the castle, however, which, from its structure, gave rise to the greatest amount of ill-feeling in the hearts of the conquered nation was probably the entrance tower; and whereas in former days the Welsh people made the statue of Edward I., which surmounts the gateway, the object of their hatred and their theme for calling each other to arms, so in our own times, now that the expression of the statue has faded, and the meaning of its position been defaced by age, the Welsh antiquaries keep up the quarrel with one another as to whether the king is triumphant or menacing, gentle or conciliatory. But even if the features are somewhat faded by age, the rest of the grand entrance remains complete, and the work of Henri de Elreton is here to be seen at its best. Dallaway, who affirms that this portion of the castle is the most handsome structure of the age of Edward in the kingdom, describes it as "at least 100 ft. high; and the gateway, of very remarkable depth, is formed by a succession of ribbed arches, sharply pointed."

So we may wander on, recalling picture after picture, and jotting down sketch after sketch: whether it be a fragment of an arch shrouded by drapery of trailing creeper, or the relic of an old stone eagle, famous for the quarrels of antiquaries; whether it be wandering through old halls of which the walls have long crumbled; or climbing upon the ramparts and among the towers to see below us the life of to-day. On the summit of the Eagle towers we see beneath us the lovely land of Wales; before us, the Menai Straits and the Isle of Anglesea; to the north-east lies Bangor; and to the south, as far as eye can reach, rise the lofty peaks of Snowdon and Moel Shabod, with the noble range of hills and valleys that surround them,—lands rich with song and the wealth of overflowing romance; while just beneath, at the foot of the castle, are a number of noisy school children let out from work, playing among the sand and stones, and paddling with their little bare feet in the water. And then, somehow, there springs up another thought, suggested by the words of Mr. Ruskin in one of the late numbers of "Fors Clavigera," concerning an incident at the school of Coniston. "And now, suppose," he says, "that there were any squires' sons or daughters down here for Christmas, from Christchurch or Girton, who could and would accurately and explicitly tell these children 'all about' the Queen's arms; what the Irish harp meant, and what a bard was, and ought to be; what the Scottish lion meant, and how he got caged by the tressure of Charlemagne, and who Charlemagne was; what the English leopards meant, and who the Black Prince was, and how he reigned in Aquitaine; would not all this be more useful, in all true sense, to the children, than being able, in two seconds quicker than the children outside, to say how much twenty-seven pounds of bacon comes to at 9¼d. a pound?"

## PROPOSED NEW STREET FROM GRAY'S INN ROAD TO ST. JOHN'S STREET ROAD.

THE proposed new street from Gray's Inn-road to St. John's-street-road for which plans have been deposited by the Metropolitan Board of Works will start from a point in Gray's Inn-road, opposite Theobald's-road, and will be carried in a curved direction through Warner-street and Coldbath-square to Farringdon-road at the junction of that road with Exmouth-street and the highest part of Mount Pleasant. The valley between Vine-street and Coldbath-square will be bridged by a viaduct about 150 yards long and about 26 ft. high at the highest part. Tothill-street, Vine-street, the south side of Coldbath-square, together with some other smaller streets will be stopped up. The salient angle of the Middlesex House of Correction at the corner of Farringdon-road and Mount Pleasant is proposed to be rounded off in order to improve the entrance into Farringdon-road from the new street. From Farringdon-road the road is carried by a short curve to John-street, which will be widened on its east side. From John-street the road is carried across Tysoe-street and Rosaman-street into Garnault-place, and thence in front of the New River Company's Offices to Sadler's Wells Theatre, which it passes on the eastern side. The new street will absorb the Myddleton's Head public-house and Deacon's Music Hall adjoining, both of which are included within the limits of deviation. The new street will terminate in St. John's-street-road, opposite the Clown public-house, a short distance to the westward of Owen's-row. The roadway will follow the course of the New River for a length of about 100 yards to the westward of St. John's-street-road.

The whole of the open space in front of the New River Company's offices, Lloyd's-row, is included within the limits of deviation, and will in all probability be absorbed for building purposes in order to recoup some portion of the expense of forming the street. Clerkenwell is a poor and densely-populated neighbourhood, with but few open spaces, and it is perhaps not asking too much that if this space is acquired by the Board it should be planted and dedicated to the public. The street is throughout of a utilitarian character, no attempt being made to give it anything approaching a monumental appearance, and such an opportunity as is presented by the occurrence of this open space in the line of the proposed new street should not be thrown away. It is perhaps too much to hope that the New River Company's buildings should be set back and a *place* or turning-place formed in the middle of the street; but this would certainly be done in any other capital in Europe, and the poverty of the neighbourhood would be held to be a justification for such an expenditure rather than the reverse.

The street at its southern end will be carried

on a viaduct, the inclination of the roadway for this portion of its course being at the rate of 1 in 503, which appears to be satisfactory; but for a short distance, namely, between Mount Pleasant and Great Bath-street, the inclination on cross section is 1 in 20. The present inclination is, however, 1 in 14, and this alteration must be looked upon as an improvement. Between Farringdon-road and St. John's-street-road the new street closely follows the present surface-levels.

The old bathhouse or bagnio in the centre of Coldbath-square will be destroyed by the formation of the new street; the bath is ancient, but the premises are not interesting except from a topographical point of view. Myddleton's Head and Deacon's Music Hall mark the site of a tea-garden much frequented by the fashionable world in Charles II.'s time. It is alluded to by Pepys, and a portion of the house attached to the gardens is shown in the background of Hogarth's "Evening," in the series of engravings entitled the "Times of the Day."

The street crosses Rosaman-street a short distance to the westward of Clerkenwell Vestry-hall, but the hall is not included within the limits of deviation shown upon the deposited plan.

The improvement which will be effected by the new street in the means of communication between Holborn, Clerkenwell, and Islington, is one which has long been urgently demanded on grounds of absolute necessity, and its execution has been frequently urged in our columns. The existing route *viâ* Elm-street and Mount Pleasant is both steep and tortuous.

## RAILWAYS IN ASIA MINOR.

That Asia Minor is destined sooner or later to become a field for railway enterprise there can be little doubt. Now that the continent of Europe has been covered with a network of railways, and the benefits consequent upon such means of intercommunication have been practically proved by the material progress of those countries, where they have been judiciously carried out, and now that in India also the railway system has been so largely extended that the extremest limits from North to South, and from East to West have been bound together, it would certainly seem as if the time had arrived when the countries which intervene between Europe and the Far East can no longer continue to remain isolated. Hence railways in Asia Minor have of late been more prominently brought before the capitalists of this country. For many years past it has been the dream of the more enthusiastic among railway projectors to connect Europe with India by the Euphrates Valley route, but that project has scarcely gone beyond the region of dreams. As usual in such questions, distinguished men are found ranged on opposite sides. Possibly in the distant future it may be found expedient to connect the extreme points whenever the intervening countries have advanced to the requisite stage of civilisation, and become themselves sufficiently developed to require being linked one with another, and with the greater world beyond them. As a first stage towards that end, the construction of local lines from the coast into the interior, so as to afford a cheaper and more expeditious mode of transit than at present exists, is a step in the right direction, and therefore, the scheme of the Mersina-Tarsus and Adana Railway, to promote the furtherance of which a meeting was, with the Duke of Sutherland's permission, held at Stafford House last Saturday, may be deserving of the attention of English capitalists. The meeting was well attended, and several distinguished men from the various classes of society responded to the invitations which were issued by the promoters. The speakers who moved and seconded the resolutions were, as a matter of course, advocates, not only of the particular project, but also of the more ambitious and extended scheme above alluded to, and as no one rose to call in question the views propounded, it is to be inferred that the measure met with general concurrence. One voice was, however, raised in doubt of the fiscal arrangement by which the promoters of the Mersina-Tarsus-Adana railway have been induced to lay it before the public. To say the least, the mode in which the capital is sought to be raised is entirely novel, so much so that the gentleman in question was doubtful of the possibility of the scheme ever realising a quotation on the Stock Exchange. The "Short Statement" with which it is introduced certainly required the special explanation devoted to it, in order to clear up the seeming intricacy in which it is involved. It may be briefly described as a company within a company, "for inside the railway company," which "has been authorised by a firman of the Imperial Ottoman Government," there is to be a "Construction Company, Limited," with a capital of 95,000*l.* A shares (without voting powers), 8,250*l.* B shares (with voting powers), with 165,000*l.* six-per-cent. First Mortgage Bonds," and which is to "subscribe for all the shares of the railway company, to procure and pay for the assignment of the concession, and to construct and equip the railway for 165,000*l.* in cash, and all the 165,000*l.* First Mortgage Bonds of the railway company." In return for this, "for each 100*l.* now subscribed, the subscriber is ultimately to receive:—

| | | | |
|---|---|---|---|
| £100 six-per-cent. First Mortgage Bonds..... | £6 | 0 | 0 |
| 40 in shares commencing at nine per cent.. | 3 | 12 | 0 |
| £140, yielding per annum ..... | £9 | 12 | 0 |

And, in addition, a share in the distribution of the final assets.

With the prospect of such a return there ought not to be any difficulty in procuring the requisite funds. Indeed, it is not clear why, with the probability of such ample returns for the investment, so circuitous a method of raising the capital should be resorted to. The proposed railway is 42 miles in length without, it is said, any serious engineering difficulty to encounter, while the existing local traffic is stated to be sufficient to insure its commercial success.

# Illustrations.

## JAPANESE CARVED FRIEZES.

These are from photographs which were exhibited at Dr. Dresser's lecture at the Architectural Association, and were lent us by him for the purpose of illustration. They are examples of the exquisite wood-carving which is frequently to be found occupying the space which answers to the frieze in Western buildings, as far as anything in Japanese architecture can be said to answer to anything in Western architecture. They are, as will be seen, open in some places. Some of these partially open-work friezes are found carved so as to give different subjects on the two sides, as in the open carving which adorns the crooks of some Mediæval crosiers.

## JAPANESE ENTABLATURE AND PART OF COLUMN.

This profusely-decorated piece of modern construction is, in the original, a blaze of gold and colour, of which the black and white drawing here necessarily conveys only an imperfect illustration. The construction is, a circular post carrying a joist placed on edge (the lowest member of the entablature) supporting a tolerably thick beam placed on the flat and diapered, as shown; then a cross-head construction of brackets carrying two more beams, with blocks between them in bracket form. It must be observed that the half shield and the floral ornaments straggling about between the upper and lower beams do not exist at all in the building, but were put in by the Japanese artist who made the drawing to fill up the blank space on the paper: a thoroughly Japanese idea.

The top portion of the column shows the survival in permanent form of an ornament originally derived from drapery hangings. The round part and the lower joist are painted over with a conventional imitation of water,—a characteristic whim worth illustrating, but utterly unsuitable for its position as architectural decoration.

## DETAILS FROM THE CHURCH OF LA MADELEINE, VÉZELAY.

These drawings, which, like those published last week, are made by M. Adolphe Guillon, show another of the boss-carvings of the ancient sacristy, and a fragment of carved ornament, in which we can almost see the transition from Classic to Gothic foliage, in actual progress or growth.

## TOKIO UNIVERSITY, JAPAN.

The erection of this building was commenced in 1879 for the Japanese Government, from the designs, and under the superintendence, of Mr. Josiah Conder, architect to the Japanese Government, and the building has proceeded in blocks. The immense area of the building, as well as the necessity of erecting only portions at one time, required the dividing up into these blocks, as will be seen from the plan. The scheme for the entire university includes theoretical and technical sections. In the former are included law, literature, language. In the latter, geology, mineralogy, metallurgy, biology, botany, mathematics, physics, civil and mechanical engineering, architecture, astronomy; with museums, libraries, lecture-hall, and laboratories. It is proposed also to add at some future time a medical school, with a small hospital. The central portion forms the administrative block, and the various sections are placed with a view to the best aspect for each, and convenience of their proximity to kindred sections having classes in common.

Of the two end towers, one forms an astronomical observatory, and the other it is intended to use for physical experiments with pendula or weights, requiring a considerable height. The buildings are in brick, with stone dressings. The style is Early Gothic, but the details have, where possible, without incongruity, been infused with a Japanese spirit, more especially in the internal architecture and fittings. The great difficulty that a European architect has to contend with in attempting to imbue brick and stone buildings in Japan with the spirit of the native architecture is that, throughout the entire country, the architecture is wooden; every quaint form, such as the bracketing under the eaves and on posts, attenuated lintels, supports, &c., are entirely illogical, weak, and meaningless translated into a stone or brick or other solid material. The only constructively decorative forms at all compatible with an arcuated style, such as is necessary in building in brick or stone, are in certain ogee-curved panels and window openings. With regard to decoration pure and simple, such as carving, casting in bronze, mural and ceiling decoration, carved and pierced panels, diapers, &c., the whole spirit of such work is in keeping with the works in Europe in the Middle Ages. The conventional treatment of foliage much resembles the Early Gothic and Late Romanesque.

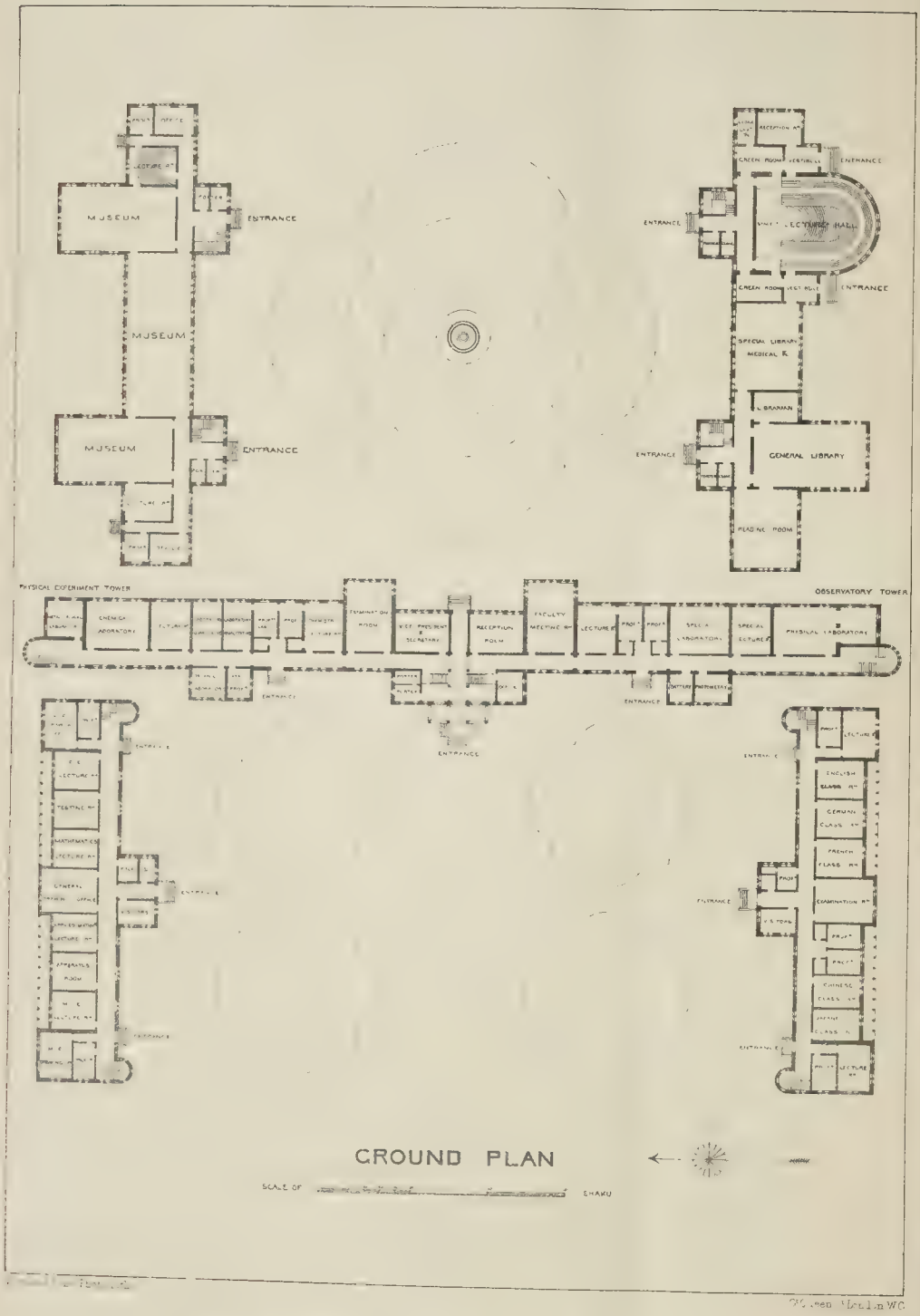
In addition to the difficulty of transferring wooden features to a harder material, there is in Japan the still greater difficulty to be met of the frequent and oftentimes severe earthquakes that occur there, a difficulty that naturally makes an architect look to iron construction as one most likely to serve him; but the Japanese authorities have not as yet taken kindly to the idea, although this mode of construction would undoubtedly enable an architect to more fully interpret the Japanese architectural spirit.

## STABLES, SWARLAND HALL, AND ENTRANCE OF A HOUSE AT BEDFORD PARK.

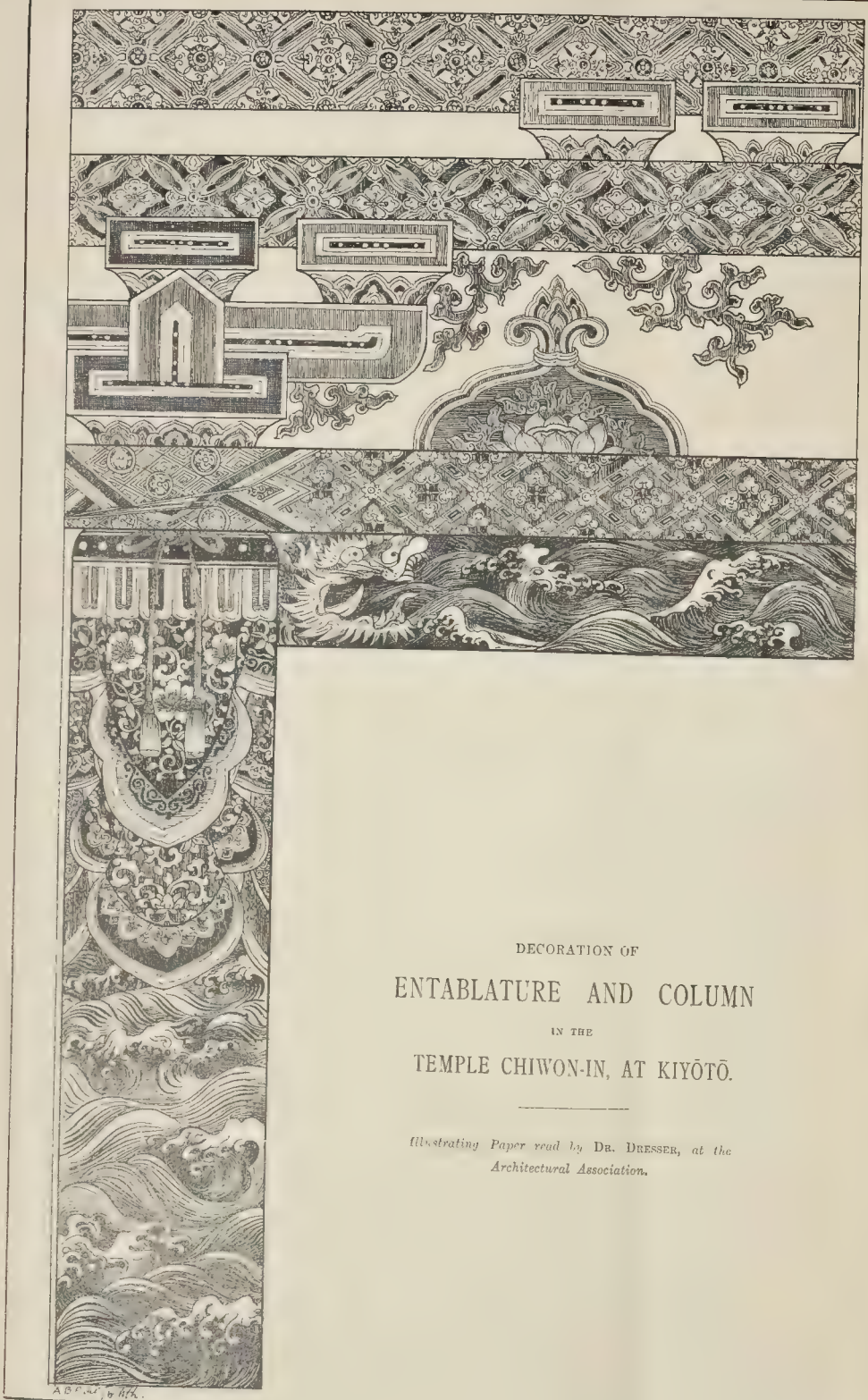
These illustrations are reproductions of sketches in this year's Royal Academy. The part of the stabling shown in the first drawing is entirely new; the rest, forming a large court-yard, are old buildings remodelled and very much altered. The new buildings have been built with a rich buff-coloured stone quarried on the estate. The house at Bedford Park, of which part of the front is shown, was completed early last year.

E. J. May.

**Brick-making in Queensland.**—The *Brisbane Courier*, of September 27th, contains an account of the proceedings at the formal opening of the works of the Queensland Brick and Tile-making Company (Limited), near Brisbane. The brick-making industry had, says our contemporary, been previously carried on in the colony under conditions which seriously impeded its progress. Now, however, they are to be manufactured in a style hitherto unknown in the colony, and on the most approved scientific principles. The machinery selected was the Plastic brick machine of Messrs. Bennett & Sayer, of Derby, which has been fitted up in a shed measuring 56 ft. by 80 ft., and turns out from 15,000 to 16,000 bricks per day of eight hours.




TOKIO UNIVERSITY, JAPAN.—Mr. Josiah Conder, Architect.



DECORATION OF

# ENTABLATURE AND COLUMN

IN THE

# TEMPLE CHIWON-IN, AT KIYŌTŌ.

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*Illustrating Paper read by* Dr. Dresser, *at the Architectural Association.*







NA PHOTO SPRAGUE & Co LONDON

## JAPANESE CARVED FRIEZES

ILLUSTRATING PAPER READ BY DR. CHRIS. DRESSER, PH D, AT THE ARCHITECTURAL ASSOCIATION



TOKIO UNIVERSITY, JAPAN



Queen St London WC

IAM CONDER, ARCHITECT.



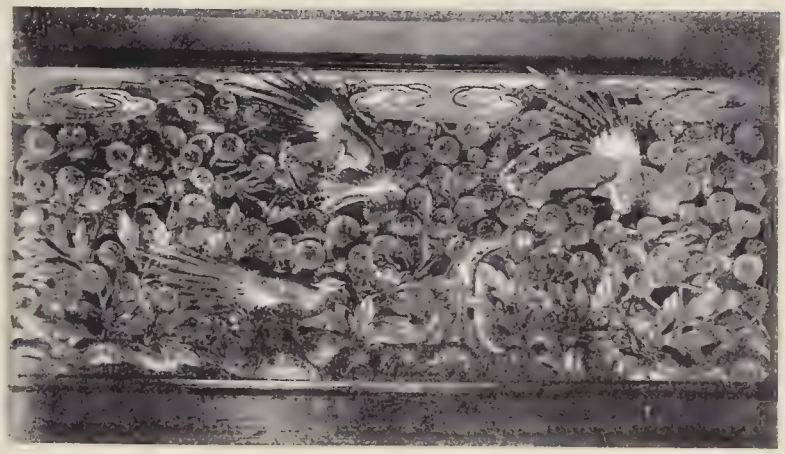




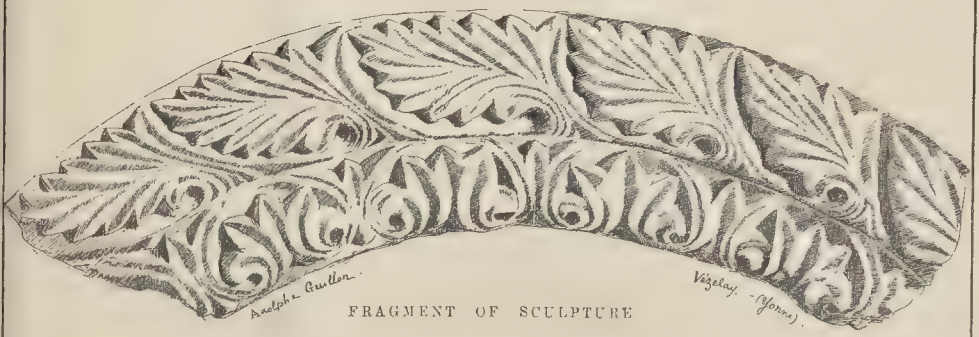
PHOTO-GRAVURE & CO., LONDON

## JAPANESE CARVED FRIEZES

ILLUSTRATING PAPER READ BY DR CHRIS. DRESSER PH D., AT THE ARCHITECTURAL ASSOCIATION




KEYSTONE FROM THE VAULT OF THE ANCIENT SACRISTY.




FRAGMENT OF SCULPTURE

DETAILS FROM THE CHURCH OF LA MADELEINE, VÉZELAY.

Drawn by M. Adolphe Guillon

Wyman & Sons Photo Litho

Queen's Head Union WC

SWARLAND HALL
NORTHUMBERLAND:
STABLE Buildgs



E. J. May del.
21 Hart St
Mansion
London W.C.

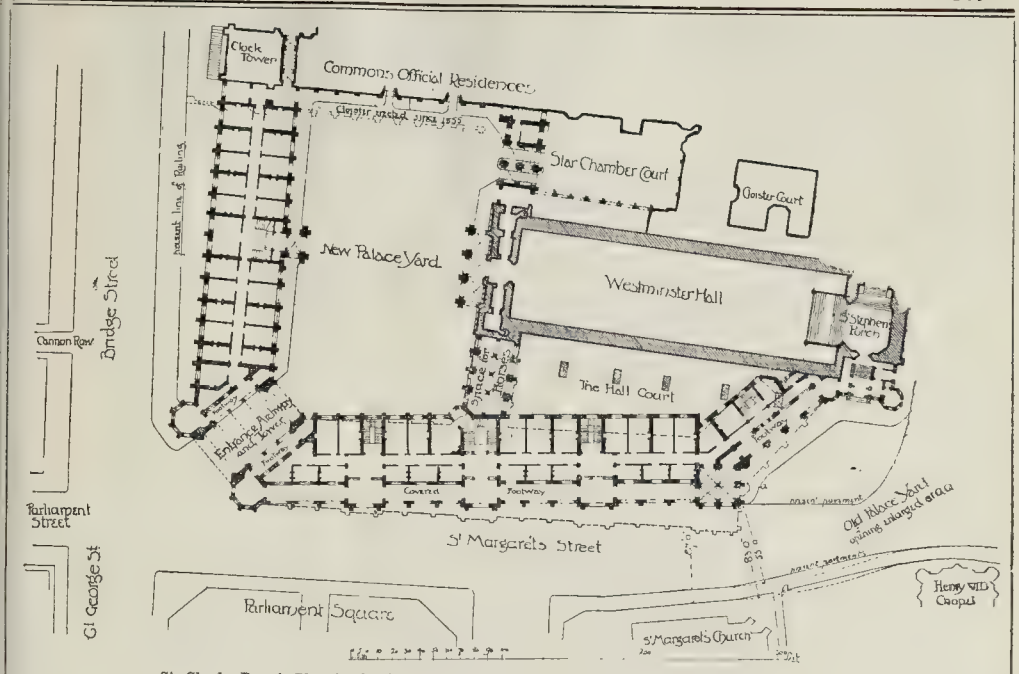
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Entrance of a House at
Bedford Park
Chiswick:
E. J. May Architect



E.J.M.

Wyman & Sons Photo-lith London W.C.




*Sir Charles Barry's Plan for the Completion of the Palace of Westminster, as modified by Mr. C. Barry.*

## THE WESTMINSTER HALL QUESTION.

THE accompanying plan shows Sir Charles Barry's scheme for completing the Houses of Parliament, in the slightly modified form submitted by Mr. Charles Barry to the Westminster Hall Committee. We subjoin Mr. Barry's memoranda on the subject:—

"It having been suggested that, in order to carry out Sir Charles Barry's plan of 1855 for a suitable completion of the new Palace at Westminster by a block of new buildings at the east side of St. Margaret's-street would unduly narrow the roadway between it and St. Margaret's Church, Mr. Charles Barry, at the request of one of the members of the Committee, has prepared a plan showing that, by a slight receding of the line of the proposed façade at the south end only, a width, for carriageway and footways, of 83 ft., can readily be provided, which is deemed ample for all possible requirements. This can be done without reducing the court which would intervene between the back of the new buildings and the west front of Westminster Hall to any damaging extent. All the old buttresses, except the southern one (which would be incorporated in the new building) would be preserved, and there would be no difficulty in erecting along the lower part of the west side of Westminster Hall such a cloister or gallery as would preserve the Norman wall there from injury by weather; and as this would not be seen, except from the court-yard, it may be built at moderate cost, without pretending to be a restoration of the old building there, for which there is really not sufficient authority. Such cloister or gallery would, moreover, form a useful passage of communication between the new buildings (proposed by Sir Charles Barry) at St. Stephen's Porch and the new building (also proposed by him, and part of his plan of 1855), completing the façade to New Palace Yard on its south side, of which the gable or raised towers of Westminster Hall would form the most important feature.

The cloister or gallery would, of course, be one story only in height, and in no way interfere prejudicially with light and air in the proposed new court, called in Sir Charles Barry's plan 'The Hall Court.'

It may be mentioned that the width of the carriage-way east of St. Margaret's Church is here (exclusive of footways) only 37 ft. 3 in., whereas by the modified plan, proposed by Mr. Charles Barry, it would be 55 ft."

## THE ENLARGEMENT OF MIDDLESEX HOSPITAL.

THE new wing to the Middlesex Hospital, which has for some time past been in course of construction, is now completed, and is intended to be formally opened on Tuesday next by the Princess Christian. The object of the extension has been to provide additional accommodation for the out-patients, and, at the same time, to increase the residential accommodation for the medical staff, nurses, and domestics. The new wing has been erected on the east side of the quadrangle, having three frontages, one within the quadrangle, another in Mortimer-street, and a return frontage in Cleveland-street. The principal frontage is that in Mortimer-street, which is 52 ft. in length, and 48 ft. in height, containing four floors and a basement. The elevation is faced with Portland cement, the ground-floor portion as well as the angles from the street level to the cornice being in rusticated work. The return frontage in Cleveland-street is carried to a depth of 87 ft., of which 18 ft. is faced with Portland cement, and otherwise uniform with the Mortimer-street elevation. The remaining portion of this frontage is faced with stock brick and red brick bands and dressings. The new buildings cover a ground area of about 4,500 superficial feet. The entrance to the buildings for patients is by a newly-erected porchway on the east side of the quadrangle, and here it should be observed that that portion of the old building on the north-east side of the quadrangle has, to a great extent, been rebuilt and re-modelled. The entrance leads into a corridor, 7 ft. in width, with several other corridors of similar width at right angles, the floors of the whole of these corridors, together with several narrower passages, being in mosaic, whilst the walls are faced with buff and white glazed brick. The ground floor is mainly devoted to the out-patient department, and contains the dispensary, men's and women's waiting rooms, surgeons' consulting-room, operating-room, and dressing-rooms. The walls of the men's and women's waiting-rooms, which immediately adjoin the dispensary, are, like the corridors, faced with glazed brick. Light and ventilation to the whole of the apartments on the ground-floor, as well as the corridors, have been amply provided for. At the first-floor level, over a central open area, there is a flat asphalte roof. This roof contains twelve lantern lights, affording light and means of ventilation to all the apartments named. All the upper floors are intended for the occupation of the medical officers, nurses, servants, porters, and others connected with the domestic arrangements of the hospital. Amongst other apartments in the basement is the dispensers' dining-room, together with dispensary and general stores. The walls of all the staircases leading to the upper floors are faced with a dado in glazed brick, 5 ft. in height. All the floors from the basement to the top of the building are of fireproof construction. Mr. Matthew Wyatt is the architect, and Messrs. Higgs & Hill the general contractors. Messrs. Haden & Sons, of Trowbridge, supplied the boilers, warming apparatus, and all the engineering work. Mr. Barrett, of York-buildings, Adelphi, furnished the ironwork; Mr. Johnson, of Wandsworth, the lifts; and Mr. Ebner, of Clerkenwell-road, laid down the mosaic floors. Mr. W. Tookey is clerk of the works, and Mr. W. Swain the general foreman. The estimated cost of the building is 16,000*l.*

## CHARGING ORDERS.

BY Section 17 of 45 Vic., c. 14, where a building is ruinous or so far dilapidated as thereby to have become and to be unfit for use or occupation, or is from neglect or otherwise in a structural condition prejudicial to the property in or the inhabitants of the neighbourhood, the Metropolitan Board of Works is empowered to issue a summons calling upon the owner and occupier of such neglected structure to show cause why the structure should not be taken down, repaired, or rebuilt, and upon the order being made, if the same is not obeyed, the Board are empowered to enter and execute the same. If the order is to take down the structure, the Board may sell the materials as they think fit. And by Section 18 of the same Act the Board may, after notice served, apply to a magistrate for an order for payment of any expenses which they have incurred in respect of dangerous or neglected structures, such order directing that until such expenses are paid no part of the land upon which such dangerous or neglected structure stands or stood shall be built upon, or that no part of such neglected structure, if repaired or rebuilt, shall be let for occupation until after payment of the Board's expenses.

A great number of orders of this character

have been and are being obtained, and, as will be seen from the above-quoted sections, the same seriously affect builders and owners of property in the metropolis. Any one may purchase a piece of land upon which one of the above orders has been obtained, and find himself liable to pay a very large amount in addition to his purchase-money, and as both builder and owner are liable to heavy penalties and imprisonment if they commence to build upon property so charged, it would be well, where there is the slightest suspicion of a charge, for both builder and owner to search the Register of Orders made, kept at the Offices of the Board, and which can be inspected without fee.

## CASE UNDER THE METROPOLITAN BUILDING ACT.

TEMPORARY BUILDINGS.

This case, which came up in the Court of Appeal, before Mr. Justice Matthews and Mr. Justice Day, was an appeal from the decision of Mr. Marsham, sitting at the Woolwich Police-court, by the Metropolitan Board of Works, upon a complaint that Messrs. Anthony & Co., of Lonsdale-chambers, Chancery-lane, had erected, without the licence of the respondent, a wooden building for the purpose of advertisements, contrary to 45 Vic., c. 14, sec. 13. The complaint, after several arguments, was finally decided on the 3rd day of May, 1884, when the learned magistrate dismissed the summons on the ground that the building having been completed six months before the taking out of the summons, the complainants were out of time in taking their proceedings, according to Jarvis's Act, 11 & 12 Vic., c. 43, s. 11, which enacts that the complaint shall be laid within six calendar months from the time when the maker of such complaint or information respectively arose.

Against this decision the respondents appealed.

Mr. Besley and Mr. Avory appeared for the appellants, and Mr. Fox for the respondents. After hearing the arguments on behalf of the appellants that this was a continuing offence, and counsel for the respondents, the Court directed to allow the appeal, and ordered the case to go back to the magistrate with the decision of the court that the application should not have been dismissed, and that he must proceed to deal with and inflict the penalties of 5*l.* and 40*s.* for every day during which the default in removing the erection continued, bearing in mind the power he had in dealing with the penalties to remit same if the respondents would undertake to remove the erection.

Costs of the appeal allowed.

## THE DECORATION OF THE CUPOLA OF ST. PAUL'S.

Sir,—The important question that has now to be decided is, whether the cruel injustice done to Thornhill by his dismissal, in 1718, from the Office of Works, where he had so long occupied an honourable position, is to be followed up by the erasure of his decorations, and by the annihilation of his artistic reputation? Let us be somewhat consistent. The Legislature has recently made enactments for the preservation of rude stone monuments, &c., and there exists a very active organisation in England to prevent foreigners doing what they like with their own cathedrals. Yet in the very face of, and notwithstanding, all this, it is coolly proposed to utterly efface the most important work of a distinguished artist, who has been entitled "The Father of the English School of Historic Painting." Moreover, I do not stand alone in thinking that Thornhill's designs are, in their general arrangement, far better adapted to their purpose than any others recently suggested. A writer in the "Encypædia Londoniensis" (1815), article "London," thus states the case:—

"We cannot leave this subject without expressing most earnestly our wish, which is common with that of all those who look up to the paintings of the cupola, that they may either be repaired or the subjects entirely repainted, preserving, out of respect for the original designer, the outlines of his compositions. But then we would advise the giving up of the idea of chiaroscuro. The dome is rather indifferently lighted, therefore the more glowing the colours might be and the more glaring the ornaments might blaze in burnished gold, the greater would be the effect."

The heaviness of Thornhill's monochromes is frequently condemned, but those who condemn it forget that neither Wren nor Thornhill would have willingly limited the decorations to monochrome; the introduction of colour was opposed by the Puritanical prejudices of their time, as it was subsequently, and for the same reason, when the Bishop of London rejected the offer of Sir Joshua Reynolds, West, &c., to pictorially decorate St. Paul's. W. Cave Thomas.

## STATUARY FOR BLACKFRIARS BRIDGE.

Sir,—In your issue of Nov. 29th [p. 742], Mr. Cave Thomas comments on the Blackfriars Bridge competitions.

As the recipient of a premium in the open competition, may I be permitted to add a few remarks?

The Blackfriars Bridge *fiasco* illustrates in a striking manner the relations of sculpture and patronage. Some means are certainly required to bring those with commissions to bestow into immediate relation with capable sculptors willing to execute them.

The open competition resulted in six premiums being awarded, and in the committee being able to determine the kind of work they thought most suitable for the purpose; and having decided on this point, the natural course would have been to request the winners of the premiums (and other artists, if the committee so desired) to submit further designs.

Instead of which, a fresh competition was arranged, and the winners of the premiums were excluded.

The instructions in the open competition were extremely vague, and consequently the sketches were slight, as with the uncertainty of a large competition before them, sculptors cannot afford the time and expense necessary to make highly finished works; while the limited competition was much more favourable to the artists, as they knew exactly the subjects the committee desired, and possessed other advantages.

Why in a second competition the winners of premiums in the first were expressly shut out, and refused permission to submit any further designs on any condition whatever, I am at a loss to understand. As a natural result the affair collapsed on being submitted to the Court of Common Council.

The entire proceeding is most unsatisfactory, and points to the urgent necessity of some such body as suggested by Mr. Cave Thomas (at least as far as sculpture is concerned) capable of advising in these matters.

An Association of Sculptors, comprising the entire body, and having degrees such as member, associate, and lesser grades, that could meet and discuss the position of sculpture, and use their combined influence in advancing it, would not only be employed in the healthy occupation of looking at matters as they affect the *art*, instead of the *individual*; but would do much to raise it to its proper place in public estimation, and gain for it the position of dignity it should undoubtedly occupy.

W. S. Frith.

## THE MERSEY TUNNEL.

GEOLOGICAL PREVISION.

Sir,—All who are interested in the success of a great engineering work will be pleased to hear that the Mersey Tunnel is now completed under the river and arched in. This is cause for congratulation all round, and especially to Liverpool people, for it has been an undertaking of great boldness both in conception and execution.

The work has been pushed on with great spirit, and much praise is due in the first place to the skill of the engineers, Messrs. Brunlees & Fox; and secondly to the energy of Mr. Waddle, the contractor; and to their efficient assistants, the resident engineer, Mr. Irvine, and the contractor's engineer, Mr. Prentice.

Having ventured a prediction as regards the strata likely to be met with, in a paper "On the Buried Valley of the Mersey," published in the "Proceedings of the Liverpool Geological Society" as far back as 1872, I think it is well, now the work is secure beyond a doubt, to call attention to the actual facts. In my paper of 1872 I stated the grounds of my belief that, notwithstanding the prevailing opinion that a shelf of rock extends across from Seacombe Point to Prince's Dock, it would be found that there exists in the bed of the river between Liverpool and Birkenhead a "deep rock channel or gully filled with drift.

In a paper on the "Drift Beds of the North-West of England," Part II. (Quarterly Journal of the Geological Society, May, 1883), I restated this view; and in the columns of the *Builder*, February 4th, 1882, I further called attention to and insisted upon it. I may also add that my views were published in the face of two sections in my possession at the time (1872) which professed to give the actual surface configuration of the rocky bed of the river as ascertained by borings for the projected tunnels; one on the site of that now carried out, the other higher up the river, between the south end of the city and New Ferry, both of which showed a thick covering of rock over the tunnels the whole way across the river.

The actual facts are these. The tunnel works have shown that the rocky bed of the river at its deepest point is, some 300 yards from the Liverpool side, deeply buried in drift. About 100 yards of this gully or pre-glacial bed has been intersected by the upper part of the tunnel. Before this part was finally arched up I had permission from the engineers to inspect it, which I did in company with my friend Mr. Frank Archer, of the firm of Messrs. Gill & Archer, solicitors to the company, who have done so much to insure the success of the undertaking. Mr. Archer, having a good knowledge of geology, has always felt the greatest interest in the geological aspects of the tunnel works. We found the upper part of the tunnel section was in stiff, hard, boulder clay, resting, excepting in one place where there was a thin patch of yellow sand, upon the hard surface of the homogeneous triassic rock. There was no doubt of the nature of the strata, the clay was of the true glacial-marine type, and numerous boulders of granite, trappean rocks, and greywacke were strewn about,—specimens of these are now in Mr. Archer's possession. All that I saw were rounded, and not striated, having the character usually possessed by the lower beds of the low-level boulder clay as described in the account of the Atlantic Dock excavations.*

Very strong timbering had to be resorted to to support the roof of the tunnel, which was, however, the driest in this of any length. In fact, given the gully, it could not possibly have been filled with better material for tunnelling through had it been made to order.

I think I have now stated enough for the present to show that geology is of considerable service to engineering. The fact that the hard rock surface was swept clean and bare, the hard boulder clay resting directly upon it, shows that this was the veritable bed and outlet of the river; for in most sections we find much broken or disintegrated rock between the true rock and the boulder-clay.

At the present moment further borings are being made in the upper reaches of the river, so I shall reserve a discussion of the levels and further aspects of this exceedingly interesting geological problem until they are completed. T. Mellard Reade, F.G.S.

*Liverpool, Dec.* 5, 1884.

## ARCHITECTS' COMMISSIONS.

Sir,—The proceedings at the meeting of the St. Pancras Board of Guardians, on the 27th ult., reported in your last issue [p. 774], is, it appears to me, an instance of the absurdity of architects making a uniform charge of 5 per cent. for all kinds of work. If it had not been for this irrational mode of payment, I doubt very much if Mr. Commissioner Kerr would have questioned for a moment the employment of an architect. I have long been convinced that the payment of architects by commission is not considered by people in general a fair mode of payment, and that this apparently small matter is the cause of a great deal of work, which should by right go to the architect, being taken out of his hands. C. F. M.

*** We are very much in sympathy with our correspondent's views, but have not felt that we were quite called upon to attack a system which the profession have so generally adopted and seemed satisfied with.

## SEWAGE DISPOSAL.

Sir,—If you have space in your valuable paper for the following, it may be of interest, in consideration of the above often troublesome problem, to many of our inland towns and villages.

Could not the formation of trunk sewers, with a satisfactory outlet at the coast, be promoted by our Government, and made to pass through large centres of our population, to which all available districts should be made to radiate, with charges *pro ratâ* for cost and maintenance?

Our own town in particular, with an effective trunk from the east coast, would be equal to the wants and collection of the different towns and villages on the route, and might embrace the town of Bradford in its capacity. Joseph Bentley.

*Leeds, Dec.* 5, 1884.

* "Drift-beds of the North-West of England."

## WESTMINSTER HALL.

SIR,—I have just had the honour of seeing my humble name in your columns [p. 752, *ante*]. You speak of my "foolish letter" to the *Times*, and say further that I am a "self-constituted authority."

I have nothing to say in mitigation of your first adjective. The foolishness of my letter is a matter of opinion. It is not my place to estimate the value of my own opinion. For this reason I did not reply to Mr. Pearson's letter in the *Times*. He sheltered himself behind an anonymous journalist in order to attack me, and I naturally concluded that if his case was so bad as to need this kind of advocacy, I might safely leave it to some one else to reply, the more so as Mr. Pearson made no attempt to reply to my facts,—I do not say "arguments,"—as it requires some one who knows as much, or nearly as much, as Mr. Pearson, to make arguments out of such facts.

But when you use the second adjective or adverb, "self-constituted," you fall into a certain amount of error, which, no doubt, with the usual "justice without mercy" which I have received at your hands, you will allow me to clear up. In this case, certainly, I was not a "self-constituted authority." Very unwillingly on my part, I was the spokesman of two antiquarian committees. I am unable, for reasons into which it is not needful to enter here, to offer to give evidence before Mr. Shaw-Lefevre's Committee; and, in default, I undertook to write the letter which you characterise as "foolish." As that letter contains the result of the researches of many non-restoring antiquaries, I do not greatly distress myself at the reception it has met with.

W. J. LOFTIE.

## PROVINCIAL NEWS.

*Newcastle-on-Tyne.*—New premises for the Young Men's Christian Association were opened by Earl Cairns on Dec. 5. The architects have converted the interior of what was St. James's Congregational Chapel into a convenient set of apartments. The whole of the interior was, in the first place, cleared out (retaining only the chapel floor and ceiling), and an entirely new floor was constructed across the building at the level of the former galleries, thus obtaining a large hall, the full area of the interior, and capable of seating about 450 persons. The contractors were as follow:—For the structural works, Mr. Sidney Millard; for the plumbing, steam-heating, and ventilating, Messrs. Walker & Emley; for the decorative work, Messrs. J. Richardson & Co., for whom the stained glass was executed by Mr. G. J. Baguley. The architects from whose plans and under whose superintendence the whole has been carried out, are Messrs. S. Oswald & Son, of Newcastle.

*Sidmouth.*—A handsome staircase in oak and walnut is about to be erected at Primley, Sidmouth, the residence of Mr. R. Taylor. It is in three flights; the newels carried to the ceiling on the ground-floor, in order to form a parclose, and on the landing supporting the beam carrying the roof. The main portions are oak; the brackets between the balusters, the panels of the spandrel, and doors being walnut. The work is being carried out by Messrs. Goff & Co., of Exeter, from the designs of Mr. Octavius Ralling, architect, Exeter.

*Marlow.*—The new waterworks at Marlow, Bucks, have been opened. The company, at the commencement of the year, purchased land from Major Carson, near the Old Chalk Pit (where a well has been bored). The building comprises an engine-room and boiler-room, with the necessary appurtenances. The shaft of the well is 6 ft. 6 in. in diameter, and 90 ft. deep. The boring at the bottom is 9 in. in diameter, and 260 ft. from the surface, and from this boring an ample supply of very fine water is obtainable. The reservoir at the top of the hill will hold 160,000 gallons. The engine for pumping is 12-h.p. nominal, indicating up to 30-h.p., with 24-in. stroke. The pumps have two throws and 24-in. stroke, and are 9 in. in diameter. Three miles of mains, 55 lb. pressure to the square inch, are already laid, and it is hoped before long another three miles will be added. The engineer was Mr. Jabez Church, M.I.C.E., of Westminster, and the contractor for the well was Mr. R. B. Paten, of St. Albans. The rest of the work has been carried out by Messrs. H. Young & Co., of Pimlico. The cost of the works has been about 6,500*l*.

*Lancaster.*—An extensive range of conservatories is being added by Mr. James Williamson to his residence, Ryelands, Lancaster. A glazed corridor, skirting portions of two sides of the house, connects the sitting-rooms with the large conservatory, which is 40 ft. long by 18 ft. wide, covered by a curved roof with lantern. This conservatory is lofty, and is intended for large plants. Leading from this is a smaller and lower conservatory, 31 ft. by 23 ft., roofed by a double-span roof, hipped at the ends, for ordinary greenhouse plants. A porch entrance, carried up as a tower, with Mansard roof, forms a connecting-link between the two conservatories and a storehouse, of less height, 32 ft. by 14 ft. The range has been designed by Messrs. Paley & Austin, architects, of Lancaster, and has been carried out under their supervision by Messrs. Messenger & Co., horticultural builders, of Loughborough, all the latest improvements in ventilating gearing having been introduced. The heating is on the low-pressure system.

*Ludlow.*—At the meeting of the Rural Sanitary Authority of the Ludlow Union, last week, the question was discussed of the payment of the railway fares to and from Ludlow of the candidates for the post of engineer and surveyor in connexion with the water-supply and sewerage of Craven Arms. The four candidates selected to appear before the Board were Mr. Parker, city surveyor, Hereford; Mr. G. J. Stead, Southport; Mr. F. S. Stooke, Shrewsbury; and Mr. W. Wyatt, Ellesmere, and it was decided to allow them second-class fares. There were eighty-three applications for the appointment.

*Leamington Spa.*—The spirit which has moved Bath and Harrogate to an appreciation of their own merits as English Spas has at length extended itself to the pretty Midland town of Leamington. The Corporation, which has in the past been too unmindful of the interests committed to its charge, has recently been strengthened by an accession of professional men, who are determined to restore Leamington to popular favour. On Monday last, with only one dissentient, the Corporation decided to embark in a very considerable expenditure on the improvement and modernising of the Pump Room and Baths, and so endeavour to obtain a share of the tide of fashion which has already begun to turn in favour of our own English watering-places.

## CHURCH BUILDING NEWS.

*Highgate.*—The committee for erecting the Church of St. Augustine, Highgate, have placed the work in the hands of Mr. Sedding, of 447, Oxford-street.

*Upleatham.*—Upleatham Church, Yorkshire, is about to be re-seated and restored, from designs prepared by Messrs. Clark & Moscrop, architects, Darlington.

*Islington.*—The church of St. Peter, Islington, erected about forty years ago by Sir Charles Barry, has lately undergone considerable repairs and alterations internally. The floor, which was attacked by dry rot, has been removed, and the entire church has been re-floored. The eastern portions of the north and south galleries have been removed, and also the children's galleries in the transepts and west end. The old lead lights have been replaced with new windows in geometrical designs, glazed with tinted glass. The works have been carried out under the direction of Mr. J. Douglass Mathews, of Dowgate-hill, by Messrs. Dove Bros., Islington. The cost, including lighting and warming, will be about 1,500*l*.; but, as the funds in hand do not reach this sum, the external work has to be postponed.

*Netley.*—A new church is shortly to be built at Netley, upon a site (given by Colonel Crichton) overlooking the ruined abbey. The designs are by Mr. J. D. Sedding.

*Pallion.*—The whole of the walls and roof of the chancel of Pallion Church, Sunderland, have now been completed in colour decoration to harmonise with the portions done some little while since. The work consists chiefly of diapers and ornamental bands emphasising the architecture here and there, and in some delicately-traced work upon the roof-panels, which are divided by the rafters done in black and gold. The reredos has also received some little colour and ornamentation, and figures of the Evangelists have been painted in the panels. The work is from the designs of Messrs. Powell Bros., of Leeds, and has been executed under their superintendence.

*Burstow (Surrey).*—The parish church of Burstow has lately been re-opened, after very extensive repairs and re-arrangement of internal fittings. The building is a good and characteristic specimen of a Surrey church, possessing work of the twelfth, thirteenth, fifteenth, and sixteenth centuries. The chancel is of considerable length in proportion to its width, and contains, on the north side, a little Norman window and a trefoil-headed Early English one. The nave was considerably altered in the fifteenth century, retaining, however, a small Norman window, now blocked up, on north side. In the sixteenth century an aisle was added on the south side. The old nave roof has rude oak massive tie-beams, with moulded king-posts and braces, the ordinary rafters being what is called trussed construction. At the west end stands the tower, of a construction by no means uncommon in this part of Surrey, *i.e.*, there are no stone walls, as the tower from the ground-line is formed of most massive oak timbers, framed with oak stud-work, covered externally with weather-boarding, crowned by an oak shingle spire. The piers on each side of the chancel arch, and on the nave side, contain niches. The windows to the north nave and south aisle walls are of Perpendicular character. The rich octagonal font is of the same period. Several portions of the walls, some of the buttresses, and upper part of chancel arch, have been rebuilt. Nearly the whole of the walls had to be carefully underpinned. A new oak trussed rafter-roof has been put to the chancel in lieu of the lath-and-plaster ceiled one of same form, which was thoroughly decayed. This was also the case with the nave roof, which has been renewed in oak, save the old trusses. The south aisle roof is also entirely new, founded on the old lines. A vestry, with lean-to roof, has been added on the north side of the chancel. The modern unsightly south porch has been replaced by an open oak porch, with cusped ornamental tracery panels and barge boards. The main gables have been furnished with carved oak barge-boards and floriated crosses. Externally the roof has been covered with Broseley tiles. Proper eaves gutters and down-pipes have been supplied, as well as a sunk brick channel course round the walls, after the ground had been lowered. Entirely new windows, to replace the incongruous modern ones, have been inserted in the east and west walls of the south aisle; the other windows having been repaired where necessary, and the westernmost window on the north side of the nave restored to its original length. New oak doors with floriated hinges have been put up. A handsome moulded stone archway and glazed traceried screen, with doors, has been inserted in the west end of the nave, thus opening to view the interesting timber construction of the lower part of the tower. The modern high pews have given place to open pitch-pine benches, with oak prayer-desk and chancel seats. The communion-table has been raised on a platform, and new oak altar-rails fixed on octagonal moulded shafts. A new oak pulpit, with traceried panels, partly open, on a pedestal of red Corsehill stone, has been fixed. The font has been reset on a new platform, with ornamental oak iron-bound cover. The windows have been glazed with rolled cathedral glass, in various lead quarry patterns, mixed with clear white glass, arranged by the architect. The hot-water apparatus is by Messrs. Rosser & Russell, of London. The total cost of the works is about 1,900*l*. Mr. B. Edmund Ferrey, F.S.A., was the architect; and Mr. Alfred Guy, of Camberwell, the contractor.

*Bradford-on-Avon.*—Christ Church, Bradford-on-Avon, which was re-opened recently, after restoration, carried out from the designs of Mr. John Oldrid Scott, has just received a handsome addition (embraced in the original design), consisting of an ornate font cover, of carved English oak. The cover is octagon in plan, and rises to a considerable altitude. The base is boldly moulded and embattled, and from this rises the spiral canopy of graceful ogee outline, which has upon every angle richly-carved crockets. The spandrels on very cant are of flowing tracery, and these panels are each respectively broken half way up by an embattled string running right round the entire cover. On the summit is a finial of crisp foliage, carrying above it a sculptured representation of the pelican feeding her young. The work has been executed by Mr. Harry Hems, of Exeter.

*London.*—St. Mary's Church, Spital-square, has been re-opened, after having undergone extensive alterations and repairs under the direction of Mr. D. R. Dale, architect. The ceiling and cornice are entirely new, and the windows have received the addition of architraves. The galleries, which could not well be dispensed with, have been considerably altered to meet special requirements. The old-fashioned

pulpit and reading-desk have been replaced by furniture of better material and more artistic form.

*Shilton.*—The first rood erected in the diocese of Oxford since the Reformation was unveiled on the 4th inst. at Shilton Church. It stands above a new chancel-screen of Perpendicular character, all the work being in British oak. The whole has been designed by Mr. Clapton G. Rolfe, architect, of St. Michael's-chambers, Oxford. The central figure of Christ forms part of the upright portion of the cross, being all wrought out of the solid beam. The ends of the cross are foliated, and contain sculptured emblems of the four evangelists. This rood is the work of Mr. Harry Hems, of Exeter.

## DISSENTING CHURCH-BUILDING NEWS.

*Newcastle-on-Tyne.* — The new Wesleyan chapel at Heaton, of which the memorial stones were laid on November 26th, will be situate on a commanding site at the corner of Heaton-road and Tynemouth-road. It is being built of stone, in the Early English style of Gothic architecture, from the plans and under the superintendence of Messrs. S. Oswald & Son, architects, of Newcastle-on-Tyne, whose designs were selected in competition. The contractors are Messrs. Greason & Stockdale, of Gateshead, for whom Mr. T. H. Hutchinson, of Gateshead, is executing the mason work. The clerk of works is Mr. James Grant. The edifice comprises a chapel capable of seating from 900 to 1,000 persons; a lecture-hall for 350; and five vestries and class-rooms. In plan, the chapel consists of a nave and side aisles, with shallow transepts. There will be galleries all round the interior, that for the organ being behind the platform in an apsidal recess. The principal front is towards Heaton-road, and comprises the lofty east gable of the chapel flanked by the gallery staircases, and terminated at the north-east angle by a tower 90 ft. high. South of the chapel the end of the lecture-hall, which is one story high, also faces Heaton-road. Internally, the nave and aisles will be divided by timber arches, with traceried spandrels, carried on metal columns.

*Cheltenham.*—The memorial stones of a new Wesleyan Chapel were laid at Winchcombe, near Cheltenham, on Wednesday, the 3rd inst. The chapel, when completed, will provide sitting accommodation for 350 persons. The design is Early English. The central feature in the front elevation will be a four-light window, with traceried and cusped head, and in the gable over it a quatrefoil cut, sunk, and perforated Bath stone panel. The dressings are of Bath stone; the main walls will be of Cleeve-hill stone; and the roofs are to be covered with blue slates. The internal fittings are to be of varnished pitch pine. The roof will be open-timbered to about two-thirds of the height. A gallery is to be erected at the front end of the chapel only. The total cost, when completed, will be about 1,200*l.* Mr. Herbert J. Jones, of Bridge-street, Bristol, is the architect; and Mr. Geo. Essex, of Swindon-road, Cheltenham, is the contractor.

*Hull.*—The restoration of Albion Church, Hull, has been completed, and the edifice was reopened for public worship on the 30th ult. The building, which was erected in 1842, at a cost of about 8,000*l.*, to accommodate 1,600 persons, is on plan a parallelogram, 110 ft. in length and 62 ft. in breadth. The principal front, which is executed in Harehill stone, represents a Grecian-Doric hexaprostyle temple, of bold proportions, the diameter of the columns being 4 ft. 6 in. The alterations effected have been carried out without materially changing the original construction of the interior. In the new arrangement of the pewing to the body of the church the three original aisles have been retained for about a distance of 35 ft. from the entrance lobbies. At this distance is a cross aisle connecting them, and at which the centre aisle terminates. It was the wish of the Church Committee to entirely dispense with the centre aisle, but as, in the opinion of the architect, to have done so would have been to remove what is beyond doubt a leading feature in the original design, the present arrangement was suggested as a compromise. From the cross aisle before mentioned the side aisles converge to the Communion dais, around which is a semi-circular aisle of good width, and from which four smaller aisles radiate to the seats under the side galleries. New pulpit gaslights and other gasfittings have been supplied by Messrs. George Clark & Sons, brassfounders, of Hull. The old low-pressure warming apparatus has been removed, and Messrs. King & Co., of Hull, have been entrusted with the heating of the building on the high-pressure system. The plans for the restoration were prepared by Mr. W. H. Bingley, under whose supervision the alterations have been made.

## The Student's Column.

### DOMICAL ROOFS.

THIS name is applied to roofs which cover a circular, elliptical, or polygonal area, and is a very ancient method of roofing. In the domical roofs of former times the material used for the covering was either brick or stone, as in that over the Pantheon at Rome, which has a span of 142 ft., and the hemispherical dome of St. Sophia at Constantinople, having a span of 110 ft. The inner surface of the dome of the Pantheon is hemispherical, and divided into deeply-recessed panels or *caissons*, by means of vertical and horizontal ribs. This dome was built of great solidity, being 4 ft. thick at the thinnest part near the summit, and increasing to 15 ft. at the springing; it forms the roof of a circular building, of which the walls are about 70 ft. in height. The Temple of Minerva Medica at Rome was covered with a dome of similar construction to that of the Pantheon, the diameter being 80 ft.

The thickness given to the dome of the Pantheon involves a great waste of material, and we find that the domes of Constantinople are much lighter. The dome of Sta. Sophia covers a square building, or, rather, it rests upon four arches built at right angles to each other and supported on four corner piers. The angles between the springing of the arches and that of the dome are cut off by curved surfaces called *pendentives*, which act as *corbels*, and form a uniform circular base for the dome to rest upon. The contour of the dome is nearly a hemisphere on the inside, and its thickness is about 2 ft. for about three-fourths of the distance from the crown; but at the springing the thickness is greatly increased. The dome is elevated 130 ft. from the ground.

The domical roof has been very generally used for dwelling-houses in the South of Italy, Turkey, and many Asiatic countries. Such a covering can be constructed of two or three courses of tiles bedded in cement, with a rendering of cement on the outside to render it weather-proof.

The domes built in India about the sixteenth century were often of great thickness, that of the Gol Goornuz at Beejapore being 10 ft. thick. It is nearly hemispherical, and erected over a building 135 ft. square. A description of it will be found in the "Transactions of the Royal Institute of British Architects" for 1854.

In the Middle Ages we have in Europe the domes of Florence and of St. Peter at Rome, with a span of 139 ft., built of brick and surmounted with a heavy lantern, the former being octagonal on plan and having a pointed arch for its section, and the latter being nearly hemispherical. These domes differ from most of the Eastern ones in being elevated on a lofty *drum* so as to form an important architectural feature when viewed externally; and, as they support the weight of a heavy lantern placed on their summit, the strength of the dome has to be proportionally increased. They are built with vertical ribs having a solid mass of brickwork filled in between them. To prevent outward thrust upon the walls of the supporting drum domes of this form are generally secured with iron belts placed round them near the springing. In a hemispherical dome of uniform thickness the greatest outward thrust is about 20° from the base, and it is at this part that the belt should be placed; but in a pointed dome the belt may be rather lower down.

The Pantheon at Paris is surmounted by a panelled dome of stone, nearly 80 ft. in diameter, the thickness of the ribs being 2 ft. 2 in. at the base, and decreasing by one-half at the top. This dome, however, does not carry the weight of the stone lantern at the top, the real support of which is a brick cone built on the inside of the stone dome.

In modern times buildings of this form have been generally roofed in by a structure of timber and iron, and it is to these materials that we shall now confine our attention. St. Paul's Cathedral in London has a dome which is a combination of brick and timber, the inner dome being of brick and hemispherical, surrounded by a brick cone, on which latter rests an elaborate framework of timber to receive the covering of the outer dome. A series of curved wooden ribs form the contour of the outer dome, with purlins fixed between them, to which the boarding for the lead covering is nailed. The curved ribs are supported by horizontal timbers, whose inner ends rest on stone corbels built into the brick cone, and are strongly braced and strutted.

Philibert Delorme, the architect of the Tuileries who flourished in the sixteenth century, introduced a method of constructed domical roofs with ribs of timber by placing side by side two or more thicknesses of planking, as before described for the curved ribs of semicircular roofs. The feet of the ribs are let into a curb of timber which goes all round the top of the wall; the planks are in short lengths of 3 ft. or 4 ft., cut to the required curve, and are bolted together side by side. The ribs are placed about 2 ft. apart at the base, and meet together at the vertex. For a dome of 60 ft. span the ribs should be of two thicknesses of 2 in. planks 13 in. deep, and for 100 ft. span two thicknesses of 3 in. planks, or three of 2 in. A dome of this kind was erected over the Halle au Blé (corn-market) at Paris about a century ago, with a clear span of 130 ft. In this case the ribs were made of three thicknesses of 3 in. planks 9 ft. long and 13 in. deep, bolted together in such a manner as to break joint. After standing for twenty years it was destroyed by fire.

The outer dome of the Church of Sta. Salute at Venice, which is 80 ft. external diameter, has ninety-six curved ribs 5½ in. thick, each in four thicknesses 8½ in. deep, which are held in by a strong iron hoop placed round them at some distance above the springing. The lantern which surmounts this dome is carried on an internal dome of brick.

In domes of this construction, the purlins which receive the covering are placed horizontally all round the ribs, and notched upon their backs, to give them stiffness; similar purlins being notched on the inside to receive the plastering of the ceiling.

*Pyramidal roofs* over square or oblong buildings are constructed in the manner described above, either with straight or curved rafters, which form the external angles or *hips*. The hip rafters meet either in a point or ridge, or else abut on a rectangular frame, as in curb roofs; purlins are laid horizontally across the main ribs or rafters to receive the common rafters and the roof covering. Timber spires are formed in this way, either square, round, or polygonal on plan. Many of the spires of Sir C. Wren's City churches are constructed in this manner.

The domical roofs of modern times are generally constructed of iron, that which covers the elliptical area of the Albert Hall, at Kensington, being formed of thirty half-trusses on the bowstring principle, as shown by fig. 5 of the former article on "Iron Roofs" (p. 777, *ante*). These trusses are united in the middle to a central iron curb, elliptical on plan, and having the full depth of the trusses. The boom of each truss is of T section, 11 in. wide by 9 in. deep, and the tie-beam is of similar form and dimensions; the half-truss is divided into seven parts by radiating struts of cross-section, between which is diagonal cross-bracing of round iron. The heel of each truss is rounded, and rests in a cast-iron shoe, which is securely fixed to a wrought-iron wall plate, 3 ft. 8 in. wide, made in the form of an I girder, and laid all round the top of the outer wall of the building. The depth of the trusses at the centre is 17 ft. 6 in., and the span varies from 185 ft. to 219 ft. Between the trusses are seven rows of purlins, six of which have a depth of 5 ft. 11 in., and the lowest just above the springing is 2 ft. 3 in. deep. They are formed of lattice bracing and struts, riveted to top and bottom booms. A description of this roof will be found in the "Transactions of the Royal Institute of British Architects" for 1872.

The usual modern method of forming domes is by fixing curved ribs of iron, springing from the top of a wall and uniting in the centre, or in a central curb, as in the reading-room of the British Museum, which has a span of 140 ft., and is 106 ft. high. The ribs in this case are of wrought iron, twenty in number, and unite at

he top to an iron ring, 40 ft. in diameter, which orms the opening for a skylight.

The roof erected over the Vienna Exhibition uilding in 1873 is a dome of conical form, ircular on plan. The span is 360 ft., and the one springs at a height of 80 ft. from the round, resting on thirty cast-iron stanchions laced 36 ft. apart. The cone is inclined 30 deg. o the horizontal, and is truncated at the top, aving a circular opening 96 ft. in diameter. t is constructed of wrought-iron plates, 1 in. hick, riveted together, bent to the curve, and apering towards the top. Vertical ribs of attice work are fixed on the outside, running rom the top of each column to the summit, with four rows of purlins fixed between the ribs.

On the top of this cone a drum is erected 34 ft. in height and 100 ft. in diameter, which is surmounted by another truncated iron cone, aving an opening at the top 24 ft. in diameter, on which stands a second drum, 28 ft. high, carrying a hemispherical dome and lantern. Mr. J. Scott Russell, the designer of this structure, claims for it a maximum of strength combined with a minimum of weight and material, the greatest amount of strength being provided where there is the heaviest strain, and the least strength where the strain is lightest, so that there is no waste of material or strength; every part of the structure combining with the rest for their common support, and each part not only performing its own particular duty, but also assisting the others where necessary in the performance of theirs.

Domes of wrought-iron plates might be constructed of spherical forms, but the expense would be greater than in the conical form, as the plates would have to be curved vertically as well as horizontally; they would also require to be of greater strength, as the resistance to crushing would be much less in a curved plate than in a straight one.

Mr. Scott Russell's account of the Vienna dome will be found in the "Transactions of the Royal Institute of British Architects" for 1874.

## Books.

*A Treatise on Earthy and other Minerals and Mining.* By D. C. DAVIES, F.G.S. London: Crosby Lockwood & Co. 1884.

MR. DAVIES is already favourably known as the author of several useful books on mining subjects. His last treatise on earthy and other minerals is intended as a companion volume to his work on "Metalliferous Minerals and Mining," under the classification of earthy minerals and a number of substances of great importance in the arts and manufactures. Firstly, the useful compounds of alumina, magnesia, lime, and the various clays; secondly, what Mr. Davies terms the haloid minerals, or compounds of earths and alkalies, such as common salt, nitrate of soda, borax, alum shale, phosphate of lime, &c.; thirdly, carbon and the compounds of carbon, sulphur; and, lastly, some metallic minerals such as arsenic, antimony, and manganese. This is a wide range of subjects to cover in one volume, yet each mineral of importance is sufficiently noticed to convey some information.

It is interesting to learn that the china-clay trade of this country is of comparatively recent date, having been founded by Mr. William Cookworthy, of Plymouth, in the year 1733. In 1809 the export of this clay from Cornwall amounted to 1,757 tons, and in 1881 it had risen to 241,458 tons, besides a further quantity of 30,479 tons from Devon. China clay is derived from the decomposition and wearing down of granite rocks, and consists almost entirely of silicate of alumina. Among the haloid minerals worked in England, common salt is the most important. According to ancient records, salt was worked by the Saxon kings, and since those early days it has been continuously and increasingly worked until in 1881 the production amounted to 166,740 tons in Cheshire, and 20,891 in Ireland. In early days the trade in England was hampered by taxation long since removed. It seems strange that Mr. Davies does not refer to the great salt lagunes of Cyprus, nor to the value of the potassium salts derived from certain salt beds. Nitrate of soda and borax, also haloid minerals, are not mined in England, but largely imported.

Considerable space is devoted to the consideration of the phosphate deposits of the world, forming a very interesting chapter. The next section treats of carbon, compounds of carbon and sulphur. All carbon-containing minerals are included except coal. First comes the diamond, the most singular crystallisation of a black and opaque substance.

Although diamonds have been used by the lapidary from time immemorial, it was not till the end of the last century that Lavoisier demonstrated that the brilliant and transparent stone was composed of carbon. India was for a long time the only source of supply of diamonds, but in 1726 they were discovered in Brazil, and lately, in 1867, in South Africa. The news of the discovery was at first received with great suspicion, and in 1868 a writer in the *Geological Magazine* ends an article on the discovery in the following words:—"I can only now conclude by expressing my conviction that the whole diamond discovery in South Africa is an imposture, a bubble scheme." New discoveries are frequently thus treated by irresponsible writers who have not the knowledge of facts necessary to form a correct opinion, and very often are not capable of forming a correct judgment, even with the facts before them. The result of the discovery so far has been that in 1881 the value of the diamonds sent through the Post-office from South Africa amounted to 3,685,000*l.* We have not space to follow the author in his notices of plumbago, oil shales, and other carbonaceous minerals. The chapter devoted to metallic minerals includes manganese ores, so important to the chemical and iron trades.

The volume closes with a classified list of the mineral substances. This book contains a great deal of useful information, succinctly given. It is more an epitome than a treatise, but as such is useful for reference, especially to students. The subjects are somewhat unequally treated. There is very little said about some, and nothing at all about others. For instance, the ochres so largely used in the manufacture of paint, and meerschaum, from which tobacco-pipes are made, are not noticed.

The volume is well illustrated, which is an important feature in such a book, and greatly assists the text.

## RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

1,636, Improved Method of Laying Bricks. H. W. Hart.

This invention is designed principally for use with the patent bond bricks devised by the patentee, in which the bricks are formed alternately with joggles and recesses on their bedding and butting surfaces, and the invention has for its object the laying of such bricks without mortar or cement. It consists in the application of a thin layer of waterproof or asphaltic mixture laid on a fibrous material. These layers are stamped out in the pattern of the brick, and are first steeped in a solution of tar cement. The joints are thus neatly and carefully laid without skilled labour, and quickly dry, even during bad weather.

2,539, Improvements in Paints. O. Fischer.

The materials are so devised as to produce a paint which is applicable as priming or body colour, but by mixture with some added material it becomes a substitute for linseed oil.

386, Improvements in Artificial Marbles, &c. Shaw Bros.

The natural operations in the formation of stone or marble are imitated. A piece of clay is rolled or beaten out on a board or slab into a bat, which is then dried in the sun or an oven until it cracks or veins. Into the fractures a slip is poured between. This slip being composed of coloured clay, minerals, &c., so as to form the shade, colour, and veins of the marble imitated. Granite or other stones are also imitated, and the articles are glazed or fired in the usual way.

132, Improvements in Ventilation. J. S. Sweet.

Between the floor and ceiling an air-tube is carried into a shaft, the centre-piece of the ceiling forming an outlet. On the shaft the ventilator is fixed. The inside of the ventilator is made in sections or tubes, which causes a strong up-current of air. Under the roof a tapered injector is fixed, so that the smaller end enters the air-shaft, while the outer is on the roof. The pressure of air will then drive out all impure air, and the ventilation will then be rapidly and effectively carried out.

APPLICATIONS FOR LETTERS PATENT.

*Nov.* 28.—15,662, P. E. Ayton, Improvements in Door Chains.—15,682, H. Gratrix and J. Best, an Improved Size.—15,701, S. B. Goslin and J. J. Brown, Water Waste-preventer and Flushing Apparatus.

*Nov.* 29.—15,726, W. D. Cliff, Constructing Glazed Brick Walls.—15,729, M. J. Adams, Ventilating Apparatus.—15,737, Securing Sign-plates to Walls, &c.—15,739, W. G. Margetts, Manufacture of Portland Cement.—15,745, E. Reese, Decoration of Chimneypieces and other Ornamental Work.—15,751, J. Howie, Improvement in Drain Traps.—15,753, J. Campbell, Improvements in Ladders.—15,755, T. Durrans, Gully Traps.—15,758, J. Bartlett, Improvements in Stencils.

*Dec.* 1.—15,782, W. Sanderson and T. A. Moffitt, Lock and Latch Furniture.—15,803, J. B. Robinson, Improvements in Sashes.—15,805, G. S. Buchanan, Improvements in Ventilators.

*Dec.* 2.—15,846, H. Benson and E. H. Kent, Locks or Fastenings.—15,857, H. Gardner, Surfacing Compounds.—15,863, B. J. Mills, Extension Ladders.

*Dec.* 3.—15,871, W. H. Withington, Water-closets.—15,875, W. A. Leipner and C. Brotherhood, Electric Bell Pushes.—15,894, P. Quigley, Double Mitre Sawing-machine.

*Dec.* 4.—15,927, J. T. King, Apparatus for Closing Doors and preventing the Slamming of same.—15,928, G. Heward, Cooking and Kitchen Ranges.—15,945, J. J. Taiman, Attaching the Handles of Door Locks to their Spindles.—15,954, M. Ker, Raising and Suspending Venetian Blinds.—15,955, W. H. Willett and T. C. Wakeling, Improvements in Fire-grates.—15,963, W. R. Lake, Manufacture of Bricks.—15,966, J. Shaw, Combined Level, Plumb, and Angle Indicating Tools.—15,973, W. Teague, Rock Drills.—15,976, E. R. Hollands, Open Stoves or Fireplaces.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,888, R. A. Lowe, Sash Windows.—13,668, S. Willett, Securing Door Handles on their Spindles.—14,316, R. Willis, Preparing Wood previously to Painting and Varnishing.—14,346, G. Kinnaird, sen., G. Kinnaird, jun., and J. Kinnaird, Combined Open and Close Fire-ranges.—14,393, J. Stansfield, Asphalte Pavements.—14,417, J. Ball, J. H. Rawson, and F. P. Rawson, Combined Ferrule and Bolster for Chisels and Gouges.—14,430, A. B. Joy and J. J. Lewen, Imitation Marble.—14,433, A. Putney, Wood Flooring, Ceilings, and Dados.—14,616, E. Shrimpton, Glazing Sashes, &c.—14,618, A. Parkinson, Stench Traps.—15,086, J. Inshaw, Domestic Fireplaces.—15,194, W. Gadd, Joining Lead Pipes.—15,301, L. Coppard, Hanging Sashes.—14,074, G. W. Webb, Exhaust Ventilators.—14,711, A. Mackie, Machinery for Grinding and Shaping Bricks.—15,088, E. Jones and J. J. Calcott, Cheeks for Register Stoves.—15,192, W. Russell, Improvements in Overmantels and Ornamental Frames.—15,289, J. Endean, Syphons and Cisterns for Water-waste Preventers.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

2,374, J. Mould and J. J. Mould, Improvements in Zinc Roofing.—2,687, N. Frère, Joints for Metal or other Pipes.—2,907, H. W. Hart, Manufacture of Bricks and Tiles.—3,329, G. Kay, Fixing Roof Rain-water Gutters. 9,939, W. Finch, Roofing Tiles.—13,430, P. A. Ames, Construction of Ceilings and other Parts of Buildings or Structures.—3,279, J. Haywood, Machines for Painting, Varnishing, Sizing, and Washing Laths.—3,957, A. J. Boult, Manufacture of Wood Screws.—13,284, F. George, Connexions for Lead and other Pipes.—14,241, A. M. Clark, Improved Composition Mastic.—14,511, F. Cuntz, Intermittent Flushing Apparatus.—14,521, H. Curzon, Filtering Rain-water in its Flow from Roofs to Tanks.—14,621, J. Hatfield, Manufacture of Artificial Stone.

## RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

DECEMBER 5.

By BAKER & SONS.

| | |
|---|---|
| Willesden—7, Hillside, 82 years, ground-rent 8*l.* 8s. | £585 |
| Barking—North-street, two plots of freehold land, 3a. 0r. 23p..... | 765 |
| Paradise Marsh, containing 4a. 2r. 11p. ..... | 290 |
| Kingston—two plots of freehold land..... | 78 |
| Worthing—a plot of freehold land..... | 80 |

DECEMBER 8.

By — CHAMPNESS.

| | |
|---|---|
| Whitechapel—62, High-street, freehold ..... | 1,310 |

By DOWSETT & WOODS.

| | |
|---|---|
| Kentish Town—36, Clarence-road, 52 years, ground-rent 9*l.* ..... | 790 |

By C. G. CUTLER.

| | |
|---|---|
| Winchmore Hill — Ground-rent of 40*l.* a year, reversion in 96 years ..... | 1,125 |

By P. D. TUCKETT & Co.

| | |
|---|---|
| Kingston—Crescent-road, a plot of freehold land, ca. 1r. 32p..... | 350 |

By TOOTELL & SONS.

| | |
|---|---|
| West Smithfield—59, 61, and 63, St. John-street, freehold ..... | 1,920 |

DECEMBER 9.

By C. & H. WHITE.

| | |
|---|---|
| Clapham — Rectory Grove, house and stabling, 43 years, ground-rent 12*l.* ..... | 600 |

By CHADWICK & SONS.

| | |
|---|---|
| Chelsea—57, Lamont-road, 83 years, ground-rent 8*l.* | 410 |

By E. & H. LUMLEY.

| | |
|---|---|
| Maida Vale—24 and 26, term 25 years, ground-rent 23*l.* 6s..... | 1,560 |

DECEMBER 10.

By L. R. FOOT.

| | |
|---|---|
| Whitby—the reversion to one-fourth share of freehold and leasehold property yielding 40*l.* a year..... | 130 |

DECEMBER 11.

By NEWBON & HARDING.

Islington—6, Cloudesley-place, 22 years, ground-rent 6*l.* ..... £230
Homerton—38 and 40, Sidney-road, 90 years, ground-rent 2*l.* ..... 905
Hoxton—76, Gopsall-street, 52 years, ground-rent 5*l.* 10*s.* ..... 420

By W. SCHOFIELD.

Brixton—74, Arthur-road, 79 years, ground-rent 5*l.* ..... 325

By BARBER & TAYLOR.

Croydon—1 and 7, Gordon-terrace, freehold ..... 900
Forest Gate—Atherton-road, a plot of freehold land ..... 375

By E. STEVENSON.

Bermondsey—30, Marine-street, and a cottage, 45 years, ground-rent 3*l.* 15*s.* ..... 250
432, 434, and 436, Southwark Park-road, 65 years, ground-rent 9*l.* ..... 610
Brixton—7, Loughborough Park, 38 years, ground-rent 5*l.* ..... 290
22-36, even, Chapel-street, 15 years, ground-rent 33*l.* 8*s.* ..... 650
Walworth—34, 36, and 38, Barlow-street, 23 years, ground-rent 9*l.* ..... 440
Bermondsey—14 and 16, Spa-road, 32 years, ground-rent 6*l.* ..... 330
Old Kent-road—43 and 44, Bowles-road, 57 years, ground-rent 9*l.* ..... 450
Peckham—1, Willow Brook-road, 38 years, ground-rent 3*l.* ..... 200
93 and 97, Gordon road, freehold ..... 470
Old Kent-road—2 and 4, Gervase-street, freehold ... 495
Walworth—78, Manor-street, 66 years, ground-rent 4*l.* 10*s.* ..... 320
Wandsworth-road—23 and 25, Southville and ground-rents of 24*l.* a year, term 12¾ years ..... 275
33, Southville, and ground-rents of 1*l.*, a year, term 12¾ years ..... 225
43, Southville, 12¾ years, ground-rent 8*l.* ..... 180
Priory-mews, stabling, and a ground-rent of 5*l.*, term 12¾ years ..... 100
Newington-causeway—16, Union-road, 7 years, ground rent 5*l.* ..... 95

By FAREBROTHER, ELLIS, CLARK, & CO.

Islington—The Peacock Inn and 13, High street, adjoining, freehold ..... 13,000
9, High-street, freehold ..... 3,350
Holloway—Eskell street, ground-rent of 23*l.* 9*s.*, reversion in 76 years ..... 570
Hertslet-road—Ground-rent of 47*l.* 10*s.*, reversion in 76 years ..... 1,285
Seven Sisters road—Ground-rent of 60*l.*, reversion in 76 years ..... 1,550
Maylon street—Ground-rent of 47*l.* 5*s.*, reversion in 76 years ..... 1,155
Grove-road—Ground-rent of 51*l.* 16*s.*, reversion in 78 years ..... 1,310
Maylon-street—Ground-rents of 22*l.* 1*s.*, reversion in 76 years ..... 570

## MEETINGS.

MONDAY, DECEMBER 15.

*Royal Institute of British Architects.*—Mr. Lawrence Harvey on the late "Professor Semper's Theory of Architectural Ornament." 8 p.m.

*Society of Arts (Cantor Lectures).*—Mr. Harold B. Dixon, M.A., on "The Use of Coal Gas." III. 8 p.m.

TUESDAY, DECEMBER 16.

*Institution of Civil Engineers.*—Continued discussion on Steam Tramways. 8 p.m.

*Statistical Society.*—Mr. A. S. Jeans on "English and Foreign Labour Compared." 7 15 p.m.

WEDNESDAY, DECEMBER 17.

*Society of Arts.*—Mr. P. L. Simmonds on "The Present and Prospective Sources of the Timber Supplies of Great Britain." 8 p.m

*Parkes Museum of Hygiene.*—Mr. Mark H. Judge on "Public and Private Responsibility in Sanitary Matters." 7·30 p.m.

*British Museum.*—Mr. W. St. Chad Boscawen on "Assyrian and Babylonian Antiquities." 2 30 p.m.

*Royal Meteorological Society.*—Three papers to be read, including one by Mr. Charles Harding on "The Diversity of Scales for Registering the Force of the Wind." 7 p.m

*The Hospitals Association.*—(1) Professor Marshall, F.R.S., on "Hospital Circular Wards." (2) Mr. Keith D. Young on "The Miller Memorial Hospital."

FRIDAY, DECEMBER 19.

*Architectural Association.*—Mr. W. H. White on "The Ante-Chamber, to-day and yesterday, in French and English Plans." 7·30 p.m.

*Institution of Civil Engineers (Students' Meeting).*—Mr. F. H. Heublethwaite on "The Difference in Design of British and Foreign Locomotive Engines." 7·30 p.m.

## Miscellanea.

**Society of Engineers.** — The thirtieth annual general meeting of the Society of Engineers was held on December 8th, in the reading-room of the Society, Victoria-street, Westminster. The chair whs occupied by Mr. Arthur Rigg, the president. The following gentlemen were balloted for and duly elected as the council and officers for the ensuing year, viz.:—As President, Mr. Charles Gandon; as Vice-Presidents, Mr. Perry F. Nursey, Mr. Henry Robinson, and Mr. A. T. Walmisley; as Ordinary Members of Council, Mr. Robert Berridge, Mr. T. H. Hovenden, Mr. A. F. Phillips, Mr. W. Schönheyder, Mr. M. Ogle Tarbotton, Mr. J. Waddington, Mr. W. Barnes Kinsey, and Mr. William Macgeorge, the two last-named gentlemen being new Members of the Council; as Honorary Secretary and Treasurer, Mr. Alfred Williams; and as Auditor, Mr. Alfred Lass.

**British Museum Lectures.**—Mr. Boscawen gave the second of his lectures on Assyrian and Babylonian Antiquities last Wednesday. We will give a brief report of it in our next.

**A Water-Pipe Shock.**—A singular occurrence, which is stated to have recently taken place at Ithaca, N.Y., illustrates the dangers attendant upon the universal introduction of electricity. As a lady was turning on the water from the faucet over the sink in her kitchen, using her right hand, her left hand being in contact with the iron lining of the sink, she was suddenly prostrated by a severe shock. Her impression was that she had been stricken with paralysis or apoplexy, but a physician who was summoned found that the inside of the thumb of the left hand had been blistered in several places. This led him to believe that she had received a strong electric shock from some source. A few minutes subsequently the lady's daughter, in drawing water from the same faucet, was similarly affected, though not so severely. The family then became convinced that the trouble existed in the water-pipe and sink. The manager of the Telephone Exchange, after a brief examination of the premises, found the secret of the trouble. The residence was connected with the Ithaca Hotel by a "dead" private telegraph wire. This wire had been crossed by the electric-light wire. The dead wire was connected with the metallic roof on the dwelling-house, which in turn was connected by a tin water-conductor with the water-pipe leading to the sink. When the dynamo machine of the electric light company was in operation the current passed over the dead wire to the tin roof, and thence to the water-pipe. It needed only the completion of the circuit by some person drawing water.—*Scientific American.*

**The Foreign Iron Trade.** — Business is still slow in the Belgian iron market, and prices are going down as low as the cost of production will permit. Owing to scarcity of orders, works are discharging a portion of their hands. The Belgian hoop-iron syndicate will cease to exist by the end of the year, and the result will be a depreciation of that product. England, and especially the London market, it is expected, will be benefited by this collapse; that is to say, Belgian manufacturers will throw their special articles on our markets at a ruinously low price. Values of other kinds of manufactured iron are nominally unchanged, but joists, angles, &c., are sold much below official quotations, principally to England. There is no change for the better in the French iron market. At Paris, manufactured iron is still sold at 140 fr., and in the Nord no more than 130 fr. and 135 fr. can be obtained, some large sales having even been effected at 125 fr. In the Haute-Marne, coke iron is still held at 155 fr., and mixed brands are treated at 170 fr. to 175 fr. In the German iron market the improvement of recent weeks has not been maintained. Pig-iron remains unaltered, but the prices of manufactured iron continue depressed, although orders cannot be said to be scarce. The American iron market continues in the heavy condition of the last few weeks. *Iron.*

**Liverpool Engineering Society.**—The annual general meeting of this Society was held last week at the Royal Institution, Colquitt-street, Mr. R. R. Bevis, jun., president, in the chair. On the conclusion of the ordinary business and the election of officers for the ensuing year, the President delivered his retiring address. Some of the local events of engineering importance were first considered,—particularly the Mersey Tunnel and the Manchester Ship Canal. The fact was referred to that it was only in the early part of this year that a practical hope was given of the speedy realisation of the former project, and as the work is now approaching completion some of the possible changes and developments likely to follow were also remarked upon. With regard to the Manchester Canal, it was observed that even in its lately submitted form, and apart from all consideration of its ultimate commercial success, it, at all events, would have the merit of providing a large amount of work during its construction. Recent developments of ocean steam navigation were next dwelt upon. The latter portion of the address was devoted to matters more particularly relating to the Society. The President congratulated the members on its continued success.

**Proposed Club-house at Streatham.**—A meeting of Conservatives was held at Streatham last week, when it was resolved to build a Conservative Club-house, at a cost of about 2,500*l.*, and a committee was appointed to obtain subscriptions and confer with the architects, Messrs. Wheeler & Hollands, as to the cost of future extension, &c.

**British Archæological Association.**—The second meeting of the session was held on the 3rd inst., Mr. Thomas Morgan, F.S.A., in the chair. Mr. Roach Smith, F.S.A., communicated the discovery of a curious Anglo-Saxon buckle found in North Wales. It has three bronze hinges, and on the woodwork between these have been scratched mystic inscriptions. It has been deposited in the ground near an upright stone pillar, placed, apparently, to mark the spot. Dr. Woodhouse exhibited some medals relating to the troubles in France during the Reign of Terror and of the period of the Russian Alliance, of much interest. Mr. Romilly Allen, F.S.A. Scot., reported a remarkable discovery at Ilkley. During some works of enlargement of the gardens of the Rose and Crown Hotel at Ilkley, an old wall was met with by the workmen, and demolished. A large stone was noticed in the foundation, which, on being raised, was found to have sculpture and an inscription. It is a Roman sepulchral stone, having the figure of a female seated, with two long plaits of hair, one falling on each side of the face. There are four lines of inscription, the sepulchral character of which is shown by the common termination H. S. E. The stone had been used as old building material, but had evidently been removed from the cemetery of the Roman station of Olicana. The Chairman then read a paper on the results of the recent successful Congress at Tenby.

**The Smithfield Club Show.**—Among the machinery and implements exhibited at the Cattle Show this week there were a few exhibits of special interest to some of our readers. Samples of ensilage were in great force at the stands devoted to farm produce, and Messrs. F. W. Reynolds & Co., of Acorn Works, Blackfriars-road, showed a very interesting and instructive series of models of pit and barn silos, some with sliding roofs, and all provided with Messrs. Reynolds's appliances for compressing the silage. Mr. E. S. Hindley, of Bourton, showed in addition to his well-known combined vertical engines and boilers, a new form of portable engine, running on two wheels only, and designed specially for use in India. The St. Pancras Ironwork Company, amongst their exhibits of stable, cowhouse, and piggery fittings, showed a stall well suited for a heavy draught-horse, with ventilating ramp and safety manger fitting; also a vertical fodder-rack for cowhouses, as executed for the Duke of Bedford's model farm at Woburn. Messrs. Barrows & Stewart, of Banbury; Clayton & Shuttleworth, of Lincoln; Marshall, Sons, & Co., of Gainsborough; Davey, Paxman, & Co., Colchester; and F. Morton & Co. (Limited), of Liverpool, were amongst other well-known exhibitors.

**Civil and Mechanical Engineers' Society.**—The opening meeting of this useful and rising Society was held at the Society's rooms, No. 7, Westminster-chambers, on the 3rd inst., when the newly-elected president, Mr. Thomas Cole, A.M.I.C.E., delivered his inaugural address, taking for his subject the progress of sanitation and of sanitary legislation during the last fifty years,—a period including the rise and growth of what may almost be termed a resolution in the matter of things sanitary, and culminating in the Public Health Act, in which is incorporated the fifteen main Acts and ten subsidiary Acts which form our sanitary legislation. Mr. Cole then pointed to several of the permissive clauses of the Public Health Act which *should be compulsory*, and alluded to the necessity of town surveyors being placed in the position of independence enjoyed by medical officers of health; and, in conclusion, pointed out the duties of private individuals and of public authorities to further diminish the decreased death-rate that has followed from the sanitation of fifty years.

**Egypt and the Soudan.**—We have received from Mr. Jas. Wyld, of Charing-cross, a map of considerable interest at the present moment, of "The Nile, Egypt, and the Soudan," being No. 11 of his Egyptian series. The map seems very complete, and in addition to the localities, gives heights above sea level, and telegraph lines, land and submarine.

**Wood Chimney-pieces.**—Messrs. Walker & Sons, of Bunhill-row, issue an illustrated catalogue of their carved wood chimney-pieces, mostly in the modern "Free Classic" style. The designs are mostly of an appropriate character, and suitable for execution in wood work. The name of the designer or designers is not given.

**The Parkes Museum of Hygiene.**—The ordinary general meeting of the members of the Parkes Museum was held at the Museum on Thursday, December 4th, Capt. Douglas Galton, C.B., F.R.S., in the chair. The meeting was held to consider the report of the Council for the tenth year, and to elect officers. The report set forth the work done in connexion with the Museum during the past year, which had included lectures by the Council of the Sanitary Assurance Association, in addition to those arranged by the Council of the Museum. The accounts showed that there was urgent need for increased subscriptions if the museum was to be continued, for the small invested capital had had to be made use of this year to meet the current expenses. The report was adopted on the motion of the Chairman, seconded by Mr. Rogers Field, M. Inst. C.E. Mr. Mark H. Judge, F.R.I.B.A., then proposed "That the report be printed, for circulation, with a detailed statement of the financial position of the museum, and that a special meeting of the members be convened within two months to consider the same." This was seconded by Mr. E. C. Robins, F.R.I.B.A., and carried unanimously. Sir R. Lloyd Lindsay, K.C.B., M.P., Professor J. Marshall, F.R.S., and Mr. Alfred Waterhouse, R.A., were elected vice-presidents. Six new members of Council were elected, and the meeting closed with a vote of thanks to the Chairman, proposed by Dr. J. C. Steele, of Guy's Hospital.

**New Mission Hall, Westcombe Park, East Greenwich.**—This building, erected in the parish of Christ Church, East Greenwich, was opened on the 29th of November by the Bishop of Rochester. The vicar and committee found it necessary to meet the religious wants of this growing district, and so secured a site in the Coombe Farm-lane. The building provides accommodation for 400 persons, and consists of a large hall and class-room contiguous to and communicating. The latter, which holds sixty, is so planned that from nearly the whole of the floor space a view of the speakers on the platform in the large room, may be obtained, and a shutter, by Salmon, Barnes, & Co., is provided to separate the rooms when required. The plan has been so arranged that an extra class-room may be added at a future period. Adjoining the class-room is the Vestry, which is fitted with a large boiler, to be used at tea meetings, &c.; a sink is also provided with a flap top to form a table. The clergy and teachers' lavatories and waterclosets are accessible both from hall and classroom. There are also separate conveniences for boys and girls at the end of the building. The floor is of Gregory's wood blocks, laid on solid concrete. The building is heated by small bore pipes. The whole work is substantial, though simple, and the total cost is 1,162*l*. The works were carried out by Mr. R. L. Wood, of Greenwich. Mr. V. Hibbins acted as clerk of the works. The architects are Messrs. Romaine-Walker & Tanner, of 19, Buckingham-street, Adelphi.

**Needless Noises in London.**—At the very time when a medical officer of health is, we regret to find, "putting up" local authorities to refuse permission for laying straw in the streets for the salvation of the sick who are racked on their beds of suffering by the rattling of cabs and wagons, a layman has started the excellent notion of forming a fund for the prosecution of engine-drivers, or their employers the companies, for needless whistling. A contemporary, applauding the idea, and predicting that a fund will be quickly accumulated, suggests that the area of reform should be extended, and that the incessant ringing of church-bells should be put down with an equally strong hand.—*Lancet.*

**A New Cupboard Fastening** has been patented by Messrs. Brendon Bros., of Callington, Cornwall. It embodies a valuable improvement on the ordinary "cupboard turn," simply by making a slot in the sunk portion of the face of the escutcheon for about one-third of its circumference. A stud attached to the knob runs in this slot, and thus prevents the blade of the fastener from falling below a horizontal line.

**A Memorial Brass** is about to be erected in the Parish Church of Morchard Bishop, Devon, by the parishioners, to their late rector, the Rev. J. J. Rowe, M.A., Oxon. It measures about 3 ft. by 2 ft. 3 in., and is being carried out by Messrs. William Damerel & Son, from the design of Mr. Octavius Ralling, architect, of Exeter.

**International Inventions Exhibition.**—The applications for space have now all been examined by Sub-Committees of the Council, and a selection has been made of the most promising. The number of applications has been so great that it has been decided to limit very strictly the admissions in those classes which may be considered to have been fully represented in the Exhibitions of the present and of the past year. The Council will, therefore, be obliged to refuse many valuable exhibits in such classes as those relating to Food, Clothing, and Building Construction. The Guarantee Fund now amounts to 48,280*l*., a sum considerably in excess of that subscribed for the Health Exhibition, or for the Fisheries. *Journal of the Society of Arts.*

**Home for Female Inebriates.** — The foundation-stone for the extension of these premises, which are situated at Ebenezer-terrace, Kennington, was laid on Wednesday last by Mr. Samuel Morley, M.P. The object sought to be attained by the promoters of the Institution (which, we believe, has done much useful work) is, by building a commodious steam laundry, to make this valuable institution for the reform of drunkards self-supporting. The architect is Mr. Banister Fletcher.

**A Mace**, executed in silver-gilt, and designed by Mr. Henry Perkin, architect (Messrs. Perkin & Bulmer, Leeds), was presented by the ladies of Harrogate to the Mayor and Corporation of that newly-incorporated borough, on Saturday afternoon.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Additions to Vestry Hall Buildings... ..... | Chelsea Vestry..... | 100 guineas, first<br>50 ,, second<br>30 ,, third | Feb. 23rd | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Fittings ..... | Central Technical Coll. | A. Waterhouse..... | Dec. 15th | xviii. |
| Engineering Work, &c. ..... | Chelsea Guardians ..... | A. & C. Harston ..... | Dec. 17th | xviii. |
| Erection of 4 Cottages, Rushton, nr. Kettering | Midland Railway Co. ... | A. A. Langley ..... | Dec. 18th | ii. |
| Erection of House and Stabling, Banbury ..... | Not stated ..... | W. E. Mills ..... | do. | ii. |
| Boiler-House and Chimney-Shaft ..... | Railway Servants' Orphanage, Derby... | A. A. Langley ..... | Dec. 22nd | ii. |
| Sewerage Works..... | Tottenham Local Board | Mr. De Pape..... | Dec. 23rd | ii. |
| Erection of Baths ..... | Bristol Corporation ... | J. Thomas ..... | do. | i. |
| Portland Cement ..... ..... ..... | Brighton Town Council | P. C. Lockwood ..... | do. | ii. |
| Erection of Boundary-Wall and Railing on Western Side of Royal Courts of Justice | Commissnrs. of Works | *Official* ..... | Dec. 24th | ii. |
| Stoneware Pipes and Outfall Sewer..... ... | Tring Local Board ..... | Thomas & Taylor..... ... | do. | xviii. |
| Pulling down of four Houses, and Purchase of Old Materials, Jermyn-street ..... | St. James's Property Company ..... | ..... | do. | xviii. |
| Erection of Cellars, Malt Store, &c., Canterbry | Ash & Co. ..... ..... | H. Stopes & Co. ..... | Dec. 30th | ii. |
| Sewerage ..... | Swansea U. S. A..... | R. H. Wyrill ..... | Dec. 31st | ii. |
| Engines and Boilers ..... ..... | Farnham Local Board | J. Lemon ..... | Jan. 5th | ii. |
| Additions & Alterations to existing Buildings, and Fitting-up of Necessary Machinery.. | Commissioners of Public Baths, &c., Brmnday | G. Elkington & Son ... | Jan. 9th | ii. |
| Enlargement, and part Re-building Church of St. Mark, Bexhill, near Hastings..... | Building Committee ... | Riches & Esam..... | Jan. 15th | ii. |
| Oak Park Fencing, &c. ..... | ..... | Thos. Clarke ..... | Not stated | xviii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Surveyor ..... | Skipton Local Board ... | Not stated ..... | Dec. 16th | xvi. |
| Surveyor ..... | Swindon New Town Local Board ..... | 180*l*. ..... | Dec. 17th | xvi. |
| Chief Accountant ... ..... | Sheffield Un. Gas Lght C. | Not stated ..... | Dec. 27th | xvi. |
| Surveyor and Inspector of Nuisances..... | Chesham Local Board | 175*l*. ..... | Jan. 5th | xvi. |

### TENDERS.

For construction of about one mile of brick sewer, with manholes, sight-holes, &c., for the Kingsthorpe Sanitary Authority, Northampton. Mr. Wm. Hull, engineer to the authority. Quantities by the engineer:—

| | |
|---|---|
| C. Harris, Shrewsbury ..... | £2,737 10 0 |
| H. Hickman, Northampton ..... | 1,612 14 0 |
| R. C. Gordon, Nottingham ..... | 1,495 16 0 |
| G. Branson & Son, Northampton..... | 1,490 0 0 |
| G. Chapman, Northampton ..... | 1,353 10 6 |
| D. Cosford, Northampton ..... | 1,337 10 0 |
| R. Finnegan, Northampton ..... | 1,335 0 0 |
| J. S. Wingrove, Northampton ..... | 1,280 0 0 |
| H. Martin, Northampton ..... | 1,270 0 0 |
| G. White, Northampton..... | 1,221 0 0 |
| Green Bros., Northampton (accepted) | 1,154 0 0 |

[Engineer's estimate, £1,248]

For shop front and fittings, 174, Oxford-street, for Mr. Hancock. Mr. Lewis Solomon, architect, 7, Gray's Inn-square:—

| | |
|---|---|
| Yardley & Sons ..... | £439 0 0 |
| Drew & Cadman ..... | 423 0 0 |
| Sage & Co. (accepted) ..... | 396 0 0 |

For works in the formation of a circus at Covent Garden Theatre. Mr. Frank Matchsm, architect, Rugby Chambers, Bedford-row, W.C.:—

| | |
|---|---|
| Patman & Fotheringham ..... | £1,973 0 0 |
| Roach ..... | 1,320 0 0 |
| Shoolbred & Co..... | 1,249 0 0 |

For the erection of a shop and residence, Union-street, Aldershot, for Mr. T. Fountain. Mr. S. Friend, architect, Grosvenor-road:—

| | |
|---|---|
| W. Garland ..... | £497 0 0 |
| J. Cranston ..... | 495 10 0 |
| W. J. Snuggs ..... | 488 10 0 |
| J. Hughes ..... | 480 0 0 |
| G. Kemp..... | 435 0 0 |
| J. Batchelor ..... | 404 0 0 |
| J. Seabright (accepted)..... | 397 0 0 |

All of Aldershot.

For the erection of residence, Hemdean-hill, Caversham, Oxon, for Mr. C. H. Havell. Messrs. Brown & Albury, architects:—

| | |
|---|---|
| Geo. Wernham (accepted)..... | £1,400 0 0 |

For new billiard-room at Balmore, Caversham, Oxon, for General Radcliffe Messrs. Brown & Albury, architects:—

| | |
|---|---|
| Geo. Wernham (accepted) ..... | £760 0 0 |

For the erection of new billiard-room, &c., Reading, at the Wheatsheaf Hotel, Blagrave-street, for Mr. John Gosling. Messrs. Brown & Albury, architects:—

| | |
|---|---|
| Strong Bros. ..... ..... | £886 0 0 |
| W. H. Simonds..... | 839 0 0 |
| W. Woodroffe ..... | 797 0 0 |
| H. & A. Lewis (accepted)..... | 755 0 0 |

For alterations and forming billiard-room, at the Vine, Reading, for Mr. John North. Messrs. Brown & Albury, architects:—

| | |
|---|---|
| Geo. Wernham..... | £256 0 0 |
| Patience & White ..... | 245 10 0 |
| C. Brown ..... | 245 0 0 |
| W. Woodroffe ..... | 245 0 0 |
| H. & A. Lewis (accepted)..... | 229 16 0 |

For the erection of business premises, 22, Minster-street, Reading, for Mr. J. B. Day. Messrs. Brown & Albury, architects:—

| | |
|---|---|
| J. Sims (accepted) ..... | £925 0 0 |

For fitting up club-room at the Cross Keys, Reading, for Mr. C. P. Shadbolt. Messrs. Brown & Albury, architects:—

| | |
|---|---|
| Geo. Wernham (accepted) ..... | £156 10 0 |

For alterations to Surrey House, Collingwood, Surrey, for Mr. H. G. Poulter. Messrs. Brown & Albury, architects:—

| | |
|---|---|
| George Latter, Camberley ..... | £700 0 0 |

For enlargement of schools, Globe-terrace, Tower Hamlets, for the London School Board. Quantities by Messrs. H. F. Northcroft, Low, & Neighbour. Mr. E. R. Robson, architect:—

| | | | |
|---|---|---|---|
| Kearley | £8,414 | 0 | 0 |
| Goodman | 8,375 | 0 | 0 |
| Perry & Co. | 8,268 | 0 | 0 |
| Brass | 8,230 | 0 | 0 |
| Wall Bros. | 8,160 | 0 | 0 |
| Kirk & Randall | 7,947 | 0 | 0 |
| Jerrard | 7,899 | 0 | 0 |
| Pritchard | 7,898 | 0 | 0 |
| Smith & Son | 7,897 | 0 | 0 |
| H. L. Holloway | 7,888 | 0 | 0 |
| Shurmur | 7,866 | 0 | 0 |
| Howell & Son | 7,838 | 0 | 0 |
| Bangs & Co. | 7,820 | 0 | 0 |
| Stimpson & Co. | 7,795 | 0 | 0 |
| Grover | 7,776 | 0 | 0 |
| Wm. Oldrey | 7,768 | 0 | 0 |
| Croaker | 7,730 | 0 | 0 |
| Cox | 7,714 | 0 | 0 |
| Jackson & Todd | 7,695 | 0 | 0 |
| W. Johnson | 7,684 | 0 | 0 |
| Atherton & Latta | 7,542 | 0 | 0 |
| C. Wall | 7,210 | 0 | 0 |

For shop and dwelling-house, No. 14, Bridge-street, Exeter, for Mr. J. C. Tuckwell. Messrs. Best & Commin, architects, Exeter. Quantities supplied (to contractors marked *) by Mr. T. Mullins, surveyor, Exeter:—

| | | | |
|---|---|---|---|
| *Moass, Exeter | £1,100 | 0 | 0 |
| Sharland, Exeter | 1,075 | 0 | 0 |
| *Gooding, St. Thomas | 1,074 | 18 | 0 |
| Gibbard, Exeter | 1,066 | 0 | 0 |
| Styles, Exeter | 1,050 | 0 | 0 |
| Sanford, Exeter | 1,038 | 10 | 0 |
| *Cummins, Exeter | 1,000 | 0 | 0 |
| *Holmes, Alphington | 995 | 0 | 0 |
| *Gibson, Exeter (accepted) | 890 | 0 | 0 |

For fixing a steam boiler and fittings and for other work in connexion with the same, at the schools, Mitcham, for the Guardians of the Poor of the Holborn Union. Mr. H. Saxon Snell & Son, architects:—

| | | | |
|---|---|---|---|
| W. J. Fraser & Co. | £295 | 10 | 0 |
| Wm. Bamford | 256 | 0 | 0 |
| Frazer & Frazer | 248 | 0 | 0 |
| May Bros. | 235 | 0 | 0 |

For the erection of shops in the forecourts of houses known as Woodland Villas, Woodland-road, Greenwich, for Mr. John Dyer. Mr. John Rowland, architect, Charlton:—

| | | | |
|---|---|---|---|
| Hayward & Son | £945 | 0 | 0 |
| George Lee | 899 | 14 | 0 |
| Thos. A. Hollis | 899 | 10 | 0 |
| Holloway Bros. | 889 | 0 | 0 |
| John Blow & Son | 837 | 0 | 0 |
| Edwin Blow | 820 | 0 | 0 |

For the paving (with scoriæ blocks), flagging, draining, &c., of a number of streets within the district of the South Stockton Local Board. Mr. S. E. Thorold, C.E., surveyor:—

| | | | |
|---|---|---|---|
| Robinson, Stockton | £1,956 | 5 | 10 |
| John Dixon, Eaglescliffe | 1,948 | 14 | 10 |
| Thos. Heatley, Stockton | 1,883 | 12 | 8 |
| Richd. Jones, Stockton | 1,881 | 13 | 1 |
| Thos. Hunt, Thornaby (accepted) | 1,833 | 17 | 3 |

For alterations to the King's Head, 128, Commercial-road East, for Messrs. Gerlach & Cox. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within:—

| | | | |
|---|---|---|---|
| Toms | £987 | 0 | 0 |
| Marr | 950 | 0 | 0 |
| Jackson & Todd | 949 | 0 | 0 |
| Shurmur | 936 | 0 | 0 |
| Oldis Bros. | 890 | 0 | 0 |

For air-tight cases and fittings for new show-room, for Messrs. James Deakin & Sons, Sheffield:—

| | | | |
|---|---|---|---|
| Fredk. Sage & Co., London (accepted) | £301 | 12 | 6 |

For altering the old Court House, Bridgwater, to convert same into Municipal Offices and Free Reading-rooms and Library for the Bridgwater Town Council. Mr G. B. Laffan, Borough Surveyor.—

| | | | |
|---|---|---|---|
| Harris & Tapscott | £215 | 0 | 0 |
| Chas. Sendell | 194 | 0 | 0 |
| R. Escott | 185 | 0 | 0 |
| Thos. Searle | 163 | 0 | 0 |
| J. H. Kitch | 163 | 0 | 0 |
| Jas. Palmer | 149 | 0 | 0 |
| H. W. Pollard (accepted) | 125 | 0 | 0 |

For erection of a villa residence, at Bedford, for Mrs. Elgee. Mr. J. G. Galpin, architect:—

| | | | |
|---|---|---|---|
| Watts & Lester (accepted) | £500 | 0 | 0 |

[No competition.]

For house, bakehouse, and shop, at Bedford, for Mr. A. Mann. Mr. J. G. Galpin, architect:—

| | | | |
|---|---|---|---|
| Watts & Lester (accepted) | £300 | 0 | 0 |

[No competition.]

For alterations at Duffield, Stoke Poges, Bucks, for Mr. A. Gilliat. Messrs. Edgington & Summerbell, architects, Windsor. Quantities by the architects:—

| | | | |
|---|---|---|---|
| Willis, Windsor | 586 | 0 | 0 |
| Bowyer, Slough | 557 | 0 | 0 |
| Deverill, Slough | 550 | 0 | 0 |
| Watson, Ascot | 536 | 0 | 0 |
| Hann & Co., Windsor | 535 | 0 | 0 |
| Turtle & Appleton, Wandsworth* | 525 | 0 | 0 |

* Accepted.

For new drawing-room to High Broom House, Crowborough, Sussex, for Miss Wolfe. Mr. E. P. Loftus Brock, architect:—

| | | | |
|---|---|---|---|
| Suewin | £1,475 | 0 | 0 |
| Norman | 1,450 | 0 | 0 |
| Nightingale Bros. | 1,428 | 0 | 0 |
| Charlwood Bros. | 1,265 | 0 | 0 |
| Morris | 1,200 | 0 | 0 |
| Godly | 960 | 0 | 0 |

*Alterations at Salmon and Compasses, Dorrington-street.*—Messrs. Burch & Co. write to say that the amount of their tender was 863*l.*, not 963*l.*

*Special Notice.*—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than four p.m. on Thursdays.

## PUBLISHER'S NOTICES.

**Christmas Week**—*The* BUILDER *for the week ending December 27th will be published on* **Wednesday, 24th** *inst., at the usual hour.*

*Advertisements for insertion in that issue must, therefore, reach the Office before Three o'clock* P.M. *on* **Tuesday, 23rd** *inst.*

ALTERATIONS IN STANDING ADVERTISEMENTS, *or* ORDERS TO DISCONTINUE SAME, *cannot be attended to if received after* 12 *(noon), on* **Monday, 22nd.**

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DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher No. 46, Catherine-street, W.C

### TO CORRESPONDENTS.

T. M. R.—G. H. J. Florence.—H. H.—J. P. S.—T. M. R.—F. W. H.—J. D. S.—F. E.—E. F.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

**Best Bath Stone.**
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

**Dry Corsham Stone.**
150,000 FEET CUBE.
PICTOR & SONS,
BOX, WILTS.
[ADVT.

**Doulting Freestone and Ham Hill Stone** of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.

**Doulting Free Stone** HAM HILL STONE, BLUE LIAS LIME (Ground or Lump), For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

**Asphalte.**
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT.
COLLINGE'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD, LONDON, S.E.
DISCOUNT TO BUILDERS.

# BRABY'S PATENT GLAZING

GLASS SET FREE,
ALLOWING EXPANSION AND CONTRACTION, AND PRECLUDING BREAKAGE.
ABSOLUTELY WATERTIGHT. PAINTING AND PUTTY SUPERSEDED.
OVER ONE MILLION FEET FIXED.
DRAWINGS AND PRICES ON APPLICATION.
— MODELS AND SECTIONS ON VIEW. —
LONDON: 356 to 362, EUSTON ROAD.
LIVERPOOL: 6 and 8, HATTON GARDEN.
GLASGOW: 335, ARGYLE STREET.

# The Builder.

Vol. XLVII. No. 2187. SATURDAY, DECEMBER 20, 1884.


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### *Circular Hospital Wards.*



ON Wednesday afternoon there was opened at Greenwich the Miller Memorial Hospital, founded as a practical memorial to the late Canon Miller, of Greenwich, who invented "Hospital Sunday." The hospital is a small one, and only one half of the ward portion of it is as yet built, but it acquires importance inasmuch as it is the first hospital with circular wards to be put into actual working. Its opening was followed, appropriately enough, by a meeting at the rooms of the Social Science Association on the evening of the same day to consider the subject of circular wards generally, when Professor Marshall, who first started the idea of the circular ward in this country, gave a short address, summing up, in an admirable and lucid manner, his views as to the superiority of the circular form and his reasons for them, and Mr. Keith Young, who, conjointly with Mr. Hall, was the architect of the Miller Memorial Hospital, read a short paper descriptive of the building and the objects which have been aimed at in its plan and construction.

The ultimate reception of the circular ward system will depend on the practical experience of the medical profession in regard to its working; but this seems a convenient moment for referring to and summarising the reasons for and against it, as well as alluding to one or two of the statements made at the small, but, as far as it went, very representative meeting at Adam-street, at which Dr. Buchanan presided.

Although Professor Marshall claims to have started the idea of the circular ward in England, his attention having been directed to it by considering the method of carrying out future extensions to University Hospital, the idea seems to have sprung up almost simultaneously in other quarters, and he found that the circular ward hospital at Antwerp (M. Baeckelmans and MM. Bellmeyer and Van Kiel, architects), of which mention has been made before in these columns,* had been designed as long ago as 1872, and that previously to that Sir Andrew Clarke, whose circular ward military hospital at Seaforth (not yet in working order) we illustrated a few weeks ago, had before that designed a circular ward hospital for Madras, which was not carried out, owing to objection mainly on the ground of costliness. Sir A. Clarke, speaking afterwards, carried the history of the matter a little further back. He disclaimed originality, and said that the idea had been first suggested to him in 1854 by Dr. M'Kenna, of Melbourne, a military doctor, who had found in the course of active service elsewhere that when the wounded were placed in convent rooms, hospital gangrene usually set in; when they were placed in a circular church, hospital gangrene seldom set in, and in a much milder form when it did. In 1858 Sir A. Clarke was reminded of this by the experience with the wounded at Rome in Garibaldi's campaign, when the Pantheon was made use of as a military hospital with the most favourable results; while, again, the convent rooms which were utilised as hospitals, turned out very unfavourably. We may just remark in regard to this piece of experience that too much stress cannot be laid on the operation of the circular and domed form of building unless we know also a little about the other constructive details of the buildings utilised, and the manner in which they are kept. The churches were very likely the cleaner places, and in most cases would be built of more favourable, because harder and more impervious, materials, besides the larger cubical space in proportion to floor area,—considerations which, of course, apply especially to the case of the Pantheon. This argument, therefore, must not be pushed too far.

The historical side of the subject was further brought out at the meeting we are referring to as follows. The Antwerp designs have been referred to. There is in a hospital at Bristol an octagonal ward, a form which, it may at once be said, combines nearly all the disadvantages of the circular form with some others peculiar to itself. Not long after the initiation of the circular idea in this country by Professor Marshall, an attempt was made to get it carried into practice at Spalding. Medical opinion was not adverse to it, but caution prevailed with the Committee. It was an untried experiment and a costly one, and they would not sanction it. At Burnley the authorities were less timid, and a hospital with circular wards of one story, but with a "sun-room" above, is in progress there, and is likely to be opened about October next. Then the necessity for adding an Infirmary ward to the Hampstead Workhouse, on a very irregular and confined site, led its architect, Mr. Charles Bell, to the idea of getting over the difficulty there by the circular form, and hence arose the three-storied circular building, not yet opened, which we illustrated in the *Builder* for Feb. 2 last. The Seaforth Barrack Hospital we have already referred to and illustrated (*Builder*, Nov. 15 last); this is also in progress, and Sir A. Clarke has plans in preparation for a somewhat similar one at Milltown, near Greenwich, and for a much larger one at Valetta: these two latter may be regarded as works to be carried out, as their form is decided on. We have thus at the present moment one circular ward hospital actually opened, and five which may be regarded as practical schemes to be completed before long, viz., Antwerp, Burnley, Seaforth, Milltown, and Valetta; so that the circular ward system is now getting fairly past its theoretical stage.

Let us now consider the arguments for and against, as they appear at the present moment and in the absence still of the only sure test, that of experience. The arguments for the circular form in itself, irrespective of the nature of the site (which, as we shall see, is really a most important factor in the matter), Professor Marshall puts thus:—A circular ward gives a larger floor area per run of wall than a rectangular one, consequently also a larger cubical content. The action of the wind against the exterior surface, in the matter of affecting temperature and producing draughts, is much less powerful and direct than against a straight wall; whatever the direction of the wind, it can only operate fully against a small portion of the building, and is carried round in a circular current over all the rest of the surface. When the state of the weather is such that opening the windows is possible and desirable, the advantage is felt internally in the escaping of direct draught and the promotion of a gentle circular current round the room; whatever current of air strikes the wall having a tendency to continue round its inner circumference. The avoidance of all angles in the walls is an obvious advantage, it being now a recognised principle in hospital building to avoid angles of every kind that can hold dirt and render cleaning difficult. The advantage becomes greater and more marked when any angle at the junction of walls and roof is also avoided, and the ceiling is carried up in a more or less domical shape as a continuation of the wall. As Professor Marshall states it, fouled air has a tendency to mount up along the domical ceiling towards the centre, as certainly as water has a tendency to run *down* towards the centre of a dish with a bottom sloping to the centre. This is put a little too strongly; there are so many influences affecting currents of air which do not affect the action of water by simple gravitation; or, to put it more correctly, the superior lightness of the fouled air, which leads to its upward gravitation, is not nearly so marked as the superior weight (in comparison with surrounding air) of the water, which leads to its downward gravitation. Theoretically, however, no doubt the conclu-

* For plan see *Builder*, July 7, 1883.

sion is correct, and part of the advantage of the circular ward is lost whenever the ceiling is made flat.

These are the advantages supposed to be inherent in the circular ward *per se*. But practically the most important and undeniable one so far is in its special adaptation to the difficulties of special sites, which has mainly led to its adoption in the Hampstead and the Greenwich cases. In regard to this, we cannot do better than put the matter in the words of Mr. Keith Young's paper on the Miller Hospital, which followed Professor Marshall's address. He said :—

"The site occupied by the buildings already erected, consists of a rectangular piece of ground immediately in rear of the Royal Kent Dispensary; in length about 63 ft., in width 46 ft., or about 2,898 square feet in area. On the north it adjoins the dispensary building just mentioned; on the east a large garden or yard, belonging to a chapel; on the west a blind road or *cul-de-sac*, by which access is obtained to the hospital; and on the south the ground on which the future extension is to be built. It is not, I think, very difficult to see that to plan a hospital at all on a site so restricted as the one before us is by no means an easy task; the position of the dispensary, and the fact of its having windows overlooking the hospital site, whose light must not be unduly impeded, present obstacles of a very serious nature to the efficient lighting and ventilation of the wards. Careful study led us to the conclusion that wards of the ordinary rectangular form were entirely impracticable, and that the only possible way of overcoming the difficulties of site, was to adopt the circular form for our wards. To illustrate my meaning more clearly, let us suppose the circular ward nearest the dispensary to be removed, and to be replaced by a rectangular ward for the same number of beds, and the same floor area per bed; the result of this would be, that when the ward was placed in position, its north wall would fit close up against the back wall of the dispensary. I should mention that, in view of the intended future extension southwards, the position of the administrative building is necessarily that which it now occupies."

To these advantages we will add one other of a distinctly architectural kind, namely, that the circular form gives an architect better chances of imparting a certain degree of picturesque effect to a hospital, as was evident in some of the drawings that were exhibited of hospitals that have not been carried out. This is a consideration which can only be advanced after it has been satisfactorily shown that the practical advantages of the form are paramount; but, that granted, it counts for something additional in its favour.

The disadvantages of the circular form, as admitted by its supporters are, first, increased cost. One or two supporters of the system deny this, but, of course, no practical architect will question it for a moment. It means increased cost in walls, floors, and roofing; and the superior cost of the two latter elements increases in ratio as the size of the ward increases. There is a wide area to cover instead of a comparatively narrow apartment. The second is that, although the area per run of wall is slightly greater, the actual amount of ground on the site is not utilised to the same extent as with rectangular buildings; considerable areas outside the circle are lost. When, as in the case of the Miller and Hampstead Hospital, the filling-up of this area would have brought the Hospital too close up to adjoining buildings, this cannot be considered a loss, so that this is obviously a question depending upon the special character of the site. An objection maintained by medical opponents is that the windows opposite the bed where an operation or dressing has to be performed or a minute examination made, are too far off to give sufficient direct light. This Professor Marshall denies, and states that the diffused light obtained from all sides is equal, if not superior to, that derived from the single near window opposite to the bed in an ordinary rectangular ward. This is a point on which only practical surgeons can speak, and architects must in such a matter bow to their decision. We may reasonably suppose that the opinion of Professor Marshall would be a little biased in favour of his form of ward, and that it is only wise to wait for further surgical evidence on this point before feeling satisfied about it. The further disadvantages incident to the circular form which occur to us are, that each patient has a fuller view of all the others than in any other form of ward, and this is a condition to be avoided as far as possible; that the plan necessitates, almost, a large central block or column for fireplaces and ventilation, and this is in the way of complete surveillance of all the beds by the principal nurse; and that the arrangement brings the feet of the beds inconveniently near to each other, except in a ward of larger radius than on other accounts it would be desirable or even possible to adopt. The full advantages of the plan in regard to warming and ventilation can only be realised with the central arrangement referred to, and we doubt if this central mass blocking the middle of the floor can ever be felt to be otherwise than an inconvenience: though we do not suggest this as a very serious drawback. Still, we hold that the rectangular ward will be found the most convenient for inspection and administration; and although Sir A. Clarke said that when inquiring where any hospital disorder had first broken out he had always found it was at the beds in the angles, "where there was no ventilation," it may be replied that it is surely possible to build a rectangular ward so that ventilation should be complete in the angles.*

It appears to us, therefore, that the absolute superiority of the circular ward is at present established only in regard to sites where a rectangular form would bring the ward too closely into contiguity with adjacent buildings, and leave insufficient space for light and external circulation of air. In regard to the latter object, the circular ward in situations confined by buildings, no doubt, offers special advantages which no other form can equal. In other points and apart from site, although we are disposed to feel much less doubtful about the circular ward than formerly, it appears to us that advantages and disadvantages are, so far, about balanced, and that there is not yet ground for adopting the circular ward as the ward of the future. It must be compared with the rectangular ward on the best construction and with the best appliances, not with wards built merely on what are sometimes called "common-sense" principles; a vague phrase, which often means avoiding the trouble and difficulty of investigating details. "Common-sense" on such a matter consists in studying the question in all its details, in the light, first of theory and then of experience, and adopting the form which best stands the test of investigation.

In regard to some practical details, Mr. Keith Young considers the diameter of 35 ft., that of the Miller wards, the smallest that can be adopted without giving a feeling of confinement in regard to the central floor space (besides, we may add, bringing the feet of the beds too close,—for it must be remembered that the size of bed is a "constant"), and Sir A. Clarke regards 60 ft. diameter as the largest desirable. This is also probably correct: a larger size would lead to waste of floor space. In the Miller wards, of 35 ft. diameter, there are ten beds, giving a wall space of about 10 ft. per bed, which is liberal. In the Hampstead ward there are twenty-four beds, giving 6 ft. per bed, which is certainly the very least there ought to be. It is noteworthy, however, that although the wall space to be allowed at Hampstead is so much less, the cubical contents still leaves 1,000 cubic feet of air per bed, as against 1,100 cubic feet in the Miller ward. In other words, as the circular ward increases in size the wall space can be more closely occupied. In a ward of smaller size, the radiating position of the beds would also inevitably prevent their being put much closer than a 10-ft. spacing.

It was mentioned incidentally at the meeting that the Miller Hospital would probably be used in part at least as a hospital for paying patients, and that curtains were arranged between the beds their full length; and another speaker suggested that curtains coming forward 4 ft. from the wall would secure sufficient privacy. Now, it is just in this form of ward that they would *not*. In a rectangular ward, with the beds in a line, short curtains would secure privacy in regard to all except the opposite occupants; in a circular ward they would not. But is it not a serious question whether this array of curtains would not do away with some of the very advantages claimed for the circular ward, by checking ventilation and holding effluvia? This is more a doctor's than an architect's question; but so it appears to us. The proper sort of screen would appear to us to be one of some such material as thin enamelled iron, hung on a rail so as to leave about 3 in. between it and the wall, and not interrupt ventilation; and to be removable and washable. Bedclothes there must be; but surely it is not desirable to increase hanging stuffs in a hospital ward more than can possibly be helped.

Towards the close of the meeting we have been referring to, Professor Marshall received and read an interesting letter from Lady Strangford, accompanied by a plan of a hospital with circular wards which she had designed to be carried out in Egypt, with circular domed wards with top light and ventilation, a manner of building in keeping with the habits of the country in domestic architecture. Lady Strangford added that in her hospital at Cairo, where there was an inner domed room, the patients were found to do better than in any other ward. This was certainly an interesting and opportune testimony in favour of Sir A. Clarke's view as to the domed form. These wards, it must be observed, have the central floor-space unencumbered in any way.

* The actual "angles" should, of course, be rounded off.

## ON TYPES OF BEAUTY IN NATURE AND IN ART.

In a previous article * some progress was made in setting forth the analogies between structure and function in the organisms of nature and in works of art. The subject admits of further and extensive development, and is already in the way to be greatly assisted by what is becoming the important study of anthropometry. The subsidiary science is of too recent an origin to have realised all its capabilities, but zeal and sagacity seem not likely to be wanting to make the most of them.

Anthropometry has for its object the investigation, record, and study of the measurements of the human body in respect of its dimensions, weight, and the strength of its various physical powers. It is thus ancillary to anthropology, the natural history of man, so far as this science is concerned with man's physical development. Now, the assistance which the anthropometrist may be called on to supply falls generally under several heads. In the first place, he has to undertake the functions which are akin to those of the pure statistician. To him we must look for accurately compiled accounts of the physical conditions of the population in respect of growth and force, as it is distributed in districts, or in diversity of occupations, or at different ages. The value of the knowledge which is so obtained has appeared in the observation that a serious fallacy lies in making one standard height the test of suitableness for military service for Englishman, Welshman, Scot, and Irishman. It is manifest also that conclusions can scarcely but be brought out which will have important bearing on the conditions of health and vigour. A very considerable mass of statistics has already been accumulated and cannot be glanced over,—as in the "Manual of Anthropometry," by Dr. Charles Roberts, and the report of the committee,—without suggesting a variety of lines of study and comparison. We must look, however, to the anthropometrists themselves for reaping the full harvest of knowledge from their laborious preparation of this scientific ground. What we are concerned at present to indicate is that their ground admits of extension, and in a direction as interesting to art as it is to science.

What interests artists in anthropometry is not the general average of human forms, or

* See p. 531, *ante*.

even of special classes, but the most perfectly characteristic type of such classes, which will never be brought out as the result of an average. It is in this respect that the observations of Sir Joshua Reynolds have proved, perhaps in consequence of his qualifications not being duly allowed for, somewhat misleading. "From reiterated experience," he says, "and a close comparison of the objects of nature, the artist becomes possessed of a central form from which every deviation is deformity." Accordingly, Dr. Roberts pursues, "The distinguished mathematician, Quetelet, like the artist and the physiologist, recognises the existence of a central or typical form in man; but while theirs are ideal forms, his is a real one, and is the *mean* result of a large number of actual measurements of the living body. Hence the 'central form' of Sir Joshua Reynolds and the 'canon' of typical proportion of Professor Carns become the 'mean man' (*homme moyen*) of M. Quetelet." It is true, no doubt, that all men have been, to a certain extent, cast in the same mould, and so far the race admits of a type or model having certain universal characteristics and proportions. This general type, however, can be little more than a diagram or a formula, valuable for certain applications, but utterly characterless in any artistic sense,—as little to be taken as "a central form from which every deviation is deformity" as the archetype vertebral skeleton defined by Professor Owen. Sir Joshua, to do him justice, no sooner has uttered his dictum about the central form than he is struck by its difficulties and proceeds to make admissions rather than qualifications which are, in truth, equivalent to withdrawal in favour of a more defensible scheme. "To the principle I have laid down, that the idea of beauty in each species of being is an invariable one, it may be objected that in every particular species there are various central forms which are separate and distinct from each other, and yet are undoubtedly beautiful; that in the human figure, for instance, the beauty of the Hercules is one, of the gladiator another, of Apollo another, which makes so many ideas of beauty. It is true, indeed, that these figures are each perfect in their kind; but still none of them is the representation of an individual, but of a class."

But here again we find the great president going astray; the statues referred to are as absolutely individual as figures can be. Hercules is as absolutely Hercules as the president's own portrait of Lord Heathfield is Lord Heathfield, and the Apollo is as exclusively Apollo as his Dr. Johnson is Dr. Johnson. A figure is a type of its class in two senses,—first, as having all the characteristics which are present in every member of the class and none other; to decide this type it is necessary to exclude all details not common to all examples, otherwise any individual might be taken as a type; guidance, therefore, must be obtained by a comparison of large numbers. Such comparisons have this advantage, that they bring into view the points in which the largest numbers of agreements occur.

But the type of a class in the most important and valuable sense is an example in which the special characteristics are combined in the greatest perfection; if we are to gain a conception of this we must apply ourselves to study what those characteristics are and their relative value, and then to search for the exceptional individuals which exhibit them in the most admirable development; practically it may be safely said they are never to be found in nature assembled in a single individual, and thus it is that when associated and fused by fancy the type of a class is appropriately called ideal.

Naturalists have accepted this rule,—that the type of each genus should be that species in which the characters of its group are best represented and combined in happiest proportions. In the case of a national type this is the proportion which gives most efficiency to an organisation which is limited by certain permanent conditions, and especially by whichever is most important.

When this type is ascertained, it is for the anthropologist to press to the utmost his investigation of the factors which determined the model. Climate, elevation, as flat or mountainous, hot or cold, wet or dry; prevalent food and drink, occupation, and so forth, are taken into consideration, and still leave a remainder to be assigned to race,—to primeval influences affecting race,—and to the generally unknown.

The character of a perfect type is perfect suitability of a complex assemblage of organs to the requirements of functions which have reference to an end or general purpose of some certain complexity and dignity Every natural organism, plant, or animal in the wild state conforms to a certain type which is in some degree explainable by the conditions of its sustenance and growth, preservation and propagation. And physiologists have much more to do before they will be able to explain how the original adjustment of the organism and instincts to surroundings first came about.

But beyond this original adjustment a species is found to be susceptible more or less of alteration, to be plastic, and to develope into modifications of type which are again very specially defined. Cultivation will take such effect upon a flower as to evolve most extraordinary varieties of beauty. Again, the marvellous variety of highly characteristic types of the dog must spring from a natural plasticity, and, more than that, from plasticity having a special bias in certain directions. The natural instincts of the animal respond to characteristics of environment in the differences of prey to be pursued, or fought with, as absolutely as its coat is suitable to exposure in weather, and its digestive organs to the food which its teeth are suited to grasp and to masticate.

In the same way every characteristic type of man is the expression of response to characteristically defined influences and exigencies. The anthropometrist may be not unworthily occupied in determining what is the true type of a perfect equestrian. It would certainly be something very different from the type of a sailor, or a navvy, or a coachman.

What perfection of type is in nature perfection of style is in art, and much the same principles are involved in appreciating the characteristic types of style as of organism in the animal or vegetable kingdoms. If we compare the average of the proportions of Ionic columns with the average of Doric we shall, no doubt, obtain a result which exhibits very decidedly the main contrast of the two styles to this extent,—and so far we should be directed, if the matter were not self-evident already, to a point of difference in the two styles which is of vital importance. But our average column would only by accident coincide with an example of peculiar excellence, and so far must be less instructive than the individual extreme examples from which the average was obtained. The mean between two admirable examples may be as unsatisfactory as between two that are admirable in no respect. Whether we take a general average, or an average corrected by exclusion of extreme or insignificant groups, the *mean* of Quetelet and Dr. Charles Roberts, we, in either case, obtain a somewhat bald abstraction, as none of the details that give special interest to individual examples are represented in the result.

A mischief of an opposite nature is incurred when the value of subordinate types is as much neglected as the general type, and composition in a certain style is indiscriminate in its adoption of whatever details occur in any of its examples. Special character is not only distinctive of a style at large, but is demanded for every several variety of the style,—nay even, in due subordination, for every specimen of a variety which shall claim to be a work of original art.

The thoughts of an architect are familiarly conversant with a great variety of types of structures, from a palace to a shooting-box, from a metropolitan hospital or a theatre to a country-house or a Wesleyan chapel. They dwell in his mind as disembodied shapes, ever ready to assume varied proportions, dimensions, adjuncts, even in conception, but only to be fixed as definite designs upon presentation of local and all other definite conditions. An executed work, so far as it fully and worthily satisfies such conditions, conditions which include a requirement for characteristic beauty as well as serviceableness, is then a type, and may take its place at the head of a class including numbers, every one of which shall make clear admission of affinity, though not abrogating subordinate characteristics purely its own.

It is perhaps in sculpture, which strangely enough exceeds other arts in the proportion of its failures, that, thanks to the genius of the Greeks, we find not a few examples of success which have every claim to the high distinction of characteristic types. In painting, again, the works are numerous, of which we may truly say that they represent their classes with all the perfection of which they are severally capable. How far can the same be said of architecture, and what is the explanation if we cannot speak quite so confidently? Architecture would not be the source of delight that it is, both in study and contemplation, if numerous structures did not at once start up in memory to answer to the challenge. But let us be cool, and let us, above all, be fair. In demanding an example which is entitled to the honours of a perfect type of its class, we must bethink ourselves, before awarding such honours, as to what is meant by perfection. We pass rapidly in review before the mind a series of renowned and admirable buildings with which we are familiar as existing in full or not seriously impaired preservation, works of our own time, and works of predecessors; but of which, or let us say of how many, are we prepared to say that they give us perfect satisfaction,—that in them a given style, or a truly worthy ideal, is carried to the ultimate development in all parts and consistently,—that we wish in them nothing to be otherwise than as it is, and miss nothing which would give an enhanced charm, or that we are not left with an uneasy sense of defect or deficiency of some sort, we know not what?

If this is the case, notwithstanding the labour and the genius of which these works are the monuments, it may be taken as a warning to the world how difficult are the problems for the combination of beauty and dignity with serviceableness that it requires its architects to solve; and the thought is not altogether discouraging for architects, as it implies that,

"Much has been done, but more remains to do."

## NOTES.

THE conclusions to which the Royal Commission on Metropolitan Sewage have come in their final Report, whatever may ultimately be thought of their practicability, are in strict logical accordance with the main tendency of the evidence so far as it is summarised in the Report. The conclusion seems inevitable that, however sewage may be usefully and remuneratively employed by irrigation on a smaller scale, and under favourable circumstances of site, the London sewage is a special problem; it reaches to so huge an amount, and would require such an extent of land for utilising it, and such immense machinery for carriage and distribution, that the problem must be regarded as one that cannot be met in this way. The conclusion of the Commission is in favour of chemical precipitation of the solids, the solid matter "to be applied to raising low-lying lands, or burned, or dug into the ground, or carried out to sea," the liquid portion, *as a preliminary and temporary measure* (words in italics in the Report), to be allowed to escape into the river, but with the ultimate intention of treating this by intermittent filtration, which requires a much less area of land than broad irrigation. The Commissioners set their face against permanently sending even the effluent into the river without filtration through land. The great advantage put forth by the Commissioners for this system is that the most important part of it, the precipitation, can be applied without delay and in contiguity to the present outfalls. There is a gleam of hope in this, at

all events. Some of the suggestions of important witnesses may be considered when the evidence is published in detail. The Report as it stands is a very long, and, we may add, a very interesting one, worth the careful perusal of all concerned in the subject.

THE question of the construction of an underground railway from the Marble Arch to Cornhill is one that should be decided by one tribunal alone,—the deliberate choice of the metropolis. To remit the decision of so grave a problem to the toss-up of a couple of Parliamentary committees would, as in the case of the Manchester Ship Canal, be little less than a public scandal. Such a project may either be a well-digested effort to supply a public want, or a predatory attempt to filch the traffic of an existing line, at the cost of the residents along the suggested route. London, and London alone, has the right to decide which it is. But one or two considerations occur at this stage of the ventilation of the project. The first is that the first need for additional railway communication through London is from north to south, from Charing Cross to Euston or St. Pancras. This line should take precedence of a third route,—or indeed, a fifth route,—from east to west. The second point is, that as electric traction is proposed, it would be well to delay the authorisation of a new sub-metropolitan railway until electric traction has become practically established. And, thirdly we have to suggest that in the case of any new line through London we should borrow a hint from the engineers of Paris, and pierce the tunnel at so low a level as to avoid all interference with drainage, gas and water mains, and foundations; so low, in fact, that with an improved traction system the line should not be a destructive nuisance to the householders whom it undermines. And if the public will not descend, by lift or otherwise, to this requisite level, they can be in no crying need of the line. Had we not better set our streets in order first?

THE long-delayed improvement at the corner of the Poultry and Princes-street will shortly be completed, the lease of the European Tavern, which occupies a portion of the site, having recently expired. The old materials of the public-house and a portion of Bank Buildings adjoining, recently occupied by the Azienda Assurance, have been sold by auction, and the premises will shortly be pulled down. The estimated cost of the improvement, exclusive of professional services, is 21,600*l.*, which is at the rate of nearly 50*l.* per foot superficial.

AN interesting "find" has been made at Purwell Mills, near Hitchin, on the property of Mr. Charles Willes Wilshire. Roman bricks, shards of Samian ware, and coins of the lower empire having frequently been found in this neighbourhood, it was determined during the last month to excavate in a field near the Mills. The examination has brought to light the foundations of a Roman building; several rooms have already been unearthed; in one is the remnant of a rough tesselated pavement, red, relieved with a white pattern; in another the usual hypocaust, or apparatus for heating the house by hot air; some coins of Constantinus Secundus (eldest son of Constantine the Great) and Magnentius, have been found, which are presumptive evidence that the house was inhabited about the middle of the fourth century; a great deal of broken pottery, both fine and coarse grained, has turned up: also fragments of some glass vessel. The tiles from the roof lie in position as they dropped when the wooden superstructure gave way. The foundations are built of roughly squared flint blocks, set in excellent mortar. In breaking a detached piece, the stone was found to give way before the cement. It is premature to form any conclusions as to the size of the building until further examination has been made, but from the small dimensions of the rooms, the rough nature of the pavement and the pottery, some of the explorers are disposed to think that here we have the remains of a Roman middle class house, rather than those of some great man's villa, like that discovered at Brading. Should future examination confirm this view, it will add considerably to the interest of the discovery. We understand that the excavations are to be carried on until the whole ground-plan is laid bare. Considerable interest is taken in the work, and a great number of folks have visited Purwell Mills during the last fortnight.

WE are informed that the plot of ground at the commencement of the proposed new street from Piccadilly-circus to New Oxford-street, which forms a portion of the improvement authorised by the Metropolitan Streets Improvement Act, 1877, upon which the London Pavilion Music Hall is intended to be rebuilt, will have frontages upon what is now called Tichborne-street and Great Windmill-street, and the ground-floor will be utilised for shops where the land abuts upon those streets. The total area of the ground is 12,000 ft., and the rent to be paid is 3,000*l.* per annum, which is equivalent to 5s. a foot for the whole area. The lessee is to have the option of purchasing the ground-rent at twenty-seven years' purchase, which makes the value of the land in fee simple 394,036*l.* The lessee agrees to expend a sum of not less than 40,000*l.* in rebuilding the premises, and to pay the Metropolitan Board, who are the proprietors of the present Music Hall, 15,000*l.* on the transfer of the licence to him. The Metropolitan Board acquired the Pavilion Music Hall some years ago under an award by Sir Henry Arthur Hunt, who fixed the sum to be paid by the Board in compensation at 109,000*l.* The hall is at present let to Mr. E. Villiers at a rental of 7,000*l.*

WE cannot doubt that the explosion of the 13th December was a serious attempt at the destruction of one of the noblest monuments of London. The distance at which the explosion was heard, if compared with that at which such a noise as that made by the blowing up of a powder-mill, or the discharge of very heavy artillery, is audible, is enough to show that the charge of the deadly fulminant employed was enough, if directed with precision, to have blown out an arch, to say the least of it, of the bridge. But fortunately for civilisation, the precision of place and of time, without which the more rapidly exploding destructive preparations are really less dangerous than a more slowly expanding powder, are almost impossible to those who seek to perpetrate such outrages. From the latest reports, however, it would seem that the bridge has been in more danger than was at first supposed, and that every attempt had been made to plant whatever explosive force was used in a peculiarly effective manner at the base of the pier, and not above water.

THE Institute of France, on the 13th, nominated M. Diet as member of the Section of Architecture, to fill the place left vacant by the late M. Abadie. M. Diet is a former holder of the "Grand Prix de Rome," Honorary Architect and Member of the Council of Architecture of the city of Paris, Inspector-general of the Conseil des Bâtiments civils, and was the architect of the new Hôtel Dieu and of the buildings for the Prefecture of Police, on the Quay, at Paris. M. Diet also completed the "Musée Napoléon" at Amiens, and carried out the enlargemant of the Maison de Santé at Charenton, and other works of importance.

FROM *La Nature* we learn that, though electric lighting is carried out in several ways in private dwellings, it is always rather costly. One of the best systems is that of Gaston Menier, in which 150 Swan lamps are used of 40 volts and 0·7 ampères, supplied by a series of 22 accumulators. These nominally yield from 40 to 50 ampères, which are sufficient to supply 60 lamps at a time, a number more than sufficient for any ordinary purpose. The accumulators are charged each day by a continuous current Gramme machine, excited in derivation, which is regulated by resistances introduced into the circuit. The machine is driven by a 5-h.p. "Otto" gas-motor. With a little practice, the servant who has charge of the lighting can estimate the consumption pretty accurately, and re-charge the accumulators, allowing an excess of 10 or 12 per cent. for loss, possible errors. When it is necessary to use all the lamps, the direct supply from the machine is added to that of the accumulators.

IN a recent number of the *Bulletin Technologique* is described a new ceramic product from the waste sands of glass-factories, which often accumulate in immense quantities, so as to be an occasion of considerable embarrassment. The sand is subjected to immense hydraulic pressure, and then baked in furnaces at a high temperature, so as to produce blocks of various dimensions and of a uniform white colour, composed of almost pure silex. The bricks, when plunged into chlorohydric or sulphuric acid, show no trace of alteration, have remarkable tenacity and solidity, and are not affected by the heaviest frosts or the action of sun and rain. They have strong resisting powers to high temperatures, provided no fluid is present, and are also very light, the specific gravity being only 1·5. The pure white colour allows of many architectural effects in combination with bricks and stones of other colours.

WE have received the second annual report of the Metropolitan Public Garden, Boulevard, and Playground Association, for the year 1884. Under the head of "Successful Work" the Association shows a fair amount of achievement in what must be at present a very up-hill labour, and the list of propositions attempted, under the head of "Unsuccessful Work" shows that the Association keeps itself on the alert for all reasonable opportunities of putting its views into practice. As its objects become better understood the Association will, no doubt, find the items under the head "Successful" increasing, and those under "Unsuccessful" diminishing.

THE decision in the case of "Blashill *v.* Chambers," which we report elsewhere, is certainly one more in accordance with legal than with surveying and sanitarian interpretations. It appears from this that the presence on a building site of coffins filled with the remains of dead bodies does not constitute "material impregnated with animal matter"; and that the defendant, having put a shield of 18 in. of concrete over this conglomeration, had done his duty according to the letter of the law. In that case, the letter of the law had better be modified. We do not say that 18 in. of concrete is not a sufficient sanitary defence as long as the concrete remains solid and impervious; but it may be a considerable question how far the concrete is liable to crack from partial displacement when put on such an insecure style of foundation; and in that case the inhabitants would have to face the chance of mechanical and sanitary injury to their habitations at the same time.

**British Association.**—At the close of the British Association meeting at Montreal, the suggestion was brought forward that, in commemoration of the meeting, and as a recognition of the hospitality with which the members of the Association had been treated in Canada, it would be a graceful act to form a fund for the purpose of founding a gold medal at the McGill University at Montreal. After consultation with the authorities of the University, it was agreed that, subject to further consideration, the medal should be given annually, in the Faculty of Applied Science, in which there is at present no prize of this sort. Lord Rayleigh, the president of the Association, undertook to act as treasurer, and Mr. W. Topley and Mr. H. Trueman Wood as hon. secretaries. In answer to an appeal circulated amongst the members in Canada, and to a circular which has been issued in this country since the return of the Association, a sum amounting at present to 540*l.* has been subscribed. Deducting the necessary expenses of printing and postage, there will remain an amount of something over 500*l.* to provide the medal.

## A CORNER OF WILTSHIRE.

QUITE close to the western boundary of Wiltshire, and about half way from north to south, lies the little town of Bradford-on-Avon. The river from which it takes its name rises in the northern part of the county, and, after flowing beneath Malmesbury Abbey, and through Chippenham, finds its way among pleasant pastures to the factory chimneys and deep-dyed contriburions of Bradford: thence it passes by way of Bath to the great town of Bristol, and, creeping at a dizzy distance beneath Clifton Suspension Bridge, it finally loses itself in the Severn River. At Bradford it flows at the foot of a considerable hill, upon which the little town has perched itself, terrace upon terrace; while the banks of the stream are, for the most part, occupied by cloth-mills, which avail themselves of its help, and, in return, deliver into it most of what they do not want themselves. The mills, however, are not offensively obtrusive. Their presence serves to give a feeling of life and animation to the scene, without entirely monopolising both bank of the river to the exclusion of the seeker after the picturesque. Away from the water their influence is hardly perceptible, and one may toil up the steep streets, or climb the winding flights of steps which insinuate themselves between the houses, without being in the least reminded of anything so prosaic as cloth-making.




*Fig.* 1.

*Fig.* 2.

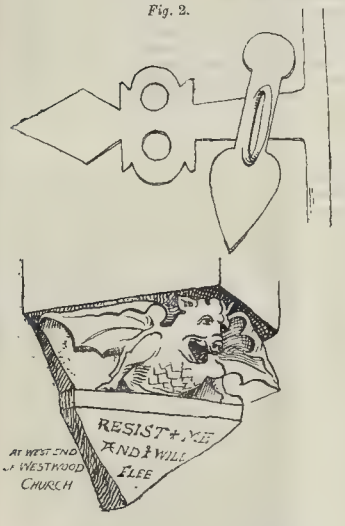



*Fig.* 5.

*Fig.* 3.

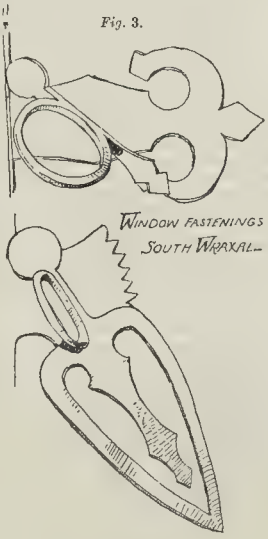



*Fig.* 4.

The centre of Bradford is its bridge. Here the road is tolerably level; here, if anywhere, there will be some life to be seen; the broad and shallow stream gives a feeling of space which is vainly sought for in the narrow streets; while the parapets being, as John Thorpe remarks of certain walls on one of his plans, "coped leaning, height," afford comfortable quarters to all who are fond of a good gossip indulged in to the soothing murmur of the water, and under the continual expectation of meeting one's friends. But it is not only for the unemployed, contemplative natives that the bridge has attractions. It has the great merit of being picturesque when seen from below, and of possessing, above, an unusual feature demanding attention from every stranger who merely crosses. This is a great point in a bridge. A bridge is usually a modest beauty whose charms only become apparent when sought for, and which are often unrecognised by ordinary acquaintance. But Bradford Bridge has a beauty-mark in the shape of a small building resting on one of the piers. Curiosity is naturally excited as to how this building is supported, and in settling the point, the whole series of Leland's "nine fair arches of stone" becomes visible. The building itself, which does this good service, is said to have been a chapel for mass, but it has undergone such changes that nothing of its original purpose could be guessed now from its outward appearance.

Bradford has two churches, one old and one new. The old church lies in an out-of-the-way corner, "bynethe the bridge on Avon Ripe," and attracts but little attention. It is a large structure, of various dates, but of no great interest to the sketcher. The modern world seems to attend the new church on the top of the hill. To the north of the old church is a small building of great interest to the antiquary, being nothing less than a real Saxon chapel. Many buildings used to be called Saxon which closer investigations have shown to be Norman; and even to this day vergers and other officials whose monotonous information was learned some twenty years ago, and has not been corrected up to date, will rise up in wrath if any doubt is cast on their cherished "Saxon" traditions. But this building at Bradford is a genuine example, and certainly no other style would care to claim a building so crude in design and so devoid of detail. To the historian or the antiquary it is full of interest, as being probably a relic of the Abbey of St. Aldhelm, founded here early in the eighth century.*

In the present day, and to the modern sketcher, more interest will probably attach to the house a little further west, now inhabited by the schoolmaster. It is a small but charming example of a Renaissance front. Nothing could be simpler or less pretentious, and yet we have here a house, hardly larger than a cottage, treated in a monumental manner.

One of the chief sights of Bradford is the "Duke's" or Kingston House, built by a family named Hall about the end of the sixteenth century. Leland says that in his time "Haulle dwelleth in a pratie stone house at the este ende of the toune *in dextra ripa Avonæ*," which would agree, so far as such a vague description can, with the site of the present house. The "pratie stone house" which Leland saw was an earlier building than anything we see now, for Kingston House is a very respectable example of the early Renaissance style, and Leland lived when Gothic was only just beginning to succumb. The Halls had lived at Bradford for a good many generations. Having started with a Reginald de Aulâ, they came, by way of the French equivalent De la Sale, to be plain Halls of Bradford. It is not known whether they were ever engaged in the historic trade of their town, nor can any one say with certainty which of them built the Jacobean house. They eventually died out, and through the female branch their house came into

* Plan, sections, and elevations of this chapel are to be found in vol. v. of the *Wiltshire Archæological and Natural History Magazine*, partly illustrating a very exhaustive paper on Bradford-on-Avon, by the Rev. W. H. Jones.

possession of the Dukes of Kingston, of whom there were but two. The second married a lady with a reputation not altogether to be envied. Princes and nobles were enamoured of her, but it would hardly be worth while to attempt to schedule her suitors together with the meed of success that attended their suits. It is quite enough for us to know that she sometimes lived in her husband's house at Bradford; and let us trust that she did not find it too dull. She married the Duke of Kingston before her first husband died; and, on the death of the duke, his relatives, in vindication of the eternal claims of morality and of needy connexions, caused the widow to be impeached for bigamy before the House of Lords. The trial was most magnificent, and attracted the exclusive attention of the fashionable world. In spite, however, of every proof, the enchanting duchess escaped without serious penalties and without losing her wealth. If, among the "Honourable House" who determined the case, were many of her rejected suitors, her escape is a great tribute to her fascinations.

Her house in Bradford was sold at the beginning of this century to a gentleman who erected a woollen-mill in the grounds by the side of the river. It was cut up into tenements and threatened to become completely spoiled, when, in 1848, it was bought by its present proprietors and carefully restored. Standing, as it does, on a terrace overlooking the valley, it presents a striking example of its style. Quite at the other end of the town, in a little suburb called Barton, stands a fourteenth-century barn, said to have been a tithe-barn, but which is also ascribed to one of the Hall family. If Mr. John Aubrey, who saw the place in the latter part of the seventeenth century, is right in thinking he saw on it the device of a hand holding a battle-axe, it is not at all improbable that a Hall did build it, since the hand with the battle-axe is their crest. The barn is like most others of the same date, well furnished with bold buttresses and long narrow slits to admit light and air. It has two transepts, each containing a large pair of doors, and a little one at the side, now fastened up. The whole building is striking and stately, though not so elaborately ornamented as those at Glastonbury, Pilton, or Doulting. Its enormous size serves to bring vividly before the imagination the fact that at one time tithes were paid in kind.

Besides these particular beauties, Bradford possesses a great number of eighteenth-century stone houses with handsome fronts,—an echo, probably, of the prosperity of the city of Bath, which is only some eight miles off. There is also, both here and in all the neighbourhood, a good deal of unpretentious iron-work, chiefly displayed in public-house signs. It all shows marks of the taste of last century (fig. 1).

Another feature of frequent occurrence is a stone porch or hood to the cottage doors. It consists simply of a moulded slab supported by two shaped brackets. The moulding of the slab and the shape of the brackets vary to a certain extent, but the type is the same everywhere, and frequently occurs in very small cottages which have no other architectural pretensions whatever.

About three miles to the north of Bradford is the village of South Wraxall, where the church, with its foreign-looking tower, at once attracts attention. The tower is the most picturesque feature of the building. Inside there is little of interest; but nevertheless every church ought to be entered, for what pleases one man has no attraction for another, and *vice versâ*. This church has been restored, and that might delight some people. Beyond the church, across some fields, and so far away as to engender a feeling of resentment at its being called South Wraxall at all, lies the Manor House. This was for many generations the seat of the Long family, some of whom lie obscurely buried in South Wraxall Church. The Longs seem to have owed their existence primarily to the Hungerfords, a powerful family living some five or six miles away at Farleigh Castle. Leland says that "one Long Thomas, a stout fellow, was set up by one of the Lords Hungerford; and afterwards, because this Thomas was called Long Thomas, Long was usurped for the name of the family." But whether this be so or not, it is very clear that the Longs were quite capable of taking care of themselves, and had a strong determination to see themselves well housed. The Manor House is a large rambling place dating chiefly from the fifteenth century. It is entered by a gateway having an oriel over it, and leading into a large quad, on two sides of which spread the buildings with cusped and mullioned windows. Most of them are empty, and may be visited on payment of a small fee. The exterior cannot boast much delicacy nor picturesqueness. The detail is a little clumsy, and the general effect appeals more to the artist than the architect; but inside there is a rich mine of work,—very late, it is true, but of great interest to all but unhappy pure Gothicists.

There are four or five fine chimney-pieces; a beautiful Jacobean screen, *in situ*; much wood panelling, stone niches, iron casement fasteners (figs. 2, 3, 4), and other delights, all to be sketched without let or hindrance so soon as the palm of the attendant sybil has been crossed. The chimney-piece in the hall bears the date 1598, which probably marks the time of the erection of all the late work. Another chimney-piece, upstairs, is an elaborate and handsome affair, reaching from the floor to the panelled plaster ceiling. It is throughout a mass of carving treated in a strictly architectural way, though much might be said as to the forms which have been used. In the over-mantel are four figures representing Prudence, Justice, Arithmetic, and Geometry. Arithmetic is thinking hard, while Geometry is very busy measuring a globe with some robust dividers. Two other rooms on the same floor have remarkable chimney-pieces, and over them all is a plentiful sprinkling of sententious Latin mottoes or posies, of which one states the well-known fact that "Death seizes all." In another part of the house is a panelled room in which are various pilasters with pedestals bearing a very charming design. The legend goes that Sir Walter Raleigh used to live here when he visited South Wraxall, and that it was in this very room that the first tobacco was smoked in England. But that reflection, though it may add interest to the house, in no way affects the detail. In this room, too, there is a good chimney-piece, at whose yawning chasm Sir Walter may possibly have lighted his pipe; and perhaps he knocked the ashes out against the little shields in the spandrels.*

## THE "CAISSE DE DÉFENSE MUTUELLE" IN FRANCE.

The following *resumé* of the position among French architects in regard to the idea of a combination for the mutual defence of their professional interests was actually laid by M. Achille Hermant before the Congress of French Architects some months ago, the proceedings of which we reported at the time at some length,† but were compelled to omit some papers of much interest, for the report of which space could not be spared at the time. The interest of this view of the subject by a French architect is, however, exactly the same to our readers as it would have been then; it may furnish hints to English architects in regard to what should be their attitude towards each other and towards the public, and we need, therefore, make no apology for printing it now. We may premise that the full definition of the subject is "La Création, sous le patronage de la Société Centrale, d'une Caisse d'Assistance judiciaire, ou mieux de Défense mutuelle, destinée à venir en aide à ceux des membres de cette association qui se trouveraient engagés dans une procès par suite de faits relatifs à l'accomplissement de leur mandat, lorsque de ce procès pourra resulter une décision judiciaire sur une question de principe ou d'intérêt général pour la profession d'architecte":—

Before entering on the main question itself, M. Hermant showed that it was naturally connected with the views expressed by M. Wollon at the last conference on the subject of public competitions, and he pointed out how unfortunate it would have been for the whole body of architects if, through hesitation or want of means on the part of those immediately concerned, MM. Malpieu and Montier, in 1846, and M. Henri Parent in 1882, had not obtained the two remarkable decrees of the "Cour de Cassation," so valuable to our profession, in that they limit the responsibility of the architect and the time during which he may be sued. M. Hermant reminded his hearers that the case of the "Comte de Bearn contre Henri Parent" lasted nearly ten years, and that the defendant was obliged, with varying results, to go before the "Tribunal civic de la Seine" and the "Cour d'Appel de Paris," and afterwards to the "Chambre civile de la Cour de Cassation," then to the "Cour d'Appel d'Amiens," to return to the "Cour de Cassation," but before the "Chambres réunies," which last issued at length a decisive decree.

What, said M. Hermant, would have been the result if in the place of M. Parent, a man of distinguished position, there had been a young man of little experience and unable to defray the expense of such a law-suit, and who, after gaining more or less advantage in the course of the transaction, would have been forced to withdraw without bringing the Supreme Court to a decision?

The proposed "caisse," on the board of which are Messrs. Rolland, president, and Chas. Lucas, secretary, involves the formation of a society with a special aim, and distinct from the Central Society, though supported by it and including a great many of its members.

We give below the principal articles of the proposed statutes:—

Art. 1.—An association of professional architects is founded, by application of the law of March 21, 1884 (law of professional syndicates), under the patronage of the central Society of Architects, for the defence of professional interests involved in suits by or against members of the association before judicial or administrative tribunals. This association will be entitled:—"Caisse de Défense mutuelle des Architectes." It will be constituted when it shall have received the adhesion of 300 members. It will have its centre in Paris.

Art. 2.—This association has for its object to defray the costs incurred in defence of their rights by those of its members engaged in legal proceedings,—by reason of the exercise of their profession of architect,—when the proceedings relate to a question of professional interest. The association will hold aloof, on the other hand, from disputes relating to questions purely personal.

Arts. 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 relate to the recruiting of the Society and its resources, and to its administration by a committee.

Art. 13.—Every application addressed to the association must be accompanied by,—1st, a memorandum containing a complete statement of the subject; 2nd, all documents necessary for the examination of the same. The candidate may offer explanations in person to the committee, or appear through a representative of his own choice. The decision of the committee will be given, at latest, during the month following the receipt of the formal application, unless a delay be necessary to ensure more ample information.

Art. 14. The application may be preferred at any stage of a suit, and on any ground which the candidate may think proper in the case in which he is interested. If a valuation has been directed, the applicant may demand the appointment by the committee of one of their members to assist in the valuation, and to draw up a report to the committee before it decides on his application.

Art. 15. The committee will decide to accept or reject the application; but it may, in exceptional cases, admit it in part. In all cases it will reserve the right of adjusting, in due proportion, the expenses to be defrayed by the "Caisse de Défense mutuelle." The decision of the committee will be final.

Art. 16. The acceptance by the committee of an application will bind the "Caisse de Défense mutuelle,"—first, to contribute to all judicial expenses, fees of advocates and attorneys, and the cost of the valuation or survey which the associate may have brought forward on his account; second, to indemnify him for judgments in costs, and expenses of the valuation or survey made by the other parties, and operating against him. If, after a negative decision of the committee, the character of the suit should be modified so as to raise a new question of professional interest, the associate interested may renew his application, which must be re-investigated; or the committee may in this case make a new decision without the application being renewed. The committee should have the new question brought under its consideration before the associate interested carries or accepts discussion before a new jurisdiction. In this case, the application and documents should be addressed to the committee, and it will decide

* To be continued.

† See *Builder*, vol. xlvi., pp. 893, 941.

with the least possible delay, so that the applicant may be able to act in good time.

Art. 17. Associates reserve the free choice of council under all jurisdictions.

Art. 18. The costs of judgments pronounced against associates on the main points will in all cases be defrayed by themselves. Judgments for costs which they may obtain should, after being paid in, revert to the "Caisse de Défense mutuelle," to the amount of its advances.

The projected statutes terminate by divers articles relating to the modification of the statutes and the dissolution of the Society, and after the reading of them, M. Hermant proposed that, as was done by the Central Society of Architects met in council and general assembly, the Congress should also adopt the principle of co-operation applied to the defence of professional interests, reserving discussion of the question and its details to a future occasion.

The question was raised at the time by a speaker, who in general supported the project, whether there were anything analogous to the proposed "Caisse" in other professions, and in reply, the existence of the "Chambres syndicates de Patrons et Ouvriers" was cited, and also of other professional syndicates, which were established with the view of defending the general interests of the profession, or the special interest of members; and further, the great moral support given by the order of advocates to each of its members, as against the magistracy. In a somewhat similar manner the *esprit de corps* of the profession of the Bar in England has been cited as an example which might be well followed by the architectural profession in this country.

Since the French Congress at which the subject was discussed, the rules and statements of the method of action of the proposed society have been printed for circulation, and probably we may hear further of the subject before long.

## SEMPER'S THEORY OF ARCHITECTURAL ORNAMENT.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary meeting of this Institute on Monday evening last, Mr. David Brandon, vice-president, occupied the chair, in the absence of the President, who had accepted an invitation from the Architectural Society at Leeds.

Mr. Lawrence Harvey read a paper on "The late Professor Semper's Theory in Relation to Architectural Ornament." Semper, he said, before beginning his book, gives his theory of beauty, so that his readers may know the exact meaning he attaches to the terms he employs. After giving his definitions of science, religion, and art, he states that on the general lines of nature are founded architecture and music, which are therefore cosmic, and not imitative, arts. The imitative arts, even the feeling for the beauties of nature, he contends, are dependent on these cosmic arts. A man of culture, in looking at nature, conjures up a scene, by which he completes what he sees into a harmonious whole; this is exactly what the painter, the sculptor, and the architect do for us, and as we gaze at their creations we forget for a moment our own selves, and are lifted above the imperfections of existence. In nature and art an object stands out clearly before our attention, when it has individual characteristics; but when the object is scarcely distinguishable from its surroundings, our impression is blurred. In the lowest forms of creation,—crystals, for instance,—the individuals are entirely disconnected with the rest of the universe; they have nothing in their shape which relates to surroundings. The centre of a crystal is the centre of an attraction to which all its parts converge, and around which they distribute at regular intervals, thus illustrating the law of Eurhythmus, which we obey whenever we wish to cut off an object from its surroundings by a frame, and thereby heighten its importance, be the object framed the neck of a fine lady, or the rude mystic symbol of a Druid's temple. A Eurhythmical object raised on one of its sides forms, in relation to its basis, a symmetrical figure. Plants give us the idea of proportion as the result of the conflict between their vital power and the attraction of the earth. In animals we find another characteristic of individuals viz., direction, a result of the conflict between their will and the resistance of either inertia or the medium in which they move. Eurhythmus, symmetry, proportion, and direction are the fundamental elements of form. In nature is also found the law of subordination, and artists, like nature, are wont to indicate the purpose of their works by subordinating symmetry to proportion and attraction, or *vice versâ*. Many authors, in searching for the origin of architecture, have started with the idea that simplest forms are the oldest; but just as it has has been found in the comparative study of languages, that our poorer dialects are the descendants of richer stocks, so it is with architecture, what seems to be primitive is only derived many times over. In the research into the origin of architectural forms, chronology is no guide,—a primitive form of art may endure in one country centuries after it has entirely disappeared from another. The Egyptian bas-reliefs, which are older than those of the Assyrian palaces, yet belong to a later development of art; their apparent stiffness and primitive simplicity are designed in accordance with the religious principles of the Egyptian priests. Wherever traces of monuments are to be found, of whatever time and country, certain features can be observed, which, however modified, are essentially the same. We may conclude therefore, that these features are older phases of social organisms, consequently the primitive features were borrowed from the processes of the technical arts and trades. They obtained a symbolical meaning, religious or ornamental, but nevertheless their original purpose has never been entirely forgotten, and still influences the architectural features of our day. To the study of the formation of these types we must turn our attention if we want to catch architecture at its source. Every work of man is the result of two primal conditions,—firstly, the purpose he wishes to serve, and secondly the stuff or material, and also the construction and technical processes, he employs. As the purpose of all work remains the same in all times, being based on the wants of men, which change not, the study of the influence of purpose on the form of the objects leads to the consideration of their general shapes. On the other hand, the materials and the technical processes change in the course of time. In discussing how they modify our works we discover what we call style; that is to say, rules special to each case. A band, for instance, is a strip of stuff wound round something to bind it. This is the general character of a band; but how a band is to be fashioned, according as it is made of flax, leather, or metal, is a question of style. There is a third element which enters into the formation of the works of men, an element which varies infinitely, and therefore affects style; that element is the degree of culture, particularly the religious, philosophical, and political theories of the men for whom and by whom different works and objects are made. This is a big question, which Semper reserved for the second part of his work on Style, which has never been published. The writer then went on to classify the technical arts and trades, dividing them into (1) the Textile Arts, (2) Ceramic Arts, (3) Tectonic (Carpentry, Joinery, &c), and (4) Stereotomy (Masonry, Carving, &c.). Carpentry, according to Semper, is applicable not only to works in wood, but to some structures in stone, as in Greek architecture, and to some forms of metal construction. Stereotomy comprises carving of any hard metal, and even modelling. As for the textile arts, they are connected with ceramic art in tile pavements, with carpentry in lattices and wainscoting, and, in fact, with all parts of architecture by the principle of clothing constructional parts, a principle which is the primary idea of all decoration. Semper succeeded in showing that the clothing principle governed the arts,—and especially architecture,—up to the Gothic period, when, according to him, the building principles of antiquity were abandoned. The ancient Gothic architects emphasised the constructional parts of a building by making it wear, according to Semper, its ribs outside its skin. When textile products are used in the form of surfaces they serve the purpose of covering, protecting, and inclosing, and as such are the oldest representatives of those abstract ideas. They are, says Semper, the primitive models of our floors, ceilings, and walls, and, starting from this point of view, he devotes many chapters to the treatment of architectural details. In any room the most brilliant effect of colour, he maintains, should be reserved for the ceiling. There are many reasons for this; firstly, the surface of the ceiling is not disturbed by any utilitarian purpose such as are the walls. Thus a painting on the ceiling is never too close for proper inspection; hypercritics cannot pry into details, and the impression on the spectator is as vivid as it is necessarily cursory. Pictures on the walls, on the contrary, are blurred by the chromatic spectrum of complementary colours, which we perceive whenever we fix any given colour too long. Speaking of colours, Semper says, there are only two systems of decoration; the one rests on the equiponderation of colours by which a richly homogeneous, yet quiet, effect is produced; the other is the Greek principle of subordination, wherein colours are toned so as to bring out a culminating effect or climax. The process of sewing teaches us an important principle of design, never to place pictorial subjects, be they painting or sculpture, in a part which has a constructional purpose, but to reserve them for neutral fields, such as the pediments and metopes. The knowledge of the knot probably preceded that of sewing, and, curiously enough, the knot is to be found in all countries as a religious symbol. The button is also a kind of seam, and may be the prototype of rivets and rosettes. To the wearing of skins of beasts can be traced the heads of Egyptian gods, as well as the masks and other animal attributes used in antique architecture and furniture. A comparison of ornamental leather wares with our own is an excellent study to initiate us into the refinements of good style, and thereby is indirectly useful to the study of architecture. To the introduction of silk from Babylon we owe the mystic beasts or monsters so often found in Byzantine ornamentation; gold brocade in which there is a brilliant surface as a background to a still more brilliant pattern; damask or ornamentation based on gradations of gloss, reminding us of Moorish architecture; satin and velvet, the special delight of the Renaissance, as shown in the paintings of Titian, Paul Veronese, and Holbein. The textile products are the leaders which have fixed the chromatic scale of coloured decoration. The connexion between costume and architecture is of two kinds: on the one hand, architecture derived the style of its ornament from dress; on the other hand, it bears with dress the impression of analogous influences, such as the taste, character, and civilisation of a people. The paper then referred at some length to the clothing principle in architecture and to the important position which China holds in regard to the study of the origin of art. Could we see Pompeii as it was 1,800 years ago it would strike us, in many respects, as very Chinese! The opinion that India is the cradle of mankind does not agree with the tale told by its architectural remains, which point to a mixed style derived from various sources. When the oldest written documents are consulted it is found that Indian art was most complicated and rich in forms; wood, brick, stone, metal, and stucco were already in use, and each of these materials brought its contingent and special features. But the one which seems to have had the greatest influence on Indian architecture is stucco, for the over-laid ornamentation on Indian monuments is nothing but stucco work laid in stone. The paper described a Buddhist Convent in Ceylon, built about 200 years before Christ, — brick buildings supported on stone columns 12 ft. high, portions of the structure being covered with the most precious materials; the columns decorated with sculptures of lions and other beasts, as well as gods. At the present time one could see these columns with traces of stucco, which proves that the sculpturesque ornamentation spoken of in the description was obtained by stucco. Semper is induced by this discovery to enunciate the very bold hypothesis that the dolmens and stone circles of Stonehenge and Brittany were but the kernel of stucco structures. They are, to what existed, just what the iron framework of a clay statue in a sculptor's studio is to the statue itself. Referring to later times, the lecturer said that while smiling at the clothing of columns, we little thought that the column itself was but the clothing of a post, hull over hull, such is Semper's definition of the progression of art. The fact that Classic architecture needs the help of upholstery Semper reckons as a great point in its favour, as a means of heightening the effect of a building on great occasions. Reference was next made to the art of Chaldea, and the clothing principle as expressed in the alabaster

dados which decorate the walls of the interior chambers of Nineveh. The Assyrians appeared to have used metal, either hollow or as casing, on wood framing, thus forming a strong contrast to the Egyptian metal-work, which was solid, and made in thin bars. The metal plating and hollow work appeared under three forms: firstly, on square framing; secondly, a circular section of kernel with corrugated plating; and thirdly, a plating of thin metal pressed out on a lathe like tinware, and used only for vertical supports. A very much later example of the evolution of metal-work out of the casing of woodwork could be seen in the case of two bronze doors at Rome,—the one, from the temple of Remus, followed exactly the original wood panel construction; the other, from the Pantheon, presented outwardly the appearance of panel work, but was really made of one piece of hollow metal. In an upper room of St. Sophia there is an example of metal casing such as was probably used by the Assyrians. The clothing principle had evidently been applied to the construction of the terraced walls of Assyria. Semper concluded that the bricks were laid together on the floor after being sun-dried, and the whole surface was then painted over with enamel colours. When the colours were dry, the bricks were built up in their proper position on the wall, according to the numbers marked on their backs, and the colour was burned in by making a large fire within the chamber, so that the invention of burning clay to harden it into brick may be due to the experience obtained in fixing the colours thereon by fire. What the colour of the alabaster relievos might have been it was impossible to say, but Semper felt assured that they were left neither naked nor coloured, like the Assyrian Court of the Crystal Palace. He was inclined to believe they were gilt, and decorated with encaustic wax colours. Reference was made to the description of Ecbatana by Herodotus, in which we find there were seven concentric walls, rising one above another, each painted with a different colour, viz., white, black, purple, blue, orange, silver, and gold. Mr. Harvey referred to the stone-work of the Temple at Jerusalem, which Josephus affirms had a casing of wood and gold. The clothing principle was an essential characteristic of the Pyramid The lecturer also touched upon the history of Roman architecture, which, like that of the Roman Empire, was split into two portions. The Christian architecture of Byzantium was the old Roman architecture invested with the spirit of an Oriental court. In the West the church was not only free, but mistress. The sensual decorations of pagan art were abandoned, and as the structure could be bared of its clothing, the construction and the material rose into artistic importance.

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In the course of the discussion which followed,—

Mr. Geo. Wallis (South Kensington Museum) said he had the pleasure of being associated with Semper during the time of his connexion with the Science and Art Department. Semper's views were comparatively new in England. The fact was that from 1836, the period at which the Parliamentary Committee was formed to inquire into the relation of art and manufactures, there had been a considerable agitation as to the necessity for schools of design and museums. Therefore when Semper came to England he found a small body of men who could sympathise with him in his efforts. The centre of this body was the late Prince Consort, who, he believed, was the means of bringing Semper to England. Semper's views were considered novel by those who, like him (the speaker), had been studying the question not so much in relation to architecture, as in its bearings on the textile manufactures. At that time there were many points in Semper's theories which he could not quite see his way to accept, but the Professor's earnestness and zeal made him feel that it was rather for him to inquire than to dispute. Semper's position was practically experimental in this country, but men like Sir Digby Wyatt and Owen Jones associated with him, while not accepting his theories. His was a voice really crying in the wilderness, and in the end he accepted the offer of a professorship at Zurich. Some of his theories in relation to the origin of design were rather far-fetched, but there were others again which seemed to be perfectly true, and worthy of every consideration and study. An English translation of the book would be of immense value at the present time to those arts in which they were all more or less interested.

Mr. Slater remarked that some of Semper's conclusions appeared to him very startling. He had only had the opportunity of glancing through the book, but it seemed there were two or three points to which it led. The great thing was the importance of textile manufactures. In any inquiry into the life of early nations, all students had come to the conclusion that a great deal would be gained by an examination of the savages who at the present time are in a condition somewhat analogous to the early inhabitants of the earth. All savage tribes have a passion for personal adornment, so that Semper was doubtless right in saying that the adornment of the person was the starting-point of ornamentation' generally. Semper said that clothing was the starting-point for ornament, but as civilisation had spread from warm climates where clothing was not a necessity, to colder ones where it was, it seemed a striking instance of a man letting his theory run away with him. It seemed to be an inversion of the whole thing to say that the discovery of tattoo marks on some savages of the present day, similar to certain figures on antique metal-work, showed that the tattooing was the descendant of the more cultivated forms. With regard to the evolution of columnar architecture from wooden forms clothed with metal, Semper seemed to argue from the statue to the column. At the time of Pericles, Pheidias, in his two great works, used not stone, but metal, ivory, and various other things to represent the figures. They did not know the reason for this, but there must have been one for the sculptors of Greece at the height of its art and prosperity choosing to do this. Twenty-five years, however, before the time of Pheidias, temples were existing with stone columns, and nothing to show that their forms had been covered with bronze. He agreed with Semper that clothing was the origin of everything as far as colour was concerned. Mr. Slater concluded by proposing a vote of thanks to Mr. Harvey.

Mr. Stannus thought it possible that Carlyle's "Sartor Resartus," which appeared shortly after Semper's book, might have been intended as a satire upon it. The book would be exceedingly valuable if it gave more *technique*. The world would not stand still to learn archæology or to read books on evolution. At the same time Mr. Harvey would be doing a good work if he translated Semper's book.

Mr. William White, F.S.A., seconded the vote of thanks, which was carried by acclamation.

Mr. Harvey, in replying, said that about fifteen years ago he had a great many doubts as to Semper's theories, but the more he investigated them the more he got sucked into the theories, so that now he was a believer in them. This was the best answer he could make, for if they studied Semper's book they would go further on his road than they had anticipated.

## Illustrations.

### DOORWAY OF "LA MADELEINE," VÉZELAY, YONNE.

THE French Government instituted, about four years ago, in the left wing of the Palace of the Trocadéro, at Paris, a museum of casts chosen from amongst the finest specimens of ancient sculpture (from the eleventh to the sixteenth century). This museum, in which things are methodically classed according to the system employed by the late Viollet-le-Duc, is called "Musée de Sculpture comparée," or "Musée Viollet-le-Duc."

The visitor, on entering the first hall, in which the casts from sculptures of the eleventh and twelfth centuries are exposed, has before him a magnificent double doorway, which occupies all the further end of the hall, and through which the neighbouring hall opens. This doorway is the reproduction of that of the abbatial church of the Madeleine, at Vézelay, in the department of the Yonne. The doorway has been so cleverly executed that one would really believe that it had been brought stone by stone from Vézelay, and re-erected in the Palace of the Trocadéro. The colour of the stone, the weather-beaten tinge, the very mouldiness caused by the damp, all has been reproduced with marvellous exactitude.

The casting of the whole doorway occupied the artists and their workmen about four months. I was at Vézelay at the time, and followed the whole operation with the utmost interest.

The sculptures that decorate the tympanum are very curious indeed, and of great decorative effect. They are, moreover, very much more interesting when seen close by than when taken as a whole from some distance. Each fragment as it was cast disclosed many interesting details that were altogether lost when seen from afar. New discoveries were of daily occurrence,—curious details in the costumes, the shoes, instruments, jewelry, &c. Amongst other things, we may remark a reaper with a scythe, similar to those still in use, a flail of quite modern aspect, and shoes which seem to have been copied from those of the neighbouring shoe-shop.

The artist engaged in this most interesting work having kindly put at my disposal each fragment as it was cast, I was able to copy them, and I published in the journal *L'Art*, of Dec. 15, Dec. 24, 1882, and Jan. 14, 1883, a series of thirty-six drawings, with a notice by M. Havard, which highly interested the artistic world.

"La Madeleine" was the church of the abbey of Vézelay. The abbey was founded and erected primitively at St. Père-sans-Vézelay by Gerard of Roussillon, who, as M. Havard maliciously relates, "was taken, at the close of a somewhat troubled life, with one of those fits of devout fear that have so often proved profitable to the Church, and also to the faithful servants thereof."

Pillaged and destroyed in the ninth century by the Normans, who, after having ascended the Seine and the Yonne, ravaged also the valley of the Cure, the abbey was definitively erected on the hill-top, so as to be more easily guarded and defended.

The liberalities of the pious and candid pilgrims that from all quarters assembled to pay their devotions to St. Mary Magdalene, and never failed to leave a peace-offering, soon gave riches and renown to the abbey. It was visited by King Charles VII., by St. Louis, Philippe-Augustus, Richard Cœur-de-Lion, king of England; Thomas-à-Becket, archbishop of Canterbury; and other personages of mark. Many of the high barons, on their way to the Holy Land, passed through Vézelay in order to visit the celebrated shrine, and also to procure money from the numerous bankers and money-changers that resided in the town.

The doorway of the Madeleine, of which we are speaking, dates from about the middle of the eleventh century. It gives entrance from the narthex or church of the catechumens into the principal church, by a double opening The two halves of the doorway are separated by a pillar of most exquisite style, which supports a statue of St. John the Baptist, holding in his hands a mutilated disk. This disk was originally a broad nimbus which surrounded a Pascal Lamb, fragments of which are still to be seen.

Above the pillar and jambs there are two lintels, on which are sculptured a goodly number of personages, which have puzzled archæologists for many a day, and of which even M. Prosper Merimée was obliged to declare himself unable to furnish a plausible explanation. What could the artist have meant to represent by these long-eared folks, or this other personage with a shell on his head, or, again, by this stunted dwarf, who must needs use a ladder to mount upon horseback? (*See Illustration.*)

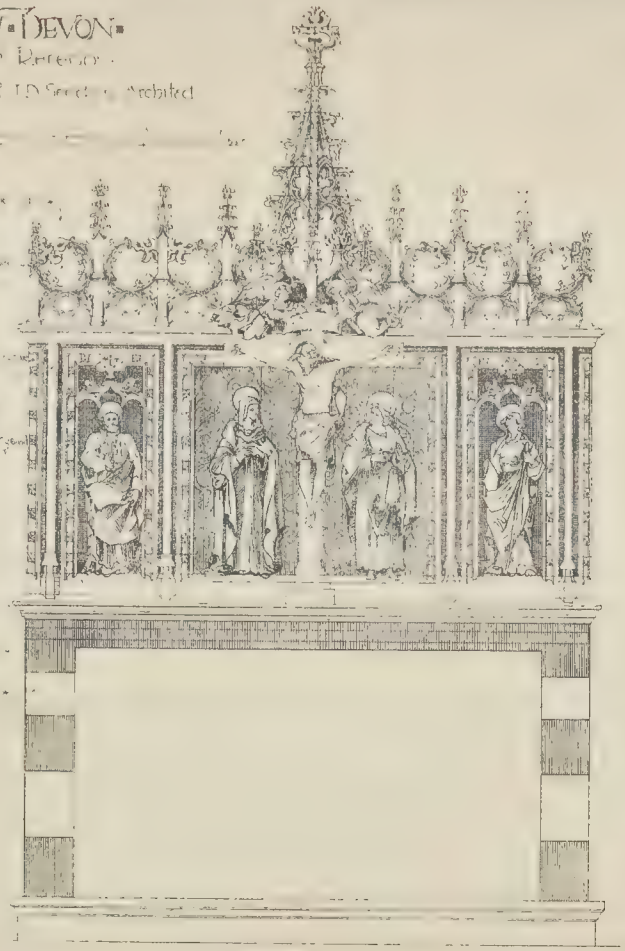
In the centre of the tympanum Christ is represented in considerable dimensions, surrounded by the twelve Apostles, each having a nimbus. This statue is clad in the ancient *peplum*; the Apostles are robed in Oriental garments.

Above this magnificent tympanum there are three archivolts. The first is divided into eight "Passions," in which are represented different scenes and figures, more incomprehensible still than those on the lintels; scribes are to be seen leaning their "scriptional" or writing-table on their knees; human bodies with animals' heads, others with almost human faces, only adorned with pig-like snouts; one personage is arrayed in Persian attire, another looks like a Russian moujik, others have ancient Roman garments, and others still, standing upon high clogs, are dressed somewhat like modern Turks, and bear great resemblance to the natives of the countries that lie around the Black Sea.

# MEAVY · DEVON ·

Design for Reredos

Mr J D Sedding Architect



Elevation



Section




SCULPTURE FROM DOOR OF NARTHEX, LA MADELEINE, VÉZELAY

DRAWN BY M. ADOLPHE GUILLON

Wyman & Sons Photo Lith

6 Queen St London WC

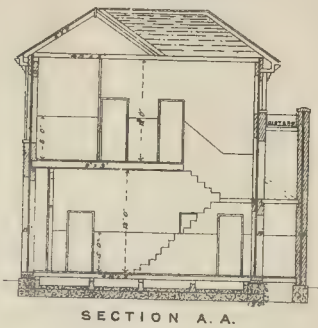
# SANITARY HOSPITAL FOR THE DISTRICT OF THE BOURNEMOUTH COMMISSIONERS.

G. R. Andrews. Surveyor. Jan.y 8th 1884

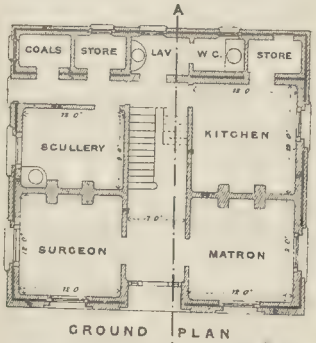


N.W ELEVATION

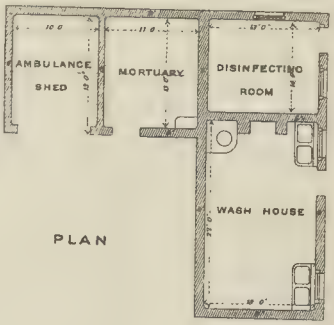
ADMINISTRATIVE BUILDING



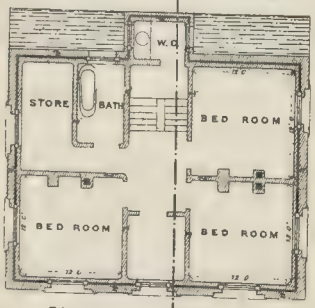
SECTION A. A.




GROUND PLAN




PLAN



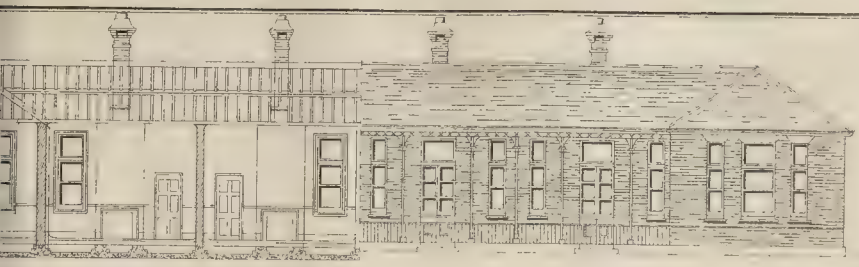

FIRST FLOOR PLAN



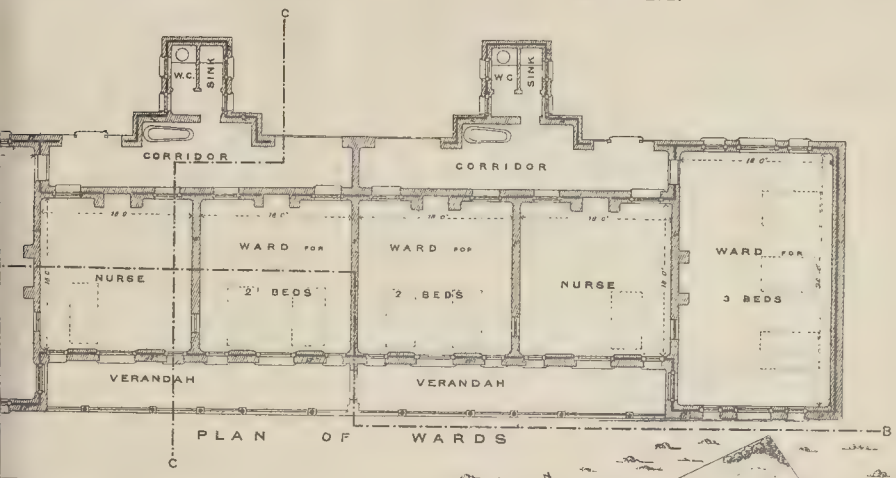
SECTIONAL ELEVATION

Scale to Plan and Sections 10 3 0 10 20 30 40 50 60 70 80 Feet

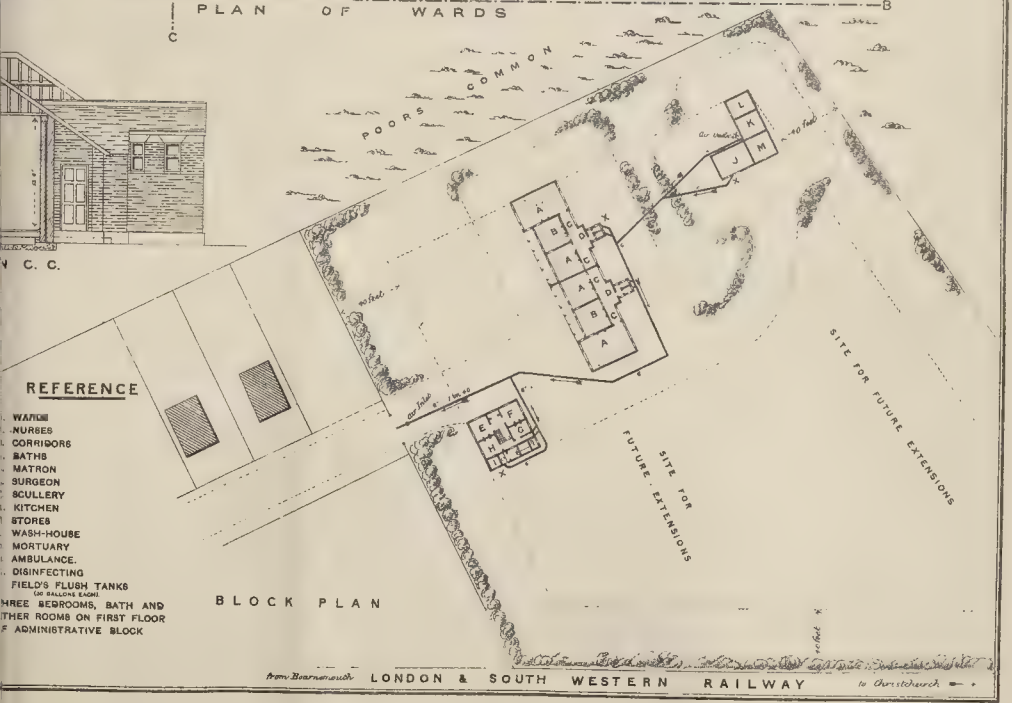
Scale of Block Plan 100 50 0 100 200 300



SECTIONAL ELEVATION OF WARDS B.B.




PLAN OF WARDS




N C. C.

REFERENCE

. WARDS
. NURSES
. CORRIDORS
. BATHS
. MATRON
. SURGEON
. SCULLERY
. KITCHEN
. STORES
. WASH-HOUSE
. MORTUARY
. AMBULANCE.
. DISINFECTING
FIELD'S FLUSH TANKS
(50 GALLONS EACH)
HREE BEDROOMS, BATH AND
THER ROOMS ON FIRST FLOOR
F ADMINISTRATIVE BLOCK

BLOCK PLAN

from Bournemouth LONDON & SOUTH WESTERN RAILWAY to Christchurch

"Queen" London WC



·BEDSTONE·COURT·SALOP
the residence of the late Sir HENRY·W·RIPLEY·Bart. Mr Thomas Harris FRIBA Architect









SCULPTURE FROM DOOR OF NARTHEX, LA MADELEINE, VÉZELAY.

DRAWN BY M. ADOLPHE GUILLON.

Wyman & Sons Photo Litho

Green St London WC







SCULPTURE FROM DOOR OF NARTHEX, LA MADELEINE, VÉZELAY.

Drawn by M. Adolphe Guillon.

Wyman & Sons Photo Litho

Queen's London WC

The diversity of these figures led M. Viollet-le-Duc to the belief that this tympanum meant to represent all the different peoples of the earth called together by the Apostles in order to hear the teachings of the Divine Master.

The second "archivolt" is composed of twenty-nine "medallions," in which are represented alternately the signs of the zodiac and agricultural scenes, particularly the culture of the vine and of corn. In the first of these medallions we see a man about to cut a slice of bread with a long knife, and in the last a personage clad in fur holding a cup of wine. This latter one is surrounded by a Latin inscription: "Omnibus in membris designat imago decembris."

The third voussoir is composed of a rather heavy ornament of great decorative effect.

The church of Vézelay is one of the rare specimens of Romanesque architecture bequeathed to us by the great school of Cluny. The sculptures of the doorway, very remarkably executed, partake somewhat of the style of Byzantine art, but they are certainly not the work, as some are inclined to suppose, of Greek artists, brought to this country by the noble crusaders when returning from the first crusade. The tendency is Byzantine, but the execution Burgundian. The clever and naïve sculptors were undoubtedly our fellow countrymen; they took inspirations from paintings, enamels, and such like brought from Eastern countries, but they interpreted them, as it were, in their own manner, with their own "temperament," and this it is that gives to this work its great originality.

In short, the doorway of the Madeleine of Vézelay is one of the finest architectural pieces of the museum of the Trocadéro, which museum is destined to expose to public admiration specimens of our ancient national sculpture, our old French school of architecture, so fertile, so bold, and to which we owe so many precious monuments that hold an important rank in our artistic and national riches.

*Paris.* ADOLPHE GUILLON.

## BEDSTONE COURT, SHROPSHIRE.

THIS mansion, built for the late Sir Henry W. Ripley, bart., stands about midway between the Hopton Heath and Bucknell Stations on the Swansea line of railway, on a knoll overlooking the valleys of the Clune and Terne, and forms a picturesque feature in the landscape viewed from the railway. It is approached by a new road through a deer park that has recently been formed, which road is entered from the main road, through ornamental gates of wrought-iron, flanked by a lodge in character with the mansion.

The house occupies three sides of a square, the entrance facing the east, the reception-rooms the south, the offices lying to the north.

The building is designed in the Early English half-timbered style, but to which has been imparted a Jacobean feeling. The brickwork is executed in red bricks from the Lilleshall Company, with quoins and dressings of Grimshill stone, and the roofs are covered with tiles, supplied by the Coalbrookdale Company.

Internally the treatment is Jacobean, and the reception-rooms are appropriately fitted up and elaborately decorated, whilst to all the apartments a special character has been given by a judicious introduction of such features as wooden chimney-pieces, moulded dados, panelled ceilings, and stained glass, the subjects chosen for the windows being suggested by the use of the respective rooms.

A reference to the plan (which will appear in our next issue) will sufficiently explain the arrangement and accommodation of the mansion.

The building was erected by Messrs. Cubitt & Co., of Gray's Inn-road, from the designs and under the superintendence of Mr. Thomas Harris, architect, of Gray's Inn-chambers, High Holborn, Mr. R. Old being his clerk of works. The internal fittings and much of the furniture was executed from the architect's designs by Messrs. Marsh, Jones, & Cribb, of Leeds, and the decoration and stained glass by Messrs. Campbell, Smith, & Campbell.

We will give another view, as well as the plan of the house, in our next.

## SANITARY HOSPITAL, BOURNEMOUTH.

THIS sheet of drawings shows the general plan and arrangement of the Hospital, which was designed for the Bournemouth Commissioners by Mr. G. R. Andrews. The external walls are built hollow, with a space of 3 in., bonded with hoop iron to internal 4½ in. walls, which latter are built in cement. Boyle's air-pump ventilators are affixed to each ward on the centre of roofs for extraction, and Ellison's radiator ventilators in the external walls for inlet. Nothing is said as to warming the fresh air on admission.

## REREDOS, MEAVY CHURCH, DEVON.

MR. J. D. SEDDING, ARCHITECT.

THIS reredos was erected in the Church of St. Peter and St. Paul in August last. The moulded framework is of a light greenish marble from the Yealmpton quarries. The panels are of alabaster, and the sculptured figures of white statuary. The work was executed by Mr. Seale, of Cold Harbour-lane, Brixton, from Mr. Sedding's designs.

ILLUSTRATIONS of a Villa at Wargrave-on-Thames, and of Old Houses at Boppard and Cochen, are unavoidably postponed.

## BRITISH MUSEUM LECTURES.

MR. BOSCAWEN delivered, on Wednesday, the 10th, the second lecture of the present series in the British Museum. With a view to the accommodation of the especially large audience, the authorities had arranged one of the large rooms in the new wing of the building as a lecture-room. Mr. Boscawen commenced his lecture by pointing out that, as the decipherment of the inscriptions had shown that all the great linguistic languages were represented by tongues using the cuneiform writing as a means of expressing their thoughts, so the researches of explorers had shown that in the population of the land were found representatives of all the great ethnic families of the human race. The reason of this mixture of the population was to be sought in the position with regard to surrounding lands, and its attractive character to nomad wanderers. To the Akkadian coming from his pine-clad and snow-crowned mountains, as to the Shemite from the arid deserts of Arabia, it was alike a garden; and, indeed, as its own records call it, a land "flowing with milk and honey," whose streams are "the waters of fertility." The lecturer then proceeded to set forth the evidence which the monuments afforded as to the non-Semetic origin of the groundwork of Mesopotamian culture. The cities of Nimrod, he said, were but a few years ago mere names wafted hither and thither over the whole of Western Asia; but now the spade of the explorer had brought to light from beneath the grave-mounds of the Chaldean plains, the very bricks which formed the walls of the temples and palaces of the cities of Nimrod. Of the cities forming the tetrapolis, Mr. Boscawen said, Babylon was the only one whose site had never been lost, and Hebrew tradition and modern Arabic still located the site in the mounds of Babel. The explorations carried out by Mr. Rassam at Aboo Hubba had restored the ruins of the city of Akkad, and Mr. Loftus had partly explored the ruins of Erech, the Uruki of the inscriptions which lay buried beneath the mounds of Warka. The last of the cities to be identified was Calneh, and this had resulted from the explorations carried out by Mr. De Sarzec at Til-Lo on the Shat-el-Hie, a small stream joining the Tigris and Euphrates. There the explorer had found bricks and stones bearing inscriptions which revealed the city to have three names, Lagas, Sergulla, and Kulunu; the last of these was the origin of the Kalneh of Genesis. In concluding the account of the primitive city Mr. Boscawen proceeded to point out the important position of the temple. It was the germ, as it were, of the city from which and round which it grew up. In Chaldea, as in Egypt, the foundation of a city was the building of a temple of some king or great man. It was the residence of the patron city-protecting duty, and became, as it were, an embodiment of the city itself. It was the chief court of justice, the school, and civic record office and treasury. Some idea of the immense amount of secular business connected with temples in Babylonia was shown by the mass of inscriptions in the British Museum. From Warka, the ancient Erech, the capital of Isdhubar or Nimrod, Mr. Loftus had brought a series of legal, commercial, and social documents, dating as remote as the twenty-second century before the Christian era, and Mr. Rassam has found in the record chambers of the great temple of the Sungod at Sippara the Sepharvaim of the Bible, over 30,000 inscribed fragments relating to almost every kind of commercial, legal, and fiscal transaction during the late Babylonian (B.C. 606 538), Persian, and Parthian empires. Mr. Boscawen next proceeded to treat of the arts and sciences of those ancient people. The discovery of a neatly-drawn plan of a temple upon a tablet, dating certainly as early as B.C. 2,500, had afforded a clue to the early origin of Babylonia mensuration. It was shown by a cubic rule, discovered with this plan, that the drawing was made to scale, and the proportional divisions of this scale had been accurately estimated by Mr. Flinders Petrie, the able Egyptian explorer and mathematician, and he found that they gave a cubit of 20.$\frac{3}{10}$ in. The divisions of this scale indicated that the ancient Chaldeans had made considerable progress in the knowledge of the theory and properties of numbers. Additional proof of this was afforded by the discovery of Mr. Loftus at Senkereh, the ancient Larsa, the Ellasar of Genesis xiv., of tablets inscribed with tables of square and cube roots from 1 to 60. The adoption of the sexagesimal scale was another evidence of the Non-Semetic origin of the inventors, and brought them in relationship with the Chinese. It was the use of the scale which enabled them to divide the great circles of heaven into 360°, and the year into 360 days. Mr. Boscawen then proceeded to describe the progress which these people had made in the arts, and his remarks were especially illustrated by the exhibition of some large drawings of the sculptures discovered by M. de Sarzec at Tel-lo. These statues, he said, were not moulded in plastic material or hewn out of soft stone, but were cut out of blocks of green diorite and porphyry, so hard as to turn the edge of the best-tempered chisels. The solution of the problem was not yet clear as to how the work was accomplished, but, judging by the analogy of Egypt, the work was carried out by the slow process of honeycombing with the diamond drill, and cutting away the perforated portion. The use of the diamond as a cutting-stone was proved by a bilingual list, and by such a slow process these great works had been carried out, and years, perhaps life-times, had been spent in their carving. Mr. Boscawen concluded his lecture by drawing a comparison between the two great civilisations of Egypt and Chaldea, and remarked that where, as in the former, priestly conservatism had exercised a fettering influence on literature and art, and stereotyped, as it were, the products of the father's mind, in the latter the nation had gone from step to step advancing along the path of progress until the influence of so rich a leaven was apparent far and wide.

The third lecture was delivered on Wednesday, the 17th, the subject being the "Shemites in Babylonia." The lecturer observed that the high position attained by the Chaldean civilisation and its far-spread influence was due to the progressive element of the Shemitic people in the population, who brought highly receptive, adaptive, and propagating faculties to bear upon the products of the Akkadian mind, and spread far and wide by the influence of war and trade the wisdom of Chaldea. The cuneiform inscriptions from the cities of Southern Chaldea threw threw great light upon the origin and position of the Shemitic element in the population. In the early contract tablets, dated in the reign of the Chaldean king Khammurabi, were found a series of early names which afforded important evidence. After referring to the connexion between these early inhabitants of Chaldea and the Hebrews and Arabs, the lecturer proceeded to deal with the question of the Abramic migration, its date and cause. In conclusion, he illustrated the social life of the people by translations from two legal tablets dating from the twenty-second century before the Christian era.

Mr. Boscawen's lecture on Wednesday, the 31st inst., will be on the "Sacred Books of Chaldea."

**Omnibus and Tramway Men's Benevolent Society.**—The cabmen have long had a society of this kind; the omnibus *employés*, who form in London a very large class, are starting a similar prudential institution, to create annuities for aged and totally disabled men, and to form a fund to assist the widows and orphans of men who are deceased members of the said fund. Mr. H. B. Verity is the secretary.

## TAUNTON CASTLE.

The large hall, 58 ft. 6 in. by 24 ft., on the first floor, to the west of the entrance gateway, which contained the geological collection, has just been considerably altered and improved. Formerly its proportion was bad, as it was only about 10 ft. high, and the light was quite insufficient to show the specimens. Immediately above it came the roof, containing a number of attic bedrooms, the whole of the upper portion of this part of the castle (except the stair turret) having been much modernised. The wooden floor of the geological hall is about a foot above the top of the Norman vaulting to the rooms beneath, but restoration of the original level would be too costly at present; this must be deferred till a future time. The attic bedrooms have been swept away, a high-pitched roof with massive trusses having collars and king-posts put, the underside of the common rafters covered with boarding, and dormer windows (made to open) inserted. It is externally covered with tiles. The decayed plastering has been removed from the walls, and a considerable part of them rebuilt or faced with brickwork in cement, well tied in, and the rotten wood linings &c., of the windows removed. By the abolition of a modern fireplace at the north end of the hall, it has been possible to open out two thirteenth-century lancet windows, one of which had been nearly destroyed; these with their deep splayed reveals in the thick walls (5 ft. 6 in.) have an admirable effect. It may be mentioned that the side walls are also of great thickness. By the removal of incongruous useless fittings it has been also practicable to open out some Perpendicular windows on the east side of the hall. It is much to be regretted that the ugly sham battlements still remain, as well as the pseudo-Gothic windows in the west wall. Something less out of character with the ancient work is much to be desired, but must wait till the necessary funds are obtained. The works described have been done from the drawings of and under the superintendence of Mr. B. Edmund Ferrey, F.S.A., for the Somersetshire Archæological and Natural History Society, Mr. Charles Fox, of East Reach, Taunton, being the contractor.

## ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—The second ordinary meeting of the current session was held at Queen's College on Tuesday evening last, the Vice-President, Mr. W. H. Kendrick, in the chair. The following gentlemen were elected members of the Association:—Mr. F. J. Yates as an honorary member, and Messrs. W. G. Midgeley and G. Payton as ordinary members. Mr. J. King James gave a lecture on "Pediments and Gables," which was illustrated by photographs and by many of the author's own sketches. A discussion ensued, in which the following members took part:—Messrs. W. Doubleday, Franklin Cross, W. H. Kendrick, and Victor Scruton (hon. sec.). After a vote of thanks had been accorded to the lecturer, the meeting terminated.

*Manchester Architectural Association.* — An ordinary meeting of the Association was held at the old Town-hall, King-street, on the evening of Tuesday, December 9th, Mr. J. S. Hodgson in the chair. A paper was read by Mr. R. B. Preston, A.R.I.B.A., on "House Sanitation," in which attention was chiefly directed to the consideration of water and water supply. The various sources and methods by which water is usually obtained for the supply of our towns were enumerated, and its different chemical properties pointed out. The absorption of gases by water was shown to be a very important property in reference to sanitary inquiries, and one which should not be lost sight of in planning drains, as this fact might, under certain conditions, render all traps practically useless against the entry of sewer gas. The opinion of Dr. Frankland was quoted in reference to the contamination of water by organic matter, viz., that the danger resulting from the use of such water did not arise from the decomposition of organic matter, but from the risk lest some of it had escaped decomposition. In the discussion which followed, Mr. F. R. Hawxby mentioned a few of the inconveniences arising from the use of well-water obtained from the red sandstone, which contained a large proportion of lime and magnesia in solution. He proposed a vote of thanks to Mr. Preston for his paper, which was seconded by Mr. T. Chadwick, A.R.I.B.A. The meeting was also addressed by Messrs. Hodgson, Mould, Woodhouse, and Worthington.

*Leeds and Yorkshire Architectural Society.*—The members of this society and a large number of guests sat down to dinner at the Great Northern Hotel, Leeds, on Monday evening. Mr. E. Birchall presided, and the vice-chairmen were Mr. J. W. Connon and Mr. J. Demaine (York). The Chairman proposed "The Leeds and Yorkshire Architectural Society," which, he said, was in a very flourishing state. Mr. G. B. Bulmer (honorary secretary), in responding, said the society was endeavouring to cultivate and maintain a proper state of feeling between those who practised the same profession. Mr. J. W. Connon proposed "The Royal Institute of British Architects and Kindred Societies." He had the greatest possible faith, he said, in the value of the work which societies of this kind did in promoting good fellowship among their members, in raising the standard of the general morality of architects, and consequently in benefiting the public generally. It was not, and he hoped never would be, the aim of any of their architectural societies to promote simply their own interests. He was sorry to find that the architects of the country showed too great an apathy with regard to the assistance to be obtained from mutual combination, and that as a consequence there was a want of correspondence in architectural work in different parts of the country, a circumstance which brought about very serious disadvantages and very great inconveniences. They looked to Mr. Christian's year of office with hope and expectancy, as one likely to be fruitful in just and beneficial changes. Mr. Ewan Christian, President of the Royal Institute of British Architects, spoke in acknowledgment, and in doing so remarked there were no fewer than eighteen architectural bodies in the United Kingdom, besides others in the United States and elsewhere. When he entered the profession there was only one architectural society in existence. He agreed that these societies were of the greatest possible value in promoting union, not for selfish purposes, but for the study of art and for promoting uniformity of practice. He reminded them, however, that whilst societies were of great importance, each individual architect ought to consider that the honour of the profession at large was entrusted to his hands, because it was only from the action of individuals that the profession would be judged. Mr. J. Holden, President of the Manchester Society of Architects, Mr. W. H. Dunn, President of the Northern Architectural Association, and Mr. W. Jackson, President of the Leicestershire Society of Architects, also spoke in acknowledgment of the toast. The Rev. Dr. Gott proposed "Literature and Art." Mr. H. H. Statham and Mr. C. Pebody replied. Councillor Tweedale proposed "Law and Medicine," and Lieutenant-Colonel Hartley and Mr. A. W. M. Robson responded. Mr. John Hepper proposed "Commerce." Mr. J. Barran, jun., replied. The toast of "The Visitors" was proposed by Mr. Geo. Corson, and acknowledged by Professor Bodington, Principal of the Yorkshire College.

## ROYAL ACADEMY STUDENTS' *SOIRÉE*.

The students of the Royal Academy held a *conversazione* in the Rooms of the Incorporated Society of British Artists, Suffolk-street, Pall-mall (by the kind permission of the Council and members of that Society), on Friday evening, December 12. The *conversazione* was attended by various members of the Academy,—amongst others, Sir Frederick Leighton, P.R.A.; Mr. J. C. Horsley, R.A., Treasurer; Mr. F. R. Pickersgill, R.A., Keeper; Mr. Yeames, R.A.; Mr. Armstead, R.A.; Mr. Dobson, R.A.; Mr. Burgess, A.R.A.; Mr. MacWhirter, A.R.A.; Mr. Brock, A.R.A.; Mr. Hamo Thorneycroft, A.R.A.; Mr. Frank Dicksee, A.R.A.; and Mr. Henry Le Jeune, A.R.A. The band of the Royal Artillery, with occasional solo and part-songs by the students, enlivened the evening, towards the conclusion of which Mr. Brandon Thomas and Mr. E. F. C. Clarke gave some of those recitations and piano performances often given at the *soirées* of the Hogarth Club, but, probably, for the first time heard by the lady students of the Academy. The *conversazione* was the first of its kind, and took the place of the usual students' supper. Its success was generally considered to be so satisfactory that it is to be hoped it may be given again in future years, if only to place the lady students on the same footing as their fellow-students of the other sex.

## COMPETITIONS.

*Manchester.*—The Manchester Corporation have awarded the first premium to the design of Mr. Joshua Bury, of Manchester; and the second premium to the design prepared by Messrs. Massie & Mills, of Barnsley, in the competition for the proposed laying out of an open space at Cheetham as a recreation-ground.

*Chelsea Vestry Hall.*—The particulars for the guidance of competitors in designing plans for the additions to the Vestry-hall buildings, as settled by the Vestry on the 25th November, have been issued by the Vestry Clerk. The Vestry offer a premium of 100 guineas for the first, 50 guineas for the second, and 30 guineas for the third of such designs as shall, after taking the advice of a professional assessor, be selected, and all such selected designs shall become the property of the Vestry. Should the author, however, of either of the designs be employed as architect of the building, then the premium will not be given, but he will be paid a commission of 5*l.* per cent. on the cost of the work. If, in the opinion of the assessor, a design cannot be carried out within 10 per cent. of the amount named by the competitor, the latter will be disqualified from receiving any premium. The designs are to be sent in on or before Monday, the 23rd day of February, 1885.

## LINE OF FRONTAGE CASE.

FULHAM DISTRICT BOARD OF WORKS *v.* COLLS.

This was an adjourned summons, heard before Mr. Sheil, the magistrate at Hammersmith Police Court, on the 16th inst.

The defendant, who is a builder and contractor, was engaged to erect a house and shop at the corner of King's-road and Parson's Green, Fulham. On the 5th of April, 1884, he gave the plaintiffs notice and deposited a plan of the proposed drainage. In due course he proceeded with the work, and the building was erected; he then called upon the plaintiffs to connect the house-drains with the main sewer: this the plaintiffs refused to do, alleging that the defendant had built in front of the general line of front of the adjoining houses, and until the question was settled, nothing could be done in the matter. The plaintiffs thereupon applied to Mr. Vulliamy (the Superintending Architect of the Metropolitan Board of Works), under the 75th Section of the Metropolis Management Amendment Act, 1862, to decide the general line of building in Parson's Green. Mr. Vulliamy gave his certificate on the 17th of November, 1884, defining the front wall of the adjoining buildings as the general line, and the defendant's building being 15 ft. in advance of that line. The plaintiffs applied for the magistrate's order to demolish the building so far as it projected in front of the general line as defined by Mr. Vulliamy.

The plaintiffs called several witnesses, but they were unable to speak definitely as to the buildings which existed upon the site before the erection of the structure complained of. On the other hand, the defendant called witnesses, who proved that the site was formerly occupied partially by a building, and partially by a paved yard, which was enclosed by a 14 in. brick wall 10 ft. in height, in which were window-openings enclosed by iron guard-bars.

Mr. Sheil decided that the owner had not relinquished his right to rebuild on the site occupied by the former building and yard, as decided in the cases of the Westminster District Board of Works *v.* Lord Auckland, and the Kensington Vestry *v.* Barlow, and dismissed the summons, with costs against the Fulham Board of Works.

Mr. Besley (instructed by Messrs. Watson, Sons, & Room) appeared for the plaintiffs, and Mr. Glen (instructed by Messrs. Marsland, Hewitt, & Everett) for the defendant.

**Welford-on-Avon Church.**—Archæologists have sustained a great loss in the destruction by fire on Saturday morning last, the 13th inst., of Welford-on-Avon Parish Church and tower. The bells had been rung on Friday night, and it is supposed that one of the ringers' candles set fire to the matting on the belfry floor, which lay mouldering through the night, and burst out into flame in the early morning. The tower is burned completely out, leaving only its massive walls standing, and five of the six bells are broken by falling on the floor below. The church is now a complete wreck. The seats and stalls, communion-table and pulpit, and other furniture, were saved.

## BY-LAWS UNDER THE METROPOLITAN BUILDING ACT.

BUILDING ON DISUSED BURIAL-GROUNDS.
BLASHILL *v.* CHAMBERS.

THIS was an appeal (by way of special case) from the decision of Mr. Hannay, the magistrate sitting at the Worship-street Police-court on the 17th day of June last, on the complaint of Mr. Thomas Blashill, District Surveyor for Bethnal-green, complaining that the defendant, on the 30th day of March last, at Peel-grove, in the parish of Bethnal-green, did unlawfully commit breaches of the By-laws made by the Metropolitan Board of Works, under the provisions of 41 & 42 Vic., c. 32, s. 14, No. 1,—that is to say, by commencing to build on a site and foundations at the south-western corner of the Peel-grove Burial-ground, which had been filled up with materials impregnated with animal matter, to wit, some number unknown of dead human bodies without the said animal matter having first been properly removed. The second offence was for not pulling down the buildings erected by him on the said burial-ground, contrary to 41 & 42 Vic., c. 32, s. 17.

The facts of the case are as follow:—The defendant is a builder, and had commenced to build on the above ground, which had been closed by an Order in Council in the year 1855, when it was estimated that some 20,000 people had been interred therein. The depth of the graves was in some cases 20 ft., and in other cases 25 ft., and the coffins were piled up to within 2 ft. or 3 ft. from the surface. After the closing of the ground rubbish was deposited thereon, forming a bed varying from 1 ft. to 4 ft. in thickness.

The builder, having commenced to put in concrete foundations, the complaints were laid, and upon the hearing, Mr. Hannay dismissed the complaints, on the ground that the meaning of the words "site and foundation" in the By-law could not be extended beyond that given by the Act 41 & 42 Vic., c. 32, s. 14, and that the foundation and site had been properly prepared, and that the By-law was not applicable to the present case.

The District Surveyor appealed against this decision, and the case was heard in the Court of Appeal last week, before Mr. Justice Grove and Mr. Justice Hawkins.

Sir H. Giffard, Q.C., and Mr. Besley, instructed by Mr. Thomas Burton, appeared for Mr. Blashill; and Mr. Gainsford Bruce, Q.C., and Mr. Graham for the builder.

After hearing the arguments of counsel, the Court decided to dismiss the appeal with costs, on the ground that the Act and By-law could not be applied to the case of a burial-ground.

## WIDE TENDERING.

SIR,—Ten years since the Cottage Hospital was erected here. Shortly after the completion of the building, the walls began to settle and crack. This has gone on increasing, and it was deemed desirable to examine the foundations, which were found lamentably defective, concrete being almost entirely absent where it ought to have been present, and, where it exists, of very inferior quality. It has been decided, under advice, to underpin the walls, and insert damp-proof course beneath the inner walls. I beg to send you the prices given by the four persons who tendered for the work, asking if you can reconcile the great discrepancy therein.

A MEMBER OF THE COMMITTEE.

*Beccles.*

*** The following is the list of tenders enclosed; but "reconcilement" of such discrepancies is as much beyond our insight as it is fortunately out of our province:—

"For underpinning the outer walls of the Beccles Cottage Hospital, and inserting damp-proof course beneath the inner walls:—

| | | | |
|---|---|---|---|
| Everal, Malvern ..... | £225 | 0 | 0 |
| Hopson, Beccles ..... | 168 | 10 | 0 |
| Bennett, Norwich ..... | 97 | 15 | 0 |
| Calver, Ringfield (accepted) ... | 52 | 0 | 0" |

## SCULPTURE, BLACKFRIARS BRIDGE.

SIR,—I wonder your correspondent, Mr. Frith [p. 808, *ante*], should not know why none of the premiated competitors in the first abortive competition were not asked to compete further.

Those eminent referees, to whose decision the Corporation remitted the matter, duly adjudicated the 1,000*l.* in premiums according to comparative merit, but they also reported as follows:—"That they were not prepared, in view of the great importance of the work and the high gifts required for its adequate performance, and in view also of the calamitous results of failure, to recommend the execution of any of the designs submitted to them, or the employment of the competing artists in the preparation of other designs with a view to their execution." The report itself may be seen at the Guildhall.

The Corporation gave away the 1,000*l.* without obtaining any benefit, and they followed the advice of those to whose judgment they referred,—namely, Sir F. Leighton, Mr. Calder Marshall, and Mr. G. F. Watts. They are to be commended for so acting.

That the competition was abortive is no reflection on the general body of sculptors. But that is now an old story: and I am sorry to add that the matter is not yet put on a footing which, in my opinion, can lead to a satisfactory result.

With regard to Mr. Cave Thomas's suggestion that an association of sculptors should be inaugurated, I heartily concur. I doubt a little whether these artists as yet see the importance of this, and are prepared to set aside jealousies and pull together for the general good; but though not a sculptor, I would gladly assist if I could, to see this done. In an instance like the present the want of some representative to speak with authority becomes painfully evident. JAMES EDMESTON.

## NEW ROUTES.

SIR,—By the *Builder* of Dec. 13 [p. 789], it seems at last settled to have a new road made from Gray's Inn-road to St. John's-street-road to improve the route to the north; but there is also a route, I believe, more directly north, *i.e.*, by Gray's Inn-road and Caledonian-road, if it were not for a very awkward block of buildings which intercepts the junction of Gray's Inn-road with Caledonian-road, and which block induces drivers of vehicles wanting to get into the one from the other of the roads to take a tortuous journey down bye-streets. It seems to me that for a very moderate sum the booking-offices at King's-cross might be readily removed, and a bridge thrown across the railway line, making a proper junction of the two roads. Possibly a little discussion in the *Builder* might lead to the much-required alteration being carried out.

H. E. BALL.

P.S.—I believe it would save omnibuses, &c., travelling from Holloway to Holborn, or *vice versâ*, fifteen to twenty minutes' time.

## FIRE-BARS.

SIR,—We have an ordinary kitchener, in which the top fire-bar every two or three weeks completely doubles up (formerly they used to last three months), and constantly has to be replaced by a new one. Will you, or any of your numerous correspondents, be kind enough to tell me if there are any means of averting the above?

AN OLD SUBSCRIBER.

## WATER STORAGE.

SIR,—I have read with interest the articles that have appeared lately in the *Builder* advocating water storage. In your issue for the 30th of August last [p. 284], you advise a slate tank or some other material. I think the following plan would be far cheaper (and cost is often a great consideration) and trustworthy. Where the soil is suitable, excavate a circular well, the diameter and depth according to circumstances; coat the surface with two of sand to one of cement; the next coat half and half, and the last coat finished in neat cement; turn an arch over, and leave a manhole, and then you would have a tank that would hold thousands of gallons, as sound as a china basin, and much cheaper than any other method. It is as well to get water into it as soon as possible after it is finished. E. P.

## PROVINCIAL NEWS.

*Haverhill (Suffolk).*—We learn that a scheme, prepared by Messrs. Smith & Austin, C.E., for disposing of the sewage of the town of Haverhill, and removing the difficulties at present obtaining with certain riparian owners, has been adopted by the Local Board.

*Liverpool.*—A temporary home for lost and starving dogs has been erected within the grounds of the Liverpool Zoological Gardens Company. The kennels,—eight in number,—form a semi-circle. They are built of red sandstone, and roofed with red tiles. Each kennel, which will comfortably hold from a dozen to sixteen dogs, has a spacious area in front of it, with a concrete flooring. The internal arrangements of the kennels are well suited to the purpose for which they are designed. The floors, like those of the yards, are formed of concrete, and the beds are raised a few inches above them. These beds are composed of soft thin shavings, which are considered the best material both from a health and warmth point of view. A sliding board keeps the beds from being scattered about the floor, and can be readily lifted up and the whole of the shavings removed when it is needful to renew them with a fresh supply. In the wall of each of these "dormitories" is an iron ventilator which can be opened or closed at will, and which gives the needful supply of fresh air when it is necessary to keep the doors closed. There is an aperture, which can also be closed when required, in each of the doors, which enables the canine inmates to frisk in and out without having the larger door open. Messrs. Sugden, of Leek were the architects.

*Exeter.*—On the 4th inst. the additions to Mr. Harry Hems's business premises in Long-brook-street, Exeter, were opened. They have been erected from plans by Mr. R. Medley-Fulford.

# The Student's Column.

## A SECOND PERSPECTIVE LESSON.

IN a previous article (p. 443, *ante*) the first principles of drawing in perspective were illustrated by the appearance of a small object, a match-box, as seen through and drawn upon a sheet of glass employed as a picture plane.

The chief use, however, of perspective to an architect is to ascertain what his buildings will look like while, as yet, they only exist on paper.

These buildings are, of course, drawn much smaller than their actual size (fig. 1), and, so far, they differ from the match-box, which was itself supposed to be laid down on the sheet of paper and its appearance drawn on the glass.

The only corresponding difference to be observed is that the spectator must suppose himself to be reduced to the same scale as his design, and that his Lilliputian eye is,—let us say,—$\frac{3}{4}$ in. above the sheet of paper representing the ground level, supposing his design to be drawn to $\frac{3}{16}$ in. scale.

He will now have the kindness to place his reduced self at the *station point* (S. P.) (fig. 2), and, looking straight before him, to mark on the sheet of paper from his feet two lines, embracing an angle of 30° (15° on each side), which will give him the extreme *visual rays* of the perspective.

He will then use his judgment, in accordance with the principles laid down in the former article, as to the *size* that he prefers for his perspective view, by fixing the relative positions to his eye (S. P.), the *picture plane* and the *object*.

He will, moreover, turn his plan about until he is satisfied that the various features, such as the gables and chimneys, form the best possible grouping, avoiding, of course, any impossible view of his intended building.

Should his building be intended for a narrow street, he will embrace a slightly wider angle of vision than 30°, otherwise he will find that his view only takes in a portion of his building.

He will also find in the result that buildings have to be specially designed to look well in narrow streets, and that the pleasing outline of a distant homestead is "nowhere" in a town; while a slice out of a Chester row would be equally unhappy-looking if perched on a hill-slope in the country.

Moreover, an elevated or depressed position must be equally calculated for, and this question, of course, determines the level of the eye and of the *horizontal line*.

In some cases it is desirable for the designer to "wish he were a bird," so as to obtain an idea of a large group of buildings as seen in a bird's-eye view. This may seem a complicated proceeding, but the writer has hit upon a very simple method of treating it, which may be illustrated, if asked for, in a future article.

Having now settled the relative positions of eye, picture, plane, and object, he has simply to proceed as before described, with this difference,—that, instead of handling a match-box, he will handle a pair of dividers, and will measure with them the various heights from the elevations that he has prepared, and transfer these to their respective lines of height.

It is often desirable to make the picture plane *touch* one angle of the plan of the building, and thus save the trouble of bringing lines forward merely to carry them back again.

On the other hand, it is false economy of trouble to work too much off one line of heights by carrying lines around the building.

On the diagram (fig. 2), the left-hand side of the plan, A B, has been brought forward to the picture plane at L H. It has then been carried back to that angle, and thence returned across the face of the gable from the left-hand *vanishing point*. A separate line of heights, found from this vanishing point, has been used for the side wall of the right-hand gable, C D.

In finding this left-hand vanishing point, according to the rules laid down, it will be found to be a long way off,—measuring always

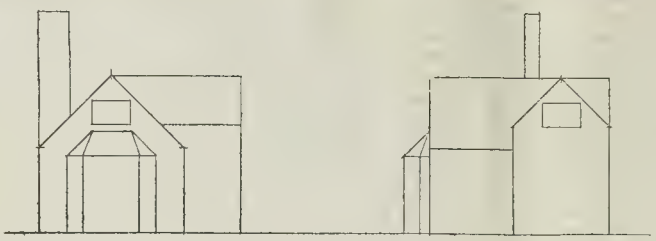


*Fig.* 1.

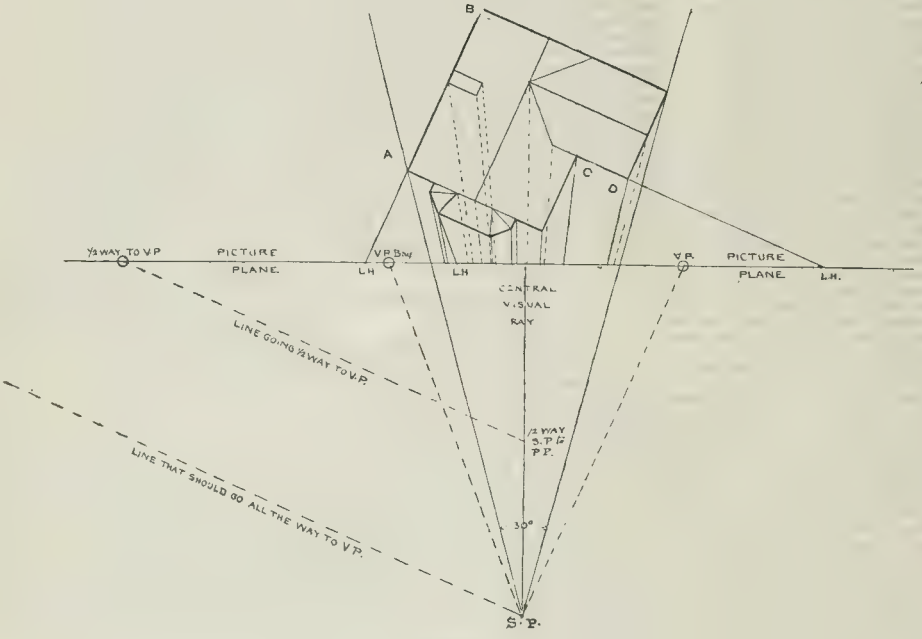



*Fig.* 2.

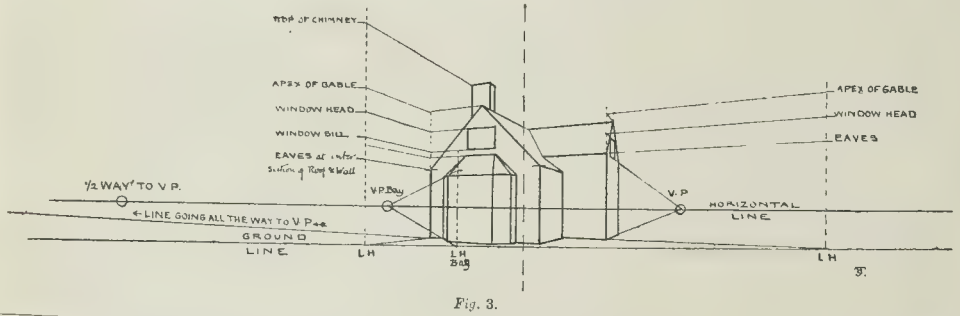



*Fig.* 3.

from the central visual ray. It might be a process involving severe gymnastic exercises on the part of the draughtsman, and is simplified by dividing the distance between the station point and the picture plane into any convenient number,—on the diagram it is divided into two.

Any one conversant with Euclid will see that a point will be found at half the required distance along the picture plane, which half distance has simply to be doubled on the horizontal line in order to find the real vanishing point.

The great thing in perspective drawing is accuracy, and the avoidance of confusion.

Plans of the building at *various heights* have to be laid down, and corresponding visual rays drawn from them. On the diagram, the roof plan is distinguished by *thin lines*, and the visual rays therefrom are *dotted*.

In practice, it is better to use different *colours* for the various planes and their rays, and, instead of crowding the picture plane with rays (many of which will overlie each other), to use separate slips of paper pinned down against the picture plane, taking care to mark on each the central visual ray first of all.

Before committing himself too far, the draughtsman should get the general block of the building into perspective to make sure of its grouping well.

Finally, if it be asked whether the view will be the same as would be seen by a man of ordinary stature, without the necessity of shrivelling himself down to one-eighth scale, or one-ninety-sixth of his actual size, the answer is, Yes; and that he has only to follow out the directions given in the previous article in order to prove this. That is to say, if the house were actually built, and he wished to make a sketch of it to the size here described, he would have to *retire from it* so as to increase the distance between the object (the house) and the picture plane (his sketch-book), until the latter, held at arm's length, contains the appearance of the house to the required size.

All the other processes then fall into their places, but, instead of being set out to one sixteenth-inch scale, they are found at their actual distances on the picture plane, and present no special difficulties as regards the vanishing points. The lines of heights would, of course, be impracticable, as they imply a sheet of paper as high as the house, but, with a little ingenuity, even this part of the rules could be applied to the process.

## CHURCH BUILDING NEWS.

*Holloway.*—On Saturday last, the 13th inst., the new Church of Emanuel, Hornsey-road, Holloway, was consecrated by the Bishop of London. The church is seated partly with benches and partly with chairs, and holds nearly 1,000 persons. On plan the building consists of nave and chancel, north and south aisles, baptistery, and vestries for clergy and choir. The style of architecture adopted is First Pointed, carried out almost entirely in red brick, no stone being used externally, except for the ornamental niche on the entrance elevation, which is executed in red Corsehill stone. Internally, Bath stone is employed for shafts, caps, bases, corbels, and the chancel arch; the remaining arches, labels, and string courses being entirely of moulded red bricks, made to the architects' full-size details by Mr. James Brown. The works have been carried out by the builders, Messrs. Taylor & Grist, of Aylesbury, from the designs of the joint-architects, Mr. Frederic R. Farrow and Mr. E. Swinfen Harris, F.R.I.B.A., of 32, Craven-street, Strand, W.C. The whole of the footways of the church are laid with mosaic by Messrs. Diespeker & Co. Especial care has been bestowed by the architects upon the design of the wrought-iron hinges, finials, railings, and gas-fittings, which have been executed by Mr. W. R. Shrivell and Mr. W. Downing. The heating is effected by high-pressure hot-water pipes supplied by Mr. R. Renton Gibbs, and a system of ventilation has been devised by the architects based upon the natural means of temperature-difference, and assisted by one of Boyle's extractors. We are informed that the acoustic arrangements of the church are based upon some recent investigations in a new direction by Mr. F. R. Farrow, and they are stated to be very successful.

*Esher.*—The monument erected in Esher Church to the memory of the late Duke of Albany is of choice selected alabaster, richly and delicately carved. It was designed by Mr. Blomfield, and has been executed by Messrs. Earp, Son, & Hobbs, the marble bust being the work of Mr. Williamson, of Esher.

*Bromley (Kent).*—Bromley Church has just been enlarged by the addition of a new chancel, south chancel aisle, and a vestry with an organ chamber above it on the north side, from the designs of Mr. T. G. Jackson, architect, at an expense of nearly 4,000*l.* Of the mediæval church at Bromley there are but few remains. During the last two centuries there appear to have been at least three tolerably complete remodellings of the building. In the last century it seems to have been either rebuilt in red brick, or so remodelled in that material as to have retained but few features of the mediæval building. About fifty-two years ago the body of the church seems to have been again practically rebuilt, and about ten years ago it was reseated, the galleries were new fronted if not reconstructed, and other alterations took place. Fortunately, the fine old fifteenth-century tower has survived these three successive attacks, which have proved fatal to the body of the church. Of the mediæval building nothing else now remains but the Purbeck bowl of the font (which, from the analogy of that at Merstham in Surrey, appears to be a work of the end of the twelfth century), a fragment of a fourteenth-century oak door, and a very interesting but incomplete arched recess, which, after being removed from the north wall of the old chancel to the south side of the vestry, was fixed in the east wall of the church, and has now been placed in the north side of the new chancel, where it serves as a credence. This dates from the latter part of the thirteenth century. The west wall of the fifteenth-century nave also remains, with the ruins of a late three-light flat arched window, and it is possible that the fabric of the south wall of the church may be old, though all the windows and doors are quite modern. With these exceptions, and that of some monuments, the church contained absolutely nothing of the slightest architectural or antiquarian interest. The fabric of 1829, so far as concerns the arcade and galleries, is so slight as to convey the impression of insecurity, the slender columns themselves being still further reduced in substance by having the back member cut away to leave room for the introduction of an iron prop to the gallery, which forms in appearance part of the clustered shaft. Nothing can well be worse, either in construction or in design, and there can be little doubt that before many years the parish will find itself called upon to replace the interior work of the nave by a more substantial structure. The new work is of brick, faced with flints and dressings of Doulting stone externally, and all the internal architectural features are in white chalk. All the old monuments have been carefully preserved and refixed chiefly in the new building, to which they add an historic interest and a picturesqueness often absent from new churches. The builder was Mr. Balding, of Bromley, and the clerk of works Mr. Bentley. The heating is by Messrs. Haden & Sons, and the carving by Messrs. Farmer & Brindley.

*St. Leonard's-on-Sea.*—Christ Church built in 1875 from the designs of Mr. A. W. Blomfield, has now been consecrated, a special interest attaching to the occasion being the erection of the new pulpit of elaborate design by Mr. Blomfield. The lower portion is hexagonal, supported by marble columns, and the upper parts circular, divided into five arches, each containing the sculptures respectively of Noah preaching (the Ark building in the background), the preaching of John the Baptist, the Sermon on the Mount, St. Peter preaching at Mars Hill, and St. Paul preaching at Athens. These are executed in white alabaster, the arches and crocketted buttresses dividing them, as also the pulpit, generally being of yellow Mansfield limestone. The work has been done by Messrs. Earp, Son, & Hobbs, of London and Manchester, who also executed the carving throughout the church at the time of its erection.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

3,036, Improved Chimney Pot. T. Anwyl.

For the cure of smoky chimneys a chimney-pot, with louvres, is here devised. The top of the chimney-pot is closed, and inside the louvre portion vertical partitions are placed at right angles, so that whichever way the wind is blowing there is always free egress for the smoke. Any direct currents of air which may strike against the pot will first strike on the louvres, and if they enter the pot will be forced to take an upward direction, and will strike against the partitions, and be deflected back through the louvres. The closed top assists this outward course of any currents of air which enter the pot, and prevents the wind blowing directly down the chimney. When the wind blows on one side of the partitions, the chambers or flues on the opposite side will be free for the egress of smoke, which to a certain extent will be drawn or sucked out by the laterally deflected currents of air.

2,847, Improved Imitation Marble. A. Guattari.

Gypsum articles or carved or sculptured objects are immersed for some length of time in a hot preparation of bitumen. During this operation the dehydration of the material is accomplished, and the bitumen not only penetrates the mass, but fills all the pores and spaces left by the water which was contained in the material treated. A hard and compact mass, which takes a brilliant black polish, is formed. Gypsum is also treated in the rough mass, and pulverised gypsum or marmorite may be similarly impregnated with bitumen.

2,404, Improved Cowls. G. F. Harrington.

This improved arrangement of cowls for ventilating purposes is an extension of an idea patented by the same applicant, where cowls are applied to the ventilation of sewers. In the adaptation, self-revolving cowls, trapped, with upcast shafts, on which they revolve, are used, and the shafts are made with wickerwork, lined inside, and coated outside with cement or brick tiles. The shafts are arranged to ventilate and convey fresh air to the sewers. A similar arrangement is by this patent adapted for rooms of public and private buildings, ships, and other places requiring ventilation. The cowls are formed swan necked in shape, to combine the acting and re-acting force of the wind. The cowls are trapped at their connexion with the shafts by means of oil in a suitable receptacle. The shafts are easily affixed to dwellings, and, from the greater size which this form of construction allows, much greater volume of fresh air is allowed to enter the hall, apartment, or cabin to be ventilated.

2,578, Ventilating Ridge Tiles. S. Turner.

A ridge tile is made with passages for ventilation under the eave or ridge of the tile.

3,274, Water-closets. S. A. Adams.

Refers to flushing out the trap of a water-closet. To effect this a branch pipe is connected from the supply to the basin, so that the trap is flushed out every time water is admitted to the basin.

3,739, Oil-cans. J. Lucas.

In the description of oil-cans where oil is ejected by collapsible sides, the shape of the sides is preserved by inserting in the body of the can a spiral spring.

### APPLICATIONS FOR LETTERS PATENT.

*Dec.* 5.—15,978, R. Cotterell, Decorative Surfaces. —15,984, J. Jenkins, Fire-grates, &c.—15,999, A. Grafty and L. Mauack, Apparatus for Preventing the Slamming of Doors.—16,000, H. J. Aldison, Manufacture of Artificial Stone. — 16,023, T. Durrans, Traps for Sinks, Basins, &c.

*Dec.* 6.—16,041, J. Gowans, Improvements in Cisterns.—16,057, J. Rhodes, Cupboard Door Turns. —16,066, C. Clarke and A. E. Parsons, Improvements in Sash Fasteners.—16,068, B. Turner, Door Springs.—16,075, J. B. Petter, Improvements in Chimney Tops.

*Dec.* 8.—16,097, J. W. Saunders, D. T. Davies, and J. A. Macdonald, Improvements in Sash Fasteners.—16,114. E. Wretzner, Improvements in Brick Presses —16,134, G. E. Eachus and P. A. Maignen, Ventilating Sewers, &c.

*Dec.* 9.—16,145, E. W. Astle, Heating Buildings. —16,154, J. Ball, J. H. Rawson, and F. R. Rawson, Manufacture of Chisels, Gouges, and Augers.—16,163, J. H. R. Dinsmore, Band-saw Machines.—16,164, J. Brown and T. A. Porter, Apparatus for Climbing Chimneys.—16,167, A. C. Billings and A. D. Middleton, Water-closet Basins.—16,177, F. Mankey, Ornamental Woodwork and Process of Producing same.—16,187, G. F. Williams and W. C. Horne, Luminous Letters and Signs.

*Dec.* 10.—16,209, C. L. Baker, Elastic Driving Band.—16,214, T. G. Dooning, Open Fireplaces for Heating and Ventilating Apartments.—16,222, F. McIlvenna, Standards for Shop Windows.—16,223, G. C. A. Krigg, Fixing Iron Rain-water and Soil Pipes.—16,239, J. Robbins, Manufacture of Cements or Compositions.—16,251, E. Brady, Substitute for Wood, Iron, or Stone.—16,255, A. H. Cowles, Machinery for Excavating Earth. — 16,268, H. Wainwright, Supplying Water to Water-closets, &c.

*Dec.* 11.—16,278, R. H. Griffin, Securing Wood against Bench Stop while being Worked or Planed. —16,283, E. Verity, J. M. Verity, and B. Banks, Apparatus for Opening, Closing, Staying, or Securing Windows, Skylights, Ventilators, &c.—16,290, T. Jones, Supporting the Roofs of Buildings. 16,311, E. E. Searle, Decorating Glass.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

5,396, T. Thornton, Flooring Cramps.—8,124, G. J. C. Marie, Cleansing the Outside of Buildings, &c.—13,713, E. Preston, Improvements in Planes, Spokeshaves, &c.—13,824, E. Grech, Manufacture of Mosaic Ornamental Designs or Patterns.—14,310, F. Candy, Manufacture of Bricks, Architectural Blocks, and Enamelled Ornaments used in Building Construction.—14,319, E. G. Banner, Ventilating Apparatus. — 14,614, W. Cortaen, Opening and Closing Windows.—14,896, T. B. Walter, Flushing Apparatus for Water-closets.—15,255, A. K. P. Gerlach and H. M. C. Unger, Kitcheners.—15,503, J. M. Bryden, Automatic Sash Fastener and Lifter. —1,588, J. Hunnerston, Locking Catch for Bolts, Window Fasteners, &c.—14 917, R. A. Stoffert, Improvements in Girders.—15,464, J. G. Lorrain, Ventilation.—15,665, J. J. C. Davis, Wood Pavements.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

942, R. Wadsworth and S. Wadsworth, Tipping Wagons and Carts.—3,093, G. R. Crow and W. H. Crow, Planing, Shaping, and Slotting Machine.—3,214, F. W. Hagen, Waste and Soil Pipes.—3,461, W. A. Carlyle, Metal Rollers for Wall-paper Printing. —4,866, A. G. Garrood, Ventilating Sash Fastener.—14,482, J. Peirce, Wood-planing Machine. —1,520, B. Haigh, Water-waste Preventers.—2,777, W. Mooney, Improvements in Wall Ties.—3,994, G. Dilliway and E. Newman, Furnaces for Bakers' Ovens.—3,927, W. Hayhurst, Holdfasts for Carpenters, Joiners, Cabinetmakers, Wheelwrights, &c. —3,945, E. Robinson, Ventilating Rooms, Passages, and Buildings.—4,047, C. Lawrence, Smoke Extractors or Ventilators.—10,221, R. Mason, Window Frames and Sashes.—10 301, G. Shudder, Supplying Disinfectants to Water-closets, Drains, &c.—10,434, G. H. Brown and A. Brown, Domestic Fireplaces.

## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

DECEMBER 11.

By HARDS, VAUGHAN, & JENKINSON.

| | |
|---|---|
| Rotherhithe—36, Derrick-street, freehold | £235 |
| Lewisham—9, St. Stephen's-road, 78 years, ground-rent 5*l.* | 260 |
| New-cross—19 and 21, Vance-street, 83 years, ground-rent 6*l.* 6*s.* | 320 |

DECEMBER 12.

By FRANK LEWIS & CO.

| | |
|---|---|
| Stoke Newington—3, Shacklewell-lane, 88 years, ground-rent 6*l.* 10*s.* | 410 |

By W. B. HALLETT.

| | |
|---|---|
| Tottenham—22, Lordship-lane, freehold | 610 |
| The reversion to one sixth share of railway stocks valued at 5,000*l.*, life aged 54 | 450 |

DECEMBER 15.

By EDWARD MILLARD.

| | |
|---|---|
| Holloway—George's-road, ground-rent of 13*l.*, reversion in 88 years | 280 |
| Wellington avenue Ground-rents of 32*l.* 10*s.*, part freehold and part leasehold | 700 |
| Grove-street Ground-rents of 32*l.* 10*s.*, ditto | 700 |
| Surrey, Kent, and Herts—Rent charges of 6*l.* a year | 102 |

By Collier & Bowditch.

Greenwich—Bridge street, the Beehive Public-house and house adjoining, freehold ..... £1,550
Croydon -23, Union-street, freehold..... 80
Canterbury Dane John Farm and 5a. 1r. 21p. freehold ..... 1,520

By Horace Dove.

Enfield—1 and 2, Gladstone-villas, freehold ..... 945

By Wagstaff & Warman.

Barnsbury—14, Edward-street, freehold ..... 275
Kingsland—16-32, even, Ormsby-street, 7 years, ground-rent 25*l.* 12*s.*..... 470

By Crispin, Moore, & Hollebone.

Gower-street, W.C.—No. 99, freehold ..... 2,100

By F. J. Bisley.

Walworth—37, Dean's-buildings, 89 years, ground-rent 6*l.* 10*s.* ..... 420
Rotherhithe—3, Princes-street, freehold ..... 375
63 and 65, Hawkstone-road, 66 years, ground-rent 6*l.* ..... 450

December 16.

By A. Booth.

Haverstock Hill 53, Adelaide-road, 62 years, ground-rent 3*l.* 10*s.* ..... 670
Kentish Town—11, Bartholomew-villas, 77 years, ground-rent 7*l.* ..... 600
62, Carlton-road, 66 years, ground-rent 6*l.* 6*s.*..... 360

By W. H. Moore.

Hampstead-road—13, Little Exmouth-street, 23 years, ground-rent 8*l.* 8*s.* ..... 700

By Rogers, Chapman, & Thomas.

Pimlico—16, Winchester-street, 47 years, ground-rent 10*l.* ..... 650
South Belgravia—11, Bessborough-street, 49 years, ground-rent 11*l.* ..... 680

By Ward & Clarke.

Lewisham—49, 50, and 51, Thurston-road, 78 years, ground-rent 7*l.* 14*s.* ..... 585
South Norwood—A plot of freehold land ..... 95

By Reynolds & Eason.

Clerkenwell Elm-street, the City of Lichfield public house, and property adjoining, freehold, area, 6,000 ft. ..... 2,070
Dulwich—Melford House, Melford-road, freehold .. 375
Bow—31 and 32, Tredegar square, 18 years, ground-rent 2*l.* ..... 320

December 17.

By Norman & Son.

Whitechapel—87, High-street, freehold..... 3,550

December 18.

By Theobald & Martin.

Notting-hill—Nos. 41 and 43, High-street, and 1, 2, and 3, Silver-street, copyhold ..... 7,450

By Prickett, Venables, & Co.

South Mimms—A plot of freehold land, 1a. 1r. 9p. . 180

By Newbon & Harding.

Tottenham-court-road—17, Tottenham-street, copyhold ..... 450
Islington—62 and 64, Queensberry-street, 20 years, no ground rent ..... 460
24 38, even, Coleman street, 11 years, ground rent 30*l.* 8*s.* ..... 2,465
Streatham—Leigham Valley-road, four plots of freehold land ..... 280
Stoke Newington -51, Wellington-road, 26 years, ground-rent 1*l.* 5*s.* ..... 210

By T. G. Wharton & Sheperiv.

Clapton—Pond-lane, ground-rent of 56*l.*, reversion in 98 years..... 1,350
Pond-lane, a plot of freehold land ..... 400

By Hepbeing, Son, & Daw.

Lower Tulse-hill—No. 112, term 55 years, ground-rent 13*l.* ..... 775
Upper Tulse-hill—No. 120, term 55 years, ground-rent 17*l.* 10*s.* ..... 720
Nos. 138 and 142, term 56 years, ground-rent 34*l.* 1,710

By G. A. Wilkinson.

625 "A" Seven per cent. Shares of 20*l.* each in the Brighton and Hove General Gas Company ..... 16,576

## MEETINGS.

Monday, December 22.

*Inventors' Institute.*—8 p.m.

Tuesday, December 23.

*Institution of Civil Engineers.*—Annual meeting. 8 p.m.

Saturday, December 27.

*Royal Institution.*—Professor Tyndall on "The Sources of Electricity."

## Miscellanea.

**Hand-Guide to Southwell Cathedral.**—A penny guide book to the grand church which now ranks as a cathedral has been brought out by Miss Glaister, of Southwell, whose name is favourably known in connexion both with decorative art (as the authoress of the book on "Art Needlework," in Macmillan's series), and with literature in the wider sense. The "Hand-Guide to Southwell Cathedral" makes no attempt at literary form, however, but simply gives, in the briefest manner, information which appears to be correct upon the date and history, and various portions of the building. A word more of explanation for the uninitiated visitor might have been as well here and there. For instance, Miss Glaister Anglicises "quadripartite" into "four-part" vaulting, but the shorter term probably conveys no more information to a casual visitor. For the same reason it would have been as well, in mentioning the panelling of the north door "carved out of the solid," to remark how very unusual a proceeding this is. These points may be attended to in a second edition, perhaps.

**A Memorial of Dr. Johnson.**—Some years ago a good old house was pulled down in the Old-square, Birmingham, in forming the new street called Corporation-street. In that house the great doctor lived for some time, when a young man, with his old school-fellow, Edmund Hector, who practised there as a surgeon for many years. The house had been already marked by a memorial tablet, put up with the owner's leave, by the members of "Our Shakspeare Club of Birmingham," in 1865. When the house was pulled down, in order to preserve the commemoration of Dr. Johnson, the wainscoting and appointments of one particular room were removed and presented by the Improvement Committee to the Archæological Section of the Midland Institute. These have been conveyed to Aston Hall, and one room on the ground-floor has been fitted up with them under the direction of Mr. J. A. Cossins, architect, in which have been placed the memorial-stone taken from the front of the old house, and one portrait of Johnson and another of Hector. Saturday last being the centenary of Johnson's death, the ceremony was gone through of presenting these memorials to the Mayor of Birmingham, who received them on behalf of the town.

**Proposed Public Improvement in Lambeth.**—At a recent meeting of the Lambeth Vestry Mr. George Hill called attention to the bad state of the enclosed piece of ground in Palace-road, belonging to St. Thomas's Hospital, and moved that a deputation should be appointed to wait upon the Treasurer of the Hospital with the object of having the nuisance abated or abolished, and also to ascertain upon what terms the Governors would be prepared to surrender the land to the parish to be preserved as an open space. He said that the space at present only seemed to afford a hoarding for advertisements. The space was 3,000 superficial feet in extent, and, in proportion to the whole of their site, had cost the hospital authorities 5,000*l.* There had been applications to build on the land, but the parties had not been able to come to terms. It would be a great improvement if the land could be secured and maintained as an open space. The motion was seconded by Mr. Schmidt, and a deputation of six members, including the rector, was appointed to wait upon the hospital authorities.

**Stanhope Patent Water Purifier.**—This is an automatic purifier, the main value of which, if it carries out its professions, will probably be in preparing hard water for more effective use in washing processes, and for use in boilers without incrustation. The patentees go further, and state that by its means refuse water from factories, &c., can be purified before passing into streams. That is a much larger matter, and we must know something about the principle and method of action before expressing any opinion on its possible usefulness in that manner. The circular sent to us gives not the slightest information on this head.

**The Ventnor Local Board**, at a meeting held on the 15th inst., resolved to give their surveyor (Mr. R. S. Scott, C.E.) an honorarium of 100*l.*, in recognition of the special services rendered by him while acting as engineer for a Bill which passed through Parliament last session, empowering the Local Board to construct a new promenade pier, roads, and other town improvements.

**A Miniature Memorandum Book.**—Messrs. Crosby Lockwood & Co. send us a memorandum-book of practical details, tables, and calculated results for mechanics, engineers, architects, builders, and surveyors, which contains a great deal of information compressed into a book which will literally go in the waistcoat pocket.

**Architectural Partnership.**—Mr. T. Chatfeild Clarke, F.R.I.B.A., whose name has been so long known in the profession, will take into partnership, from the 1st of January next, his son, Mr. Howard Chatfeild Clarke, and the style and title of the office from that date will be T. Chatfeild Clarke & Son.

**Birmingham.**—It is announced that it is the intention of Mr. Follett Osler, F.R.S., to present a new clock and bell to be fixed in the clock-tower of the new art-gallery in Birmingham, at a cost of about 1,000*l.* The new clock will have four dials, each some 12 ft. diameter.

**The Municipal Records of Bath**, from Richard I. to Elizabeth, are being prepared for publication under the editorship of Mr. Austin J. King and Benjamin V. Watts. The work will be published shortly by Mr. Elliot Stock.

**Manchester Association of Employers and Foremen.**—The annual general meeting of the members of the above Association was held on Saturday at the Mechanics' Institute, Manchester, Mr. Thomas Ashbury, C.E., the President, in the chair. There was a good attendance, and eight new members were elected. The retiring president, in reviewing the period during which he had occupied the chair, stated that the Association had made remarkable progress during the past two years, the number of members having increased forty-two per cent. The members admitted during the past two or three years were connected with firms employing no fewer than 50,000 skilled workmen, and the Association had now in hand accumulated savings amounting to 2,600*l.* Mr. Ashbury further added that Mr. William Mather had proposed to bring before the members the subject of technical education with the view of having this question thoroughly discussed by the members. On the motion of Mr. John Horsley, the retiring vice-president, seconded by Mr. Rawlinson, Mr. Alderman W. H. Bailey (W. H. Bailey & Co., Salford) was unanimously elected President for the ensuing year. Mr. Bailey, in thanking the members, said the society was composed of the most important firms in the engineering trades of Lancashire, and there was probably no similar association in the kingdom whose members employed more energy in connexion with steam engines. It was also one of the most important technical societies in the kingdom, and its papers had for years been conferring on the members what might be considered high-class technical education.

**Thames Valley Drainage.**—The Local Government Board inquiry before Mr. J. Thornhill Harrison, C.E., as to the proposed dissolution of the Lower Thames Valley Main Sewerage Board, or the separating from it of some of the constituent authorities, was continued at Kingston-on-Thames on Saturday. It was now stated on behalf of the Richmond Rural Sanitary Authority that that body did not desire the dissolution of the Joint Board or separation from it; and, further, that they were opposed to the proposed union of the urban and rural authorities in the matter of an independent scheme of sewage disposal for the five parishes comprised within the Richmond Poor Law Union. Mr. Michael, Q.C., the representative of the Ecclesiastical Commissioners, then addressed the Inspector in opposition to the various applications of authorities seeking separation from the Joint Board, whose action he defended. He severely criticised the decision of the Select Committee of the House of Commons upon the occasion of the Board's recent application for a provisional order to carry out the Mortlake scheme of Messrs. Mansergh and Melliss. He opposed the scheme of Messrs. Gotto & Beesley for bringing the sewage of Richmond district to Barnes upon land belonging to the Ecclesiastical Commissioners, and called evidence in condemnation of the proposal. A number of witnesses were examined in opposition to the Richmond case.

**The Royal Exchange Assurance Company's Offices in Pall Mall.**—Adjoining the Junior Carlton Club, in Pall Mall, the Royal Exchange Assurance Company are erecting new offices. The buildings have two frontages, one in Pall Mall and the other in St. James's-square. The Pall Mall frontage is 70 ft. in height, the elevation being faced with Mansfield stone, richly carved. The ground story, which will contain the principal business offices of the company, is upwards of 20 ft. in height. This portion of the elevation contains several full-length sculptured figures, the models for which were furnished by Mr. Boehm. There are three main upper floors, having two-light mullioned windows, between which are elaborately-carved columns and shafts with similar columns at each side of the frontage. The St. James's-square elevation, in its general character, resembles that in Pall Mall. Mr. G. Aitchison, of Harley-street, is the architect, and Mr. Woodward, of Wilson-street, Finsbury, is the contractor.

**The Timber Supplies of Great Britain.**—Mr. P. L. Simmonds read a paper on "Present and Prospective Sources of the Timber Supplies of Great Britain" at the meeting of the Society of Arts on Wednesday evening. We may return to the subject.

**Moulded Bricks.**—Messrs. Barber send us their illustrated catalogue of brick sections for mouldings, made by them at Mead Lodge Brick Works.

**The Tooting Springs and the Southwark and Vauxhall Water Company.**—A few weeks ago we referred to the deep well which the Southwark and Vauxhall Water Company are sinking at Streatham, which it was alleged was causing serious injury to the inhabitants of Tooting by draining upwards of one hundred private springs and wells, from which the residents in Tooting are largely supplied. At a public meeting of the inhabitants a committee was appointed to take the matter into consideration, and this committee presented its report at an adjourned meeting held in the vestry-hall, at Tooting, on Monday night, when it transpired that the opinion of the Solicitor-General had been taken on the question, and that it was adverse to the inhabitants. The Solicitor-General observes :—

"The case is undoubtedly a very hard one, but I am unable to see my way to suggest any legal remedy as open to the inhabitants of Tooting or the owners of the wells. At common law there is no right as to percolating water, and any person may pump on his own land, and collect and carry away the percolating water, even though by so doing he should dry his neighbours' wells. I think the Act of water companies which empowers them on their lands to sink wells and erect pumps certainly does not diminish their common law right, or entitle those who may be injured by the exercise of them to compensation. If the attention of the Legislature had been called to the matter they might, not improbably, have inserted some provision for the protection of the adjoining well-owners, as the water companies are, of course, likely to do far more than individuals would be to the prejudice of neighbouring well-owners. I fear that all that is open to the inhabitants is either an appeal to the Legislature, or by sinking deeper wells, and adding pumping apparatus, to compete with the water company for water. I am fully conscious how little either of these courses is likely to do for them, and I regret that I can suggest nothing better."

In answer to a further question, the Solicitor-General says he thinks that if the water company may legally pump the water they may legally sell it.

**Large Sale of Building Land at Lewisham.**—On Monday evening, Mr. Richard J. Collier, of Finsbury-pavement, conducted an extensive sale of building sites at Lewisham. The property consisted of the first portion of the Priory Estate, containing about 18 acres, with frontages to the Lewisham High-road and several new roads which have been laid out on the estate. The sale was held at the Plough Hotel, where there was a very large attendance of capitalists and others connected with the building trade. The number of lots advertised was fifty-one, the whole of them being sold, and, in consequence of a request by the company present that a further portion of the estate should be offered, the auctioneer consented to submit thirty-two additional lots, all of which were sold. One lot, having a frontage to Lewisham High-road of 23 ft., with a depth of 130 ft., was sold for 205*l.*; the smaller lots, having frontages of 20 ft. and a depth of 100 ft., realised prices averging from 65*l.* to 70*l.* each. One of the stipulations is that the minimum value of the houses to be erected on the estate is 300*l.*, whilst those having frontages to the high road are not to be of less value than 400*l.* Since the sale we understand that twenty-four more lots have been sold by private treaty bringing the total proceeds of the sale up to 6,500*l.*

**Royal Meteorological Society.**—At the usual monthly meeting of this Society, held on Wednesday evening last at the Institution of Civil Engineers, Mr. R. H. Scott, F.R.S., president, in the chair, Mr. Charles Harding read a paper on "The Diversity of Scales for Registering the Force of Wind." The object of this paper was to call attention to the confusion that exists in the systems in use by various countries for registering wind force, whether instrumentally or otherwise, and to show the need of action for improvement.

**Middlesex Hospital.**—In the account of the new works here which appeared in our last number (p. 807), it should have been mentioned that Messrs. Strode & Co., of Osnaburgh-street, did the whole of the gasfitting. In the same building the engineering work in connexion with the fire hydrants and system of fire extinguishing has been done by Messrs. Merryweather & Sons.

**Fire-Resisting Doors.**—The Council of the Society of Arts have awarded to Messrs. Chubb & Son the Gold Medal offered by the Society, under the Fothergill Trust, for the best exhibit in Class 27 of the International Health Exhibition. The exhibit referred to consisted of Chubb's patent fire-resisting doors.

**The New-street Station Extension, Birmingham.**—The works here are fast approaching completion, and in celebration of the event a dinner was held on Saturday evening, the 6th inst., at the Old Ring of Bells Tavern, Yardley, at which the various officials and sub-contractors were present, representing Messrs. Nelson & Co. The London and North-Western Railway Company, Messrs. Horton & Son (ironwork contractors), Messrs. Lander & Co. (timber work), Messrs. Braithwaite & Co. (glazing), and representative of various other trades.

**Mr. R. J. Crocker,** builder, of Bristol, died after an attack of paralysis at his residence, Southville, Bedminster, on the 12th inst. The deceased was a member of the Town Council for the East Ward, Bedminster, and was also a member of the Sanitary Committee of Bristol, and vice-chairman of the Bedminster Board of Guardians. The funeral took place on Tuesday, at Arno's Vale Cemetery, in the presence of a numerous company of prominent citizens. The esteem in which Mr. Crocker was held by his workmen was shown by their attendance at the funeral in large numbers.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Additions to Vestry Hall Buildings | Chelsea Vestry | 100 guineas, first; 50 ,, second; 30 ,, third | Feb. 23rd | i. |
| Street Improvements | Croydon Corporation | 100*l.*, 50*l.*, 25*l.* | March 25th | ii. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Sewerage Works | Tottenham Local Board | Mr. De Pape | Dec. 23rd | ii. |
| Erection of Laundry Buildings, Isleworth | Brentford Union | E Monson, Junior | Dec. 30th | xviii. |
| Erection of New Sanitary Turret, &c. | Guardians of St. Luke, Chelsea | A. & C Harston | Dec. 31st | xviii. |
| Construction of two Bridges, Lenton | Midland Railway Co. | A. A. Langley | Jan. 2nd | ii. |
| Supply and Erection of Ironwork for Bridges | do. | do. | do. | ii. |
| Erection of New Picture Galleries, Nat Gallry | Commissioners of Works | *Official* | do. | ii. |
| Alterations to Derby County Court Offices | do. | do. | Jan. 5th | ii. |
| Construction of Road, Lee-on-the-Solent | J. C. Robinson | do. | do. | ii. |
| Engines and Boilers | Farnham Local Board | J. Lemon | do. | ii. |
| New Service Reservoir, Filter Beds, &c. | Bedford U. S. A. | J. Lund | Jan. 6th | ii. |
| Unclimbable Iron Fencing and Gates | Willesden Burial Board | do. | do. | xviii. |
| Repairing Floor of the Chambers of Laundry | Commissnrs of Baths, &c. St. James, Westmstr | H. Monson | Jan. 7th | xviii. |
| Sewerage, &c., Knighton | Blaby R. S. A. | E. L. Miles | Jan. 9th | xviii. |
| Re-seating and Improvement, and Enlargement of Holy Trinity Church, Sheerness | Committee | R. Wheeler | do. | xviii. |
| Additions & Alterations to existing Buildings, and Fitting-up of necessary Machinery | Commissionrs of Public Baths, &c., Brmnday | G. Elkington & Son | do | ii. |
| Erection of Board School, Herne Bay | Herne School Board | do. | Jan. 13th | ii. |
| Enlargement, and part Re-building Church of St. Mark, Bexhill, near Hastings | Rev. J. N. Simpson | Riches & Esam | Jan. 15th | ii. |
| Guernsey, &c., Granite | Finchley Local Board | G. W. Brumel | Jan. 19th | ii. |
| Pulling down of four Houses, and Purchase of Old Materials | St. James's Property Company | | Not stated | xviii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Chief Accountant | Sheffield Un. Gas Light C. | Not stated | Dec. 27th | xvi. |
| Civil Engineer or Surveyor | Billesden U. R. S. A. | Not stated | Jan. 2nd | xvi. |
| Surveyor and Inspector of Nuisances | Cheshunt Local Board | 175*l.* | Jan. 5th | xvi. |

## TENDERS.

For new Metropolitan Free Hospital, Kingsland-road. Messrs. H. H. Collins & James Edmeston, joint architects. Quantities supplied by Messrs. Hovenden, Heath, & Berridge :—

| | | Addition for Oak Flooring. |
|---|---|---|
| J. R. Hunt | £23,310 0 0 | £640 0 0 |
| William & Son | 23,200 0 0 | 530 0 0 |
| J. Woodward | 23,067 0 0 | 929 0 0 |
| Colls & Son | 23,050 0 0 | 1,676 0 0 |
| W. Shepperd | 22,975 0 0 | 909 0 0 |
| Higgs & Hill | 22,940 0 0 | 1,200 0 0 |
| T. Boyce | 22,510 0 0 | 1,550 0 0 |
| Kirk & Randall | 22,420 0 0 | 470 0 0 |
| Conder | 22,363 0 0 | 1,512 0 0 |
| Ashby & Horner | 22,270 0 0 | 1,088 0 0 |
| Perry & Co. | 22,238 0 0 | 850 0 0 |
| W. Brass | 21,877 0 0 | 1,100 0 0 |
| Mark Gentry | 21,500 0 0 | 350 0 0 |
| J. Morter | 21,327 0 0 | 705 0 0 |
| J. Smith & Son | 21,111 0 0 | 599 0 0 |
| E. Lawrence & Son | 21,019 0 0 | 1,050 0 0 |
| Mowlem & Co. | 20,890 0 0 | 1,389 0 0 |
| W. & F. Croaker | 20,860 0 0 | 660 0 0 |
| W. Downs | 20,835 0 0 | 550 0 0 |
| W. Shurmur | 20,574 0 0 | 540 0 0 |

For draining, making walks, building boundary walls, and fixing palisading, iron fencing, and gates, for the Wimbury Burial Board, Middlesex :—

| | |
|---|---|
| Rowley | £1,047 0 0 |
| Cohen | 1,044 8 0 |
| Castle | 1,031 0 0 |
| Kilningback | 1,026 0 0 |
| Burnham | 965 0 0 |
| Shephard | 880 0 0 |
| Belham | 850 0 0 |
| Holliday | 821 0 0 |
| Cardus | 798 0 0 |
| Batchelor | 790 0 0 |
| Haynes | 779 16 4 |
| Pinfold | 770 10 0 |
| Pizzey | 765 0 0 |
| Prestley | 719 0 0 |
| Wood | 705 0 0 |

For pulling down and rebuilding the Sir Sydney Smith, Chester-street, Kennington-road, for Mr. Caley. Mr. Geo. Treacher, architect, 23, Carter-lane, City :

| | |
|---|---|
| Hammond | £2,450 0 0 |
| Canning & Mullins | 2,347 0 0 |
| Burnham & Son | 2,245 0 0 |
| Smith | 2,157 0 0 |
| Jackson & Todd | 2,040 0 0 |
| J. Beale | 1,998 0 0 |

For York-buildings Board School, for the Southampton School Board. Mr. E. J. Howell, architect :—

| | |
|---|---|
| Chapman | £2,489 0 0 |
| Dyer & Son | 2,434 0 0 |
| Bailey | 2,448 0 0 |
| Stevens & Sons | 2,396 0 0 |
| Rowland & Sons | 2,349 0 0 |
| Sanders | 2,340 0 0 |
| J. Bull, Sons, & Co. (Limited) | 2,300 0 0 |
| J. Crook (accepted) | 2,270 0 0 |

For lodge, coach-house, and stabling, at Highfield, Fordingbridge, for the Executors of the late Mr. J. R. Neave. Mr. Fred Bath, architect. Quantities supplied :—

| | Net. |
|---|---|
| George Dolman, Salisbury | £1,495 0 0 |
| John Shering, Fordingbridge | 1,471 0 0 |
| F. J. Meader, Wimborne | 1,459 10 3 |
| Edward Smith, Wimborne | 1,454 12 0 |
| John Wort, Salisbury | 1,431 0 0 |
| Philip Tryhorn, Salisbury | 1,392 6 0 |
| Charles Mitchell, Downton | 1,319 2 0 |
| Gilbert Harris, Salisbury | 1,241 0 0 |
| E. Young & Sons, Salisbury* | 1,230 0 0 |

* Accepted, subject to modifications.

For the erection of the Museum and Schools of Science and Art, Chester. Mr. Thomas M. Lockwood, architect, 90, Foregate-street, Chester. Quantities supplied :—

| | Terra-cotta Dressings. | Stone Dressings. |
|---|---|---|
| Forrester & Mayers, Chester | £9,350 | £9,350 |
| William Vernon, Chester | 9,270 | 9,390 |
| Wm. Andrews, Chester | 9,100 | 9,176 |
| Thomas Tyson, Liverpool | 9,035 | 9,255 |
| Bull, Sons, & Co., Southampton | 9,000 | 9,213 |
| William Parrott, Chester | 8,965 | 8,789 |
| Thomas Browne, Chester | 8,890 | 9,040 |
| Thomas Hughes, Chester | 8,850 | 9,120 |
| Brown & Backhouse, Liverpool | 8,824 | 8,924 |
| James Hamilton, Altrincham | 8,750 | 8,850 |
| Thomas Munnerley, Bebington | 8,603 | 9,021 |
| John Gallimore, Newcastle | 8,595 | 8,840 |
| John Matthews, Nantwich | 8,500 | 8,700 |
| Samuel Warburton, Manchester | 8,400 | 8,590 |
| Edmund Gabbutt, Liverpool* | 7,956 | 8,151 |

[Architect's estimate (terra-cotta), 8,500*l.*]

* Accepted.

For the construction of new street and the drainage of building land, Cope-street Coventry. Mr. Herbert W. Chattaway, surveyor, Trinity Churchyard, Coventry :—

| | |
|---|---|
| G. F. Smith, Milverton | £399 0 0 |
| C. Haywood, jun., Coventry | 395 0 0 |
| W. Boon (accepted) | 383 0 0 |

For making two new roads, laying sewers and drains, constructing flushing tank, concrete retaining walls, &c., on the Grove House Estate, Windsor, for Messrs. Bolton & Co., Temple. Mr. T. P. H. Davison, engineer.—

| | |
|---|---|
| Botterill, Cannon-street | £1,262 0 0 |
| Bishop, Windsor | 1,240 0 0 |
| Akery, Windsor | 1,098 0 0 |
| Knapp, Windsor | 1,052 0 0 |
| Hann & Co., Windsor | 1,028 0 0 |
| Streeter, Croydon | 1,004 0 0 |
| Pizzey, Hornsey | 999 0 0 |
| Nicholls, Wood green | 997 0 0 |
| Bottoms Bros., Battersea | 992 0 0 |
| T. Adams, Moorgate street | 979 0 0 |
| Pound, Bow | 976 0 0 |
| Cooke & Co., Battersea | 957 0 0 |
| Kelly, Windsor | 949 0 0 |
| Smart, Nottingham and Finsbury | 948 10 0 |
| Rowland Bros., Fenny Stratford | 947 0 0 |
| Rampside, Windsor | 924 0 0 |
| Reavell, Windsor | 878 0 0 |
| Oliver, Brockley | 851 0 0 |
| Wills, Windsor | 816 0 0 |
| Hare, Clapham | 790 0 0 |
| Free & Sons, High Wycombe | 786 12 9 |
| Trueman, South Hackney | 785 0 0 |
| Hill, High Wycombe | 783 17 3 |
| Etheridge, Croydon (accepted) | 739 0 0 |

Accepted for new shop-front fittings and decorations at 115, Westbourne-grove, for Madame Julia. Designed by Mr. Reuben Brooks:—

| | |
|---|---|
| G. S. Archer, Featherstone-street | £265 10 0 |

[No competition]

For new bar, front, &c., to the New Inn, Shefford, Beds, for Mr. Wells. Messrs. Usher & Anthony, surveyors:—

| | |
|---|---|
| L. Stapleton Hitchin | £151 0 0 |
| W. Daniels, Clophill | 131 10 0 |
| W. Wootton, Shefford | 94 0 0 |
| J. P. White, Bedford (accepted) | 92 0 0 |
| R. Ransom, Arlsey | 70 0 0 |

For extension of main sewer at Barmouth, to Hanlith-terrace. Mr. Thomas Roberts, engineer, Assoc. M. Inst. C.E.:—

| | |
|---|---|
| John Jones, Barmouth | £240 2 0 |
| W. Davies, Portmadoc | 240 10 0 |
| S. P. Owen, Portmadoc (accepted) | 150 0 0 |

[No surveyor's quantities.]

For the restoration of the tower of Frodsham Parish Church. Messrs. Lunaker & Davies, architects, Frodsham. Quantities by the architects:—

| | |
|---|---|
| E. Aukland, Warrington | £2,500 0 0 |
| Sieffert & Carter, Northwich | 2,494 0 0 |
| R. Beckett, Hartford | 2,117 10 0 |
| Johnson & Son, Kelsall | 2,021 12 8 |
| Thomas Davies, Frodsham* | 2,000 0 0 |

* Accepted.

For the erection of shop, &c., for Mr. S. Smith, Luton. Mr. A. E. Smith, architect:—

| | Elevation A. stone. | Part in Mansfield stone. | Elevation B. |
|---|---|---|---|
| Saunders | £1,691 10 0 | £1,691 10 0 | £1,651 10 0 |
| Redhouse | 1,575 0 0 | 1,618 0 0 | 1,586 0 0 |
| Neville | 1,489 0 0 | 1,704 0 0 | 1,499 0 0 |
| Dunham | 1,430 0 0 | 1,540 0 0 | 1,470 0 0 |

* Accepted.

For alterations to 22, Tottenham-court-road. Mr. Geo. Edwards, architect. Quantities by Mr. H. Lovegrove:—

| | |
|---|---|
| Crooke | £2,041 0 0 |
| Nightingale | 2,010 0 0 |
| Martin, Wells, & Co. | 1,980 0 0 |
| Green | 1,890 0 0 |
| Axford | 1,855 0 0 |
| Patman & Fotheringham | 1,810 0 0 |
| Scharien & Williams | 1,772 0 0 |
| Stimpson & Co. | 1,736 0 0 |
| Scrivener & Co (accepted) | 1,707 0 0 |

For making a new road and laying down pipe sewer, and building retaining brick walls, at Pentonville-road, for Mr. A. Attneave.

| | |
|---|---|
| Mackenzie Cole | £1,206 0 0 |
| Neave & Son, Kilburn | 1,705 0 0 |
| Wilkinson, Finsbury Park | 1,666 0 0 |
| Pizzey, Hornsey | 1,222 0 0 |
| Kirkpatrick, Camden Town | 1,135 0 0 |

Accepted for converting the old Police Station, Salisbury, into Club premises, for Mr. Willam Marlow. Mr. Fred. Bath, architect, Salisbury and London.—

| | |
|---|---|
| John Wort, Salisbury | £225 0 0 |

[No competition]

Accepted for new shop-front for Messrs. Brown Bros., Paris.—

| | |
|---|---|
| F. Sage & Co. | £140 0 0 |

Accepted for alterations to shop in Fenchurch-street, for Messrs. Crowther & Goodman:—

| | |
|---|---|
| F. Sage & Co. | £190 0 0 |

Accepted for new office screens, for Messrs. Stapley & Smith, London-wall:—

| | |
|---|---|
| F. Sage & Co. | £200 0 0 |

For the erection of two cottages at the Irrigation Farm, Bedford. Mr. Lund, architect and surveyor:—

| | |
|---|---|
| G. Haynes | £419 10 0 |
| Melcombe | 415 3 4½ |
| J. P. White | 412 0 0 |
| G. Harrison | 389 0 0 |
| Clayson & Co. | 385 0 0 |
| Corby & Son | 375 0 0 |
| Geo. Freshwater | 374 5 0 |
| C. Dennis | 370 0 0 |
| J. Smith | 369 0 0 |
| E. Pacey | 365 10 0 |
| J. Haynes | 361 4 0 |
| T. Laughton | 357 0 0 |
| G. Todd | 344 0 0 |
| J. Carter (accepted) | 337 10 0 |

*SPECIAL NOTICE.*—Lists of Tenders for insertion in our next must reach us *not later than 4 p.m.* on TUESDAY NEXT, Dec. 23.

## TO CORRESPONDENTS.

M. & L. (we will publish it in the course of two or three weeks.—Priory (719,787).—H. & K.—A. H.—H. A. (you are altogether at sea in your philology: there is no such word as "cruels"; the plural is "cruses").—J. H. next week.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (by old mere news items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other established business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

## PUBLISHER'S NOTICES.

**Christmas Week.**—*The* BUILDER *for the week ending December 27th will be published on* **Wednesday, 24th** *inst., at the usual hour.*

*Advertisements for insertion in that issue must, therefore, reach the Office before Three o'clock* P.M. *on* **Tuesday, 23rd** *inst.*

ALTERATIONS IN STANDING ADVERTISEMENTS, *or* ORDERS TO DISCONTINUE SAME, *cannot be attended to if received after* 12 (*noon*), *on* **Monday, 22nd.**

### CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines about fifty words or under ..... 4s. 6d.
Each additional line about ten words ..... 0s. 6d.

Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

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PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash, by Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum. PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher No. 46, Catherine-street, W.C.


**Best Bath Stone.**
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
BANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

**Dry Corsham Stone.**
150,000 FEET CUBE.
PICTOR & SONS,
BOX, WILTS.
[ADVT.

**Doulting Freestone.**

THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.

HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset.
London Agent—Mr. E. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.

**Doulting Free Stone**
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

**Asphalte.**
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
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# The Builder.

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## *The Building Movement of the Country.*

THE building movement of the country is a subject of no small interest to the architect, as well as to all that great host of industrious persons who are connected with the building trades. We are not so much referring to the numeric increase which is actually taking place in the number of inhabited houses (which is at the rate of upwards of 180 per day, counting only six days in the week), as to the distribution of this activity over the country. As to this, the action of three principal laws results from very extended research as found to be in operation at the present time.

In the first place, the activity of the builder is remarkably concentrated. The growth of towns seems to be, to some extent, a function of their size. Those of less than 10,000 inhabitants (at all events, as far as boroughs are concerned) have hardly grown at all within the last decade. Many of them have actually declined in the number of the inhabited houses that they contain. And all of them, taken together, have not grown on an average as much as one per cent. in ten years

At the other extremity of the scale (with one or two significant exceptions) the largest towns are also the most rapid in their growth. The urban population is not only double the rural population, but, decade after decade, it more and more preponderates. In London the increase is, at a first glance, somewhat anomalous. In the central area there has been a steady decrease of 5·8 per cent. from 1861 to 1871, and of 7·8 per cent. from 1871 to 1881, taking population as the standard. But, while the ten registration districts which form the central area of London have thus lost 13·4 per cent. of their inhabitants in twenty years, the loss may be, to a great extent, accounted for by the fact that sleeping accommodation has been sacrificed to office accommodation, so that, while the real day and night dwellers have declined, the merely day population has, in a countervailing manner, increased; for, in the outer ring as defined by the Registrar-General, the population has increased by 126·8 per cent. in twenty years. In the area intermediate between these two districts the increase has been at about half that rate, so that the total increase of "Greater London" has been 22·6 per cent. in the last ten years, and 47·8 per cent. in the last twenty, taking, of course, the census years for comparison.

This rapid rate of increase has not been rivalled in either of the six great English towns which, containing upwards of 200,000 inhabitants each, are in all equal to about two-fifths of the population of Greater London. Sheffield, Liverpool, and Bristol, have increased respectively by 18·4, 17·8, and 17·8 per cent. in the decade; Leeds by 16·4, Birmingham by 14·1, and Manchester by only 6·0 per cent. Below these, the sixteen towns containing between 100,000 and 200,000 inhabitants each, show the more rapid average growth of 21·5 per cent. in a decade, treading more closely on the heels of London than do the six first-class provincial cities; and Bradford, the largest of the sixteen, has increased by 25·3 per cent.

The towns containing between 50,000 and 100,000 inhabitants are increasing at the average rate of 17 per cent. Here, however, an element of growth becomes apparent, which is due to the second law, namely, that the increase of the ports and seaboard towns is much more considerable than that of the inland towns.

Thus Great Grimsby has increased by no less than 62·9 per cent. in ten years, Gateshead by 42·9 per cent., Hartlepool by 34·7 per cent., Hull by 29·6 per cent., Swansea by 28·5 per cent., Sunderland by 27·5 per cent., Cardiff by 45 per cent. Nor is the movement confined to great trading ports. Hastings has grown by 43·7 per cent. in ten years, Brighton by 25·1 per cent., Bournemouth by 185 per cent.; and if we took the increase for the decade 1874-1884, the last-named place would probably be found to have more than trebled its population. Thus on the one hand the calls of business, and on the other the attractions of sea air, are steadily diverting an increasing proportion of the population of England to the seaboard towns.

The third law is one to which we have previously called attention. Its operation may, to a certain extent, prove to counteract the aggregative tendency before shown to exist. It is that of direct relation between rateable value and density of population. We have previously shown (vol. xlvi., p. 922) how close this relation is, and attention must be given to the fact that the range of rateable value is very considerable. Thus, while for the whole of London we have a mean rateable value of 52·2*l.* per house, in the Mile End Old Town Union this value is as low as 23·9*l.* per house; while in the City of London proper it rises to 541*l.* per house. It is thus conceivable that rents and rates may rise with the concentration of population, and its increase on a given area, to a point at which the cost of living becomes so excessive as to arrest further growth, if not to cause decline to set in. There are not a few figures in the Blue Books which form the voluminous and wholly undigested literature of this subject, which point in this direction, showing decline of population in certain very important centres, as well as in minor towns.

An admirable paper, which was contributed by Mr. Alfred Hickman, President of the Wolverhampton Chamber of Commerce, to the Social Science Congress in Birmingham in September last, and which has been printed in pamphlet form,* gives some very significant facts as to a movement which threatens so much danger in the distribution of the building activity throughout England. We may observe that Wolverhampton, although the eighth English town (exclusive of the metropolis) in population, has only increased by 3·5 per cent. in the number of its inhabited houses in ten years; while the ports of London, Liverpool, Hull, and Gloucester, with which it has canal communication (unfortunately far from perfect), have respectively increased by 22·6, 17·8, 29·6, and 21·2 per cent. in that time. It is thus easy to understand why the manufacturers of Wolverhampton should be among the first to insist on the direction of public attention to that artificial restriction of their facilities for cheap carriage from which the return of inhabited houses shows that they are suffering. Mr. Hickman says:—"Within the last year, Messrs. Griffin & Morris, of Wolverhampton, artificial manure makers, have set up works at Newport, South Wales" (Newport, we may remark, has grown by 30·4 per cent. in the ten years). "Mr. J. C. Major, manufacturing chemist, has started works near Hull" (increase of Hull, 29·6 per cent. in ten years) "The Chillington Iron Company, have set up galvanising works at Liverpool, and quite lately, the large firms of Morewood & Co., Eliza Tinsley & Co., and the Junction Nail Company, have decided to remove their extensive patent wrought-nail works altogether to near Newport, South Wales. In other cases, instead of the natural expansion of trade taking place here, the new works have been established near the sea, and so trade has either declined or has not increased in its natural ratio. The wire trade, once a great Birmingham manufacture, has left for Warrington and other more favoured places, and the iron-tube trade has been enormously developed on the Continent and Scotland, whilst here it has been nearly stationary."

The object of Mr. Hickman's paper was to point out the suicidal policy of the railway companies serving, or rather not serving, the Wolverhampton district. Into that we are not about now to enter, although we fully share the views expressed in the pamphlet Our object at present is rather to point out what is actually occurring, and to trace its

* Barford & Hewitt, Wolverhampton.

cause, than to suggest the remedy. What is now taking place, as far as accessible statistics show, over the greater part of industrial England, is this: Continental manufacturers, benefiting, no doubt, first, by English enterprise and invention, and secondly, by English tools and machinery, which they have purchased to the value of 92,000,000*l.* within the last ten years, are now running our manufacturers very hard in the foreign market. And not only so, but, incredible as it may seem, the railway companies are doing their best to help the foreigner to introduce his goods into the home English market, there to compete with English productions. Thus, at the present time, bright iron wire is carried *viâ* London from Antwerp to Birmingham for 17s. 4d. per ton; while, for carrying home-made wire of the same description, from Birmingham to London, 1*l.* 8s. 4d. per ton is charged by the railway companies. Nails are carried from Antwerp to Wolverhampton, *viâ* Harwich, for 16s. 4d. per ton, while from Wolverhampton to Harwich the railway companies charge 1*l.* 1s. 4d. per ton. So with sheet-iron, with iron girders, with plate glass; for all which, as well as for the difference in freights on English and on foreign railways, we refer the reader to Mr. Hickman's pamphlet.

We think it more than questionable whether these differential rates are legal. As to the ruinous character of this impolicy, first as affecting the inland manufacturing towns, and secondly, and in consequence, as sapping the very springs of railway traffic, there can be no doubt whatever. In the great displacement of the building activity which is now taking place in favour of the seaport and river-side towns, it is thus hardly to be questioned that the unfortunate policy of the English railway companies is a very potent factor.

This, then, is the outcome of the inquiry. The urban population of England and Wales is increasing at almost exactly double the rate of the rural population; the ratios for the ten years 1871-81 being respectively 17·5 and 8·3 per cent. The large towns are increasing at a much more rapid rate than the smaller ones, those containing fewer than 10,000 inhabitants hardly increasing at all. The seaport towns, and the seaside watering-places, are increasing at the expense of the inland towns, and in some cases with almost Transatlantic rapidity. And the railways, whose true interest it is to minister to an inland population, spread as much as possible over the country, are adopting modes of charge which tend to the paralysis of inland industry, and to the removal of manufactures from their inland seats to the seaboard; and, indeed, from the British Isles to the Continent of Europe. The tendency of the movement, which is going on at an accelerating rate, is to surround the island with a fringe of ports, towns, and villages, which would be exposed to destruction in the event of war, and to withdraw population, manufacture, and cultivation from the inland area of the island. The movement does not appear to us to be advantageous to the welfare of the country. But of its existence there is no doubt; and it is of no little importance, as well to the constructors as to the purchasers of houses, to have an accurate idea of what is really taking place.

The phenomena above indicated would be even more marked if, instead of inhabited houses, the comparison had been made of inhabitants. Thus Manchester, while increasing, as before shown, by six per cent. in ten years in the number of houses, actually declined, during that period, in the number of inhabitants, though Salford showed a very large increase.

**A New Route from Sutton Coldfield to Lichfield.**—The London and North-Western Line from Birmingham has hitherto stopped at Sutton, but on the 15th inst., an extension was opened from Sutton to Lichfield. The distance is 8¼ miles only, and the new route will provide the public with a short direct route, instead of the old roundabout way through Walsall. Mr. Evans, of Birmingham, is the contractor.

## FRESH SUGGESTIONS ON THE GENESIS OF THE DORIC STYLE.

In a recent essay under the title "Der antike Ziegelbau und sein Einfluss auf den dorischen Stil,"* Dr. Dörpfeld throws out some new suggestions, partly derived from the excavations at Olympia, on the part which brick-building may be supposed to have had in laying the foundations from which the Doric style grew up.

As regards Egypt and Assyria, no one doubts the use of brick for building. It is enough to recall the Children of Israel and the Tower of Babel; but as regards Greece there has been a widespread idea that only walls which consist of solid masonry are properly Hellenic. When excavators have in the course of their work lighted on irregular masses of small stones or sun-burned bricks they have set them aside too often contemptuously as "comparatively late work." But recent excavations have tended to overcome this prejudice. At Hissarlik it has been shown that the Pergamos of Ilium was brick-built; at Mycenæ we have a brick wall of very ancient date; at Tiryns, at Olympia, at Tegea are still remains of brick walls whose size is considerable, and whose age indubitable. Naturally from these remains, few and scattered though they are, we conclude that had brick been a less perishable material we should have had evidence that the practice of brick building was widespread. Further evidence of the pre-existence of brick walls Dr. Dörpfeld gleans from the construction of the later stone walls. The normal stone temple wall had a basis of large slabs as a sort of foundation to the upper courses of the wall. For a brick wall this was of special service. Sun-burned brick, if in contact with the moisture of the earth, would soon rot away; it was necessary, therefore, to place a foundation course of stone, and the tradition was kept up by the large slabs long after the necessity had ceased. The very name "plinth" (πλίνθος) is a testimony to the original brick.

Again, the frames of the doors in Doric temples of quite late times (*e.g.* Parthenon) have been, it can be clearly shown, of wood overlaid for the most part with bronze. This, where the walls of the entrance were stone, seems unnecessary and inexplicable, but walls of brick would obviously need door-posts of some more solid material to resist the weight and swing of the door on its hinges. Finally, we have the evidence of modern times. Even in Athens, where stone abounds, the inferior kind of houses are still, for the most part, built of sun-dried bricks.

Dr. Dorpfeld next proceeds to reconstruct in the thought an ancient Doric temple of mixed wood and brick architecture. The walls of the naos are of brick, on stone foundations. The pronaos extending on one side is of the "templum in antis" form; it ends on either side with two short brick walls furnished with wooden antæ. Between these antæ are two wooden pillars, each standing on a stone basis. The two antæ and the two pillars support an architrave of wood. From side to side across the naos are placed beams of wood, the ends of which form the triglyphs. The roof superimposed on this was probably covered with clay and originally horizontal; later the invention of tiles made the sloping roof possible, and with the sloping roof came in, of course, the pedimental spaces. At Troy and Tiryns the roofs were of the horizontal scheme. If the naos were surrounded by a peripteros the pillars would be of wood on a stone basis, and the architrave also would be completely of wood. Such a compound structure would lead, we can readily see, to more substantial proportions than any mere building of wood only.

If buildings such as these were frequent, we must possess at least the stone foundations of something of the kind. Such a building was, in fact, laid bare by the excavations at Olympia, a temple consisting of naos and peripteros, with foundations of stone, with antæ and peripteral columns of wood, and with cella walls of brick,—the ancient Heraion, within the sacred Altis. Full details of this temple are not as yet available, but we know that it consisted of cella, with pronaos and opisthodomos, and peripteral columns; *in situ* are still preserved the stylobate of the peripteral columns, and a few scattered remains of many of the columns themselves, the wall of the cella of the pronaos and opisthodomos to about the height of one mètre, one drum of each of the two columns of the pronaos, and the stylobate of the interior columns. It is important to note what are the *missing parts*, viz., the whole of the outer architrave, the pillars of the cella, and the opisthodomos, and the upper part of the cella wall, and the whole roof. What is the obvious conclusion? In all the other purely stone buildings of Olympia traces at least of the existence of these architectural parts have been found. Only for the Heraion there are none. Why? The answer is simple: they were of wood and of clay, both perishable when exposed to the weather,—the pillar and architrave of wood, the top of the cella wall and the roof of clay. There is another curious point about the peripteral columns, some of whose drums remain. These were, of course, of stone; but, oddly enough, no two are exactly alike, their diameter, even the material of which they are made, and the style of their execution, vary in each case. One by one they have been substituted for the old wooden pillars as these fell into disrepair. In the time of Pausanias, just one of these old pillars was remaining; he saw it in the opisthodomos. There is still more circumstantial evidence as to the use of bricks. Within the precincts of the temple the excavators came upon a stratum of clay about 1 mètre deep, having no geological *raison d'être*. It can scarcely be other than the clay which once formed the upper part of the cella walls. As soon as the wooden roof perished, and the rain beat upon the rough sun-dried bricks, they melted, and the walls fell to pieces. Had we stood in the Heraion with Pausanias, and seen the last wooden pillar, we should have caught the old temple in the very act, as it were, of translating itself from wood into stone; as it is, we have in the foundations of the temple which remain interesting data for settling the proportions of a temple that was originally a compound structure of wood and brick.

It is impossible to forget that it is this heap of ruined brickwork, melted by time back into soft clay, that has so tenderly preserved for us the rarest of the treasures of Olympia, the Hermes of Praxiteles.

* From the "Historische und Philologische Aut-satze," Ernst Curtius Gewidmet.

## NOTES.

The attention of unfortunate ratepayers at this season of the year is imperatively called to the enormous increase in the urban sanitary rates, which seems to have developed a fresh vigour since the completion of the Local Government Board Report for 1883-84. But even for that year the pressure of this particular item of expenditure, on a limited portion of the community, is far heavier than would appear from the general account of local impositions. The urban population of England and Wales in 1881 was 17,285,026; and if we deduct that of Greater London (4,764,312) it was 12,520,724. The rate of increase of the last decade, if continued, would raise this population to about 13,050,000 by the beginning of 1884. The urban sanitary rate for 1881-82 amounted to 9,084,721 for extra metropolitan districts alone. Since that time we have known instances of the increase of this rate by 55 per cent., and we apprehend that such cases are far from unique. On the urban population of 1881, the actual rate for that year shows a pressure of serious magnitude, while the rural sanitary rates only amounted to 242,486*l.*, charged upon 8,683,260 persons. If this rate of expenditure for professed sanitary purposes is to continue, and not only so, but also to increase, it can hardly fail to awaken a serious reaction against an amateur system which costs the country so notable a sum, while at the same time it has almost absolutely failed to secure the purity of

our rivers. As to the Thames, we need say nothing but that the Board of Works rate and the Local Management rate of the metropolis amount together to 2,390,749*l.*

THE case of Kempson *v.* The Great Western Railway Company, recently argued before the Railway Commissioners, is remarkable for the conflicting evidence brought forward. The applicants,—better known as T. & L. Jenkins, under which name they carry on business in Birmingham,—complained of being charged an excessive rate for the carriage of undamageable wire rods from Oakengates to Birmingham. The rate complained of was 5s. 10d. per ton, the applicants further stating that they were being charged an additional 2s. per ton for cartage in Birmingham, and that they also considered this charge exorbitant. As regards the latter point, the Company proved that they were charging the same as the waterway carriers, and further, that it cost them 3s. per ton to deliver ordinary traffic conveyed at rates including delivery. But on points involved in the main question the Commissioners have to decide upon widely-differing testimony. The Great Western Company's statement of the manner in which the rate was made up included 6d. per ton for loading into the trucks at Oakengates, and a similar amount for unloading at Birmingham; and they called the chief officials of several lines to prove that the actual cost was 5½d., and that in many cases 7d. was charged, and considered reasonable. On the other hand, the applicants' witnesses stated that it could be done for from 2d. to 2½d., and the Commissioners not unnaturally took time to consider the matter, and reserved their judgment. In view of the now well-known fact that the companies intend to apply for new Parliamentary powers in regard to rates next session, it is certainly a bold thing in Messrs. Jenkins to open up this question, and the result will be eagerly looked for both by the railway companies and the trading public.

AT the meeting of the School Board for London last week, Professor Gladstone brought forward a report from a special committee on technical education. The committee was appointed two years ago to consider how far the Board could facilitate technical education. Among other recommendations the committee submitted the following:—"That the instruction in drawing commence with Standard I., and be carried out according to a graduated scheme laid down for each standard; and that increased attention be paid to freehand-drawing from models in all schools, and that mechanical drawing and modelling in clay be introduced into certain schools; and that, as an experiment, arrangements be made for the establishment of a class for the elementary instruction of boys in the use of tools as applied to working in wood, the attendance being voluntary and out of school hours." The two first-named were carried, we are glad to observe, by a very large majority. In thus bringing in drawing and modelling as an integral part of primary education, the Board have taken a step which may have larger results in the future than they are even able to anticipate at present, and they have probably done more to render the teaching of their schools a true "education" in bringing out faculties at once of mind and body, than by any enactment they have made for a long time past, besides investing the school teaching, to many children we may hope, with a new feature of interest and attractiveness.

AT the close of this year Mr. Robson will cease to occupy his position as Architect and Surveyor to the School Board. The post will now be divided; Mr. J. T. Bailey being appointed "Architect" at a salary of 600*l.* rising by annual steps to 900*l.*, and Mr. Andrew Young has been appointed "Surveyor" at a salary of 500*l.* Both have been working for many years in the department under Mr. Robson, and the Board have done wisely in appointing those who are conversant with the work and who will carry it on, we may presume, in the same spirit. Mr. Robson may claim to have placed school planning on a scientific basis, besides having come very near to evolving a School Board style of architecture. Of course on this latter point (*de gustibus*) opinions may be divided, but the result has been generally satisfactory.

A POINT which appears to have been overlooked with regard to the recent sale of Staple Inn, Holborn, is that the precinct of the Inn is extra-parochial, and is in consequence exempt from local taxation. The Temple, Gray's Inn, Furnival's Inn, Clement's Inn, Dane's Inn, and Barnard's Inn, are also similarly exempt. It is difficult, at the present time, to recognise the justice of exempting these places from all contribution to the local rates, but the exemption has been accepted by the local authorities, and maintained by the Legislature up to to-day. There has been a fiction that the societies to whom these Inns belong performed some services with regard to legal education, and on this ground their property has been hitherto considered to be entitled to be excused from payment of parochial imposts. It will be a matter for consideration whether, on a society being dissolved, and their property alienated, the ground which was formerly the property of the society still remains extra-parochial, and if it should be held that it still remains unparochial, whether steps should not be taken to subject the property to the control of the municipal authorities, and to compel the owners to contribute their proper quota to local taxation. Staple Inn is included within the metropolis by the 250th section of the Metropolis Local Management Act, 18 & 19 Vict., c. 120, but is expressly exempted from the operation of the Amendment Act of 1878, 41 & 42 Vict., c. 32. The reason for this vacillation on the part of the Legislature is not clear.

IT is to be hoped that the attention which has recently been drawn to the subject of noises in London may not only produce some practical results in regard to railway whistles, but also with reference to street bands and church bells. There is no question that any householder or lodger should have a power of ordering a band entirely out of his hearing, and not merely the power of removing it further from the house. As to church bells it may also be hoped that well-meaning people will no longer waste money by placing bells in churches in town, to the great annoyance of dwellers in the neighbourhood, and without any useful result. Every one knows that the original object of church bells was to summon those from a distance to prayer who had no other means of knowing the time, and even now in country districts such bells are not without their use. But in towns not only are they of no use, but they are a positive evil to the inhabitants of a district. At certain hours, for example, the houses close to St. Mary Abbot's, Kensington, are almost uninhabitable, and yet a large sum was spent in putting up this peal of bells and a clock with a chime and without a face. In the leading case of Soltau *v.* De Held it was decided that bells close to a house were an actionable nuisance, and there is no doubt that Kensington Church bells are only allowed by the good nature of the Kensingtonians.

WE have before us the Journal of "The National Society for Preserving the Memorials of the Dead in the Churches and Churchyards of Great Britain,"—a society which has so excellent an aim that, in spite of the length of its title, we wish it all success. The neglect and wanton destruction of old monuments is not, indeed, a vice peculiar to the present day. Weever, writing in 1613, lamented that his contemporaries regarded them with as little interest "as the parynges of their nayles," and the evil must have grown to a great height when it called forth a Royal proclamation in the second year of Queen Elizabeth's reign. Penalties were therein imposed upon any future offenders, and recent despoilers were commanded either to make good the damage done, or, if unable, "to do open penaunce two or three tymes in the church, as to the qualitie of the cryme and partie belongeth, under payne of excommunication." How the spirit of mischief had been evoked is plain from the terms of the same proclamation, viz., from the licence given (or taken) in past times "to deface monuments of idolatry, and false fayned images in churches and abbeys." But the spirit once raised has never since been laid, and the Society's record shows that it is now as active as ever. One correspondent, writing from Northamptonshire, tells of a fine old font broken up, not long ago, to mend the roads. Another relates how, in the rebuilding of Cheam Church, old brasses were recklessly torn from their slabs, and one, the finest of the set, was subsequently found in a shed in the rector's yard. Croyland Abbey was for many years treated as a local quarry, and the beautiful Bracebridge effigies in Kingsbury Church are gradually, like those whom they commemorated, becoming dust. It may be well to note that by the statute 24 & 25 Vict., cap. 97, sec. 39, it is enacted that any person who shall "unlawfully and maliciously destroy or damage any monument or memorial of the dead," either in church, chapel, meeting-house, or burial-ground, shall be guilty of a misdemeanour and liable to six months' imprisonment.

THE Lower Thames Valley Main Sewerage Board met on Saturday last at Kingston to consider two schemes reported on by the Works and Parliamentary Committee with reference to the drainage of the united district, those of Mr. Shields and Sir Joseph Bazalgette. The former proposed the collection of the sewage on land in the parishes of Twickenham and Isleworth, its defécation by the scheme of Messrs. Mansergh & Mellis, and the running of the effluent into the Thames about three-quarters of a mile below Richmond Bridge: estimated cost, 329,550*l.* The latter proposed the total diversion of all the sewage of the district to land at Crossness, which the proprietors have to sell to the Board, with two pumping stations, one at Mortlake to lift the sewage from the low-lying land at Barnes; the other at Sutton to send the sewage by gravitation on to the land at Crossness: estimated cost, 563,711*l.* The committee rightly put the question of economy on one side; whether they did rightly in accepting the Crossness scheme is another question. They characterise it as more expensive at the outset, but "final." The transport of the London sewage to Barking was thought to be "final" also.

IN the recently-published "Croker Papers" there is a rather curious discussion between Sir Robert Peel and the ex-Secretary to the Admiralty upon the appropriateness of battlements in a Renaissance mansion. Sir Robert was (in 1832) building Drayton Manor, and Mr. Croker urged him to cap his walls with battlements. Peel, however, found time in the midst of Reform agitation to look carefully into the matter, and to come to the confident conclusion that neither battlements nor labelled windows would be in character with the style of his house. "The parapet or ornamented balustrade," he writes, "was in use in the time of Elizabeth and James, and not the battlement. The battlement was of an earlier date." He then mentions the best extant examples of the period, and adds "there is scarcely a window in one of the houses named with a label. There is not one where the course is so near the top of the window, as it is in mine." Croker still contested the points, and though he preferred "to rest the battlements on beauty" rather than authorities, maintained that he had the support of the latter for the use of labels above all the windows not protected by string-courses. Sir Robert Peel was not a man likely to give way upon a question of taste, and at a later period spoke out pretty plainly upon the selection of Matthew Wyatt,—"a bad architect and worse sculptor,"—for the Duke of Wellington's unfortunate equestrian statue. He denounced it as a job and an evil precedent,—"a retro-active precedent, if such a thing can be, justifying the selection of Wilkins for the National Gallery, of Soane for this folly, and Nash for that, and every job which immortalises its own disgrace from the durable materials in which it is recorded."

ALTHOUGH as an illuminating power the electric light at the Law Courts seems satisfactory enough, yet it is anything but satisfactory to find that the noise of the engines beneath the central hall is perfectly perceptible, and that their vibration extends even to some of the courts. This in itself is not only disagreeable, but is trying to the nervous systems of men who spend so much time in courts, and often at considerable mental and physical tension. The cracks in the tesselated pavement of the Central Hall are sad to behold, and the effect of the vibration of the engines beneath is likely to have a still further harmful effect.

THE collection of works by Mr. J. D. Linton, now open at the Fine Art Society's Gallery, is of special interest as giving to the public for the first time the opportunity of seeing his fine large paintings of the "Life of a Soldier in the Sixteenth Century" simultaneously and hung in their proper order. We have commented on all of them as they successively appeared at the Royal Academy and elsewhere, and are glad to meet them again in a collective form, though they are not all of quite equal interest or success; the one representing the reception of the keys of the conquered city is decidedly weak in comparison with the others. "The Benediction" is the finest and most serious in feeling, the "Declaration of War" the most characteristic and spirited. Mr. Linton, however, is greater in water-colour than in oil. His finest work, in colour and general execution, is, perhaps, "Admonition," where a group of amorous revellers are rebuked by the authority of the Church in all its array of ecclesiastical properties. The manner in which detail has been studied in this work is exemplified in the sit of the robes upon the figure of the bishop; they are so stiff with gold and embroidery that they stand out from his figure instead of falling over it. One of the finest pieces of character is "Gil Blas" at the Tavern, which is an absolute realisation of the scene. In regard to rich and harmonious colour the exhibition is a kind of feast to the eye such as no other living English artist, perhaps, could give us.

WE greatly regret to hear that the present proprietors of the remarkable and picturesque building at Aberystwith, which Mr. Seddon long ago designed as a hotel, and which, in its incompleted state, ultimately became a college, are about to entrust its completion to another hand than that of the original architect. Such a proceeding on the part of educated men seems quite incomprehensible. The building, as designed, was a very fine and original architectural conception, and that its designer should have waited all these years only to see its completion taken from his hands and given to another, is an injustice on which we cannot but express our feeling very strongly.

MESSRS. DOWDESWELL have formed a small exhibition of beauties of Sussex scenery, by Mr. Sutton Palmer, which, without touching the highest mark, contains some very charming bits of landscape.

A NEW paper, entitled *The Plumbing and Decorating Chronicle*, of which the first number has been sent to us, appears to promise to be a useful, practical paper, so far as the plumbing portion is concerned. The atrocious coloured plate, which is given as a specimen of "sign-writing," seems to emphasise the fact that "plumbing and decorating," so long associated as trades, have no connexion whatever in the nature of things, and had better dissolve partnership as soon as possible, both in journalism and in practice.

WE have received an announcement of a proposal which, if carried out in accordance with the terms of the prospectus, ought to be of some importance to architects, builders, and patentees of building appliances. It is no less than to collect under one roof "a registry of everything worth knowing and seeing in architectural appliances, to be accompanied by an exhibit of the article where possible, or by an illustration or model." Of course something in this way has been done for some years back in the Museum of Building Appliances in Conduit-street, the range of which, however, has been rather limited. Mr. Phillips, decorative artist, of Baker-street, who is projecting the scheme, is erecting a building for the purpose. He will require a large one.

IN the matter of Westminster Hall, *bos locutus est*, that is to say, Sir Edmund Beckett has written to the *Times*. After that, of course, no more need be said; we are under infallible guidance. Seriously, Sir Edmund Beckett's letter is in matter (we say nothing of manner) a very sensible and practical one; but every suggestion and criticism in it has already been made in our columns, except that of setting up temporary models of the various schemes, to see how they look,—a procedure which is really only necessary to convince dunces, and probably will fail of that aim. The epistle includes an advertisement of "My 'Book on Building,'" and the usual insults, coupled with a pat on the back for Mr. Ayrton as "the cleverest Commissioner of Works there has ever been." It is natural that Sir E. Beckett should have a kind of fellow-feeling for the only man who has rivalled him in gratuitous and absurd insolence to the whole architectural profession.

## A CORNER OF WILTSHIRE.*

SOME two miles away from Bradford, towards the south-west, lies Westwood, where there is a church that will well repay investigation. Mr. E. A. Freeman has called its tower "wildish,"—a curious epithet, throwing more light, perhaps, on the character of him who uses it than on that of the tower itself. It is, in fact, a square tower with an octagonal stair-turret projecting from the south-east angle. The two lower stages are perfectly plain (except for door and window), while the belfry stage is enriched with simple panelling, which makes the complete circuit of the tower and turret. Above this is a panelled parapet, with enriched pinnacles at the three corners not occupied by the stair-turret. The whole design is extremely simple and bold, and compares favourably with the intricacy of many of the Somersetshire towers. The body of the church is Perpendicular, of a vigorous and pleasing type, particularly in the north aisle or chapel, but in the internal arcade (of two bays) this vigour degenerates into coarseness. It is really a relief to come across something that one can justly condemn in old work. So much trouble has been taken to impress upon our youthful minds that all old work is good, and that everything previous to, say 1530, is worth sketching; that it is a positive pleasure to find something to carp at, something to prove that the old artists, like ourselves, were men and fallible, and that they did not always tread the icy heights of perfection. Not less gratifying is it to find work of a date subsequent to the magic year of 1530 which one may honestly admire, and of which the excellencies can be proved by appeals to accepted canons of art. This classifying of the merit of work according to date, this criticism by periods, is very apt to run us into absurdities. It was no less ridiculous for our grandfathers to dismiss the consideration of many ancient buildings with the contemptuous summary that they were "barbarous Gothic," than it is for us to put a vast array of beautiful structures out of court by designating them as "beastly Classic things." The excellence of a work lies in its own intrinsic merits, and not in the style in which it is wrought. No doubt a greater number of excellent things are found in some phases of style than in others; but it is absurd to deny all beauty to a work because it happens to belong to a particular period of art.

Westwood Church offers work of two periods principally, pre-Reformation and post-Reformation. The former period saw most of the work completed. To the latter belong the pulpit, the chancel-screen, and a curious corbel at the side of the tower arch (see fig. 5 in illustrations given last week, p. 819). It clearly represents the arch-fiend himself, into whose mouth, with hardy humour, the artist has transferred the Apostolic declaration that if he is resisted he will flee. "Resist me, and I will flee," is written in seventeenth-century characters beneath his effigy. He is represented as an abnormal variety of the genus *vespertilio*, though why bats should be considered as peculiarly like devils it is difficult to determine, unless it may be that they loiter about at dusk, and attend church in a very irregular manner. In addition to the features already noticed, there is a handsome panelled roof over part of the north aisle, while a few old pews, with Flamboyant tracery, are left in the chancel. But some of the most interesting work is the stained glass in the chancel windows. This is very vivid in colour, so much so as to give the impression of being modern, but examination shows it to be ancient. It has been rearranged, and in one light includes a piece of seventeenth-century glass, probably brought from the ruins of the neighbouring castle of Farleigh. The whole glass has to do with the Passion. In the central light of the east window is the Crucifixion; in all the others are angels bearing shields charged with instruments of the Passion. The seventeenth-century glass already alluded to is an oval, containing a charming miniature of the Crucifixion. The whole series is of unusual interest, and will bear a lengthened examination.

Continuing the walk from Westwood the traveller will presently find himself descending a steep hill towards a little brook and the village of Farleigh. The brook marks the boundary between Wiltshire and Somerset. On the further bank,—everywhere steep and in places precipitous,—stands the Castle of Farleigh-Hungerford. It stands,—or rather it stood there,—for there is but little of it left. It belonged to the powerful family of Hungerford, the same whom we have already seen establishing Long Thomas at Wraxall. The Hungerfords were one of those extensive and powerful families whose chiefs held the happiness of thousands in their hands, but who are now extinct; like the Coverts, of Sussex, whose possessions are said to have extended from London to the sea, and who built one of the finest mansions bequeathed to us by John Thorpe, but of which only a few fragments remain at this day. The Hungerfords held much land in Somerset, and not a little in almost every parish of Wilts. Their stronghold was here at Farleigh. From the frowning gateway, guarded by a drawbridge, but without portcullis, their army of retainers clanked up the hill on their way to Agincourt. In later times the grey walls, sparkling with Renaissance ornament, looked down on the messenger who brought Cromwell's letter to "my honoured friend Mr. Hungerford, the elder, at his house," the father of the last Hungerford whom the castle knew as its master.

The changes of the centuries are all recorded in the little Chapel of St. Leonard, still standing within the ruined walls. They are written in stern and vigorous characters, in chain-mail, and plate-armour, in sword and spear of every beautiful and deadly shape; in the pithy incised slab of the fifteenth century, and the wordy epitaphs of the seventeenth. They speak to us in broken accents from coloured windows, and in the clearer, more embellished language of the Jacobean reredos and pulpit. Not the least eloquent of these mute voices are those of the holy-water stoup, and the candles and crucifix left on the mouldering altar, as though forgotten there when the Romish priest bowed his last bow, and the breath of the monotonous chant for the last time stirred the pennons yet hanging from the roof, blazoned with arms of Hungerford and its allies.

Of all the beautiful things, broken or whole, which this once sacred building preserves, the most fascinating are the weapons of war (fig. 6). It is curious to see how much beauty was bestowed on things that were meant to do nothing but harm to all but the possessor. The lovely curves of the spear-heads, the delicate tracery of the sword-hilts, remind one of the horrible beauty of a snake. One can well understand Claudio going ten miles on foot to see a good armour, and Benedick's regret at his afterwards preferring to carve the fashion of a new doublet. But it would never do for young artists now-a-days to settle their differences with such swords, for they would be so wrapped in admiration of each other's weapons as to forget their cause of quarrel. Important, however, as is the part which the sword and spear played in the history of the Hungerfords, they by no means ignored the pruning-hook, or

* See p. 819, *ante*.

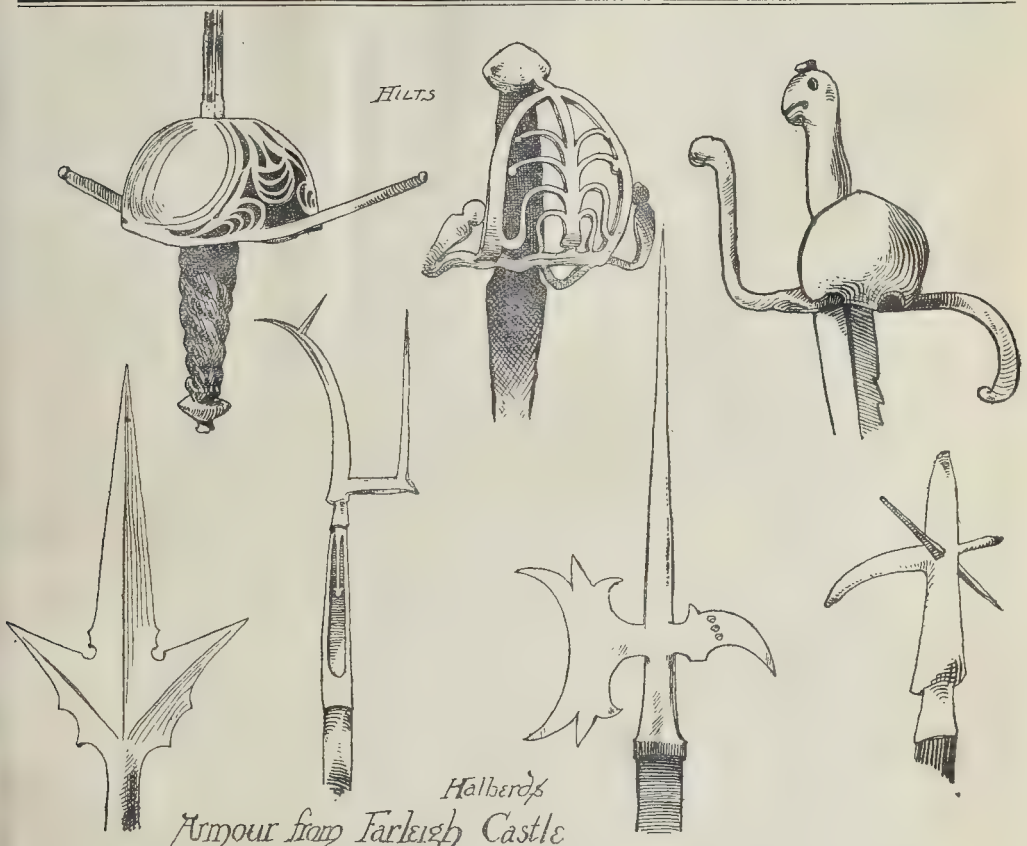



*Fig. 6.*

rather reaping-hook, for it was their crest. Either alone or in conjunction with the garb, or sheaf of corn, it appears at every opportunity,—in glass, on tombs and pennons, and very ingeniously in a lock plate, where the garb forms the key-hole, and is supported on each side by a sickle (fig. 7).




*Fig. 7.*

This chapel of St. Leonard is the focus of the interest at Farleigh. The remains of the castle walls contain no detail of any account, and, though perhaps fascinating to the day-dreamer, give little return to the student of architecture. The day-dreamer can picture to himself the long array of knights and ladies who have lived and laughed and loved here, and some of whom still lie in their leaden coffins in the chapel vault. He may fancy he can descry old Sir Walter, who was long unjustly credited with having captured the Duke of Orleans at Agincourt; or perhaps he will hear the wails of the unhappy lady, third wife to another Walter, who lay immured in one of the towers for three or four years, kept there by her cruel husband, and subjected to the poisonous wiles of his chaplain; receiving her food from the hands of my lord's fool, and sometimes surreptitiously relieved at midnight by the pitying peasants. Poor lady! her lot was a hard one, till her wicked husband lost his head on Tower Hill; but then she returned again to life and to love, and, marrying Sir Robert Throckmorton, of Coughton, in Warwickshire, became the mother of the mother of that Francis Tresham who was to perish miserably in the Tower with his fair fame shattered by his complicity in the Gunpowder Plot. Alas, for the old days, when to blow up the Houses of Parliament was such a monstrous affair as to give birth to a national festival in honour of the providential escape! Nowadays we have a potential Fifth of November almost every month.

One year after the head of the wicked Bluebeard, Lord Hungerford, fell upon Tower-hill, the same sad place saw the death of another native of Farleigh Castle, Margaret, Countess of Salisbury, and mother of Cardinal Pole. She was born here in 1473, while the castle belonged to her father, the Duke of Clarence, brother of Richard III., who confiscated the place and gave it to the Duke. The unfortunate Countess had not even the satisfaction of lying in her own beautiful chapel at Christchurch, in Hampshire, which she had built expressly to receive her mortal remains; and that charming little structure, on whose carved strings the Renaissance has laid a firm hold, has remained tenantless and silent down to the present day.

Yet one more romantic figure will cross the day-dreamer's misty vision. Napoleon, afterwards the third of that name, once went to Farleigh and sketched the ruins of one of the towers. Whether he wielded the pencil to as little purpose as the sceptre and the sword cannot be said. But none of the rusty weapons hanging in St. Leonard's Chapel could tell so sad, so humiliating a tale, as could that which was delivered up by the imperial sketcher on the field of Sedan.

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**Alexandra Palace.**—A communication has been received from the Board of Trade certifying that the Exhibition to be held next year at the Alexandra Palace is an International Exhibition.

## A SEASONABLE REMINISCENCE.

BY A LONDON ARCHITECT.

IN good Bishop Butler's discourse upon Personal Identity, there is a passage which has always been a stumbling-block to the present writer. It runs thus: "Upon comparing the consciousness of one's self or one's own existence in any two moments there as immediately rises to the mind the idea of personal identity. Or, in other words, by reflecting upon that which is myself now and that which was myself twenty years ago, I discern that they are not two, but one and the same self." Whereto, my lord, we most respectfully demur, discerning nothing of the kind. I look back through a long series of Christmas-tides and try to fix the image of myself at each successive stage in life's journey, and as the pictures present themselves before me, I am not at all sensible of that affinity between them and my present self which the good bishop thought so convincingly clear. I look *into* my self, I can only look *at* the mental pictures of the other personages who at one time bore my name. Portraits of friends arise in my imagination equally well defined, and bear as close a relation to what I now am as those other portraits which are supposed to be indeed my very self. What, for instance, is there now in common between me and that youth who in the year eighteen hundred and what-you-please came friendless to this great city with a light purse and a heavy heart. His story is known to me, it is true, but so are many similar stories of others. He had left the office of a North-country architect of declining practice, with the accumulated arrears of a small salary paid partly in cash and partly in promises, the latter never redeemed, and the former, the actual and tangible portion, by far the smaller of the two. A great war had paralysed the peaceful commerce of the country, and building was almost at a standstill. Not

a cheering outlook for this unfriended young man! An incident in his career may be worth, at this time of year, the page it takes to relate. In those days there stood in St. Peter's-court, —a little, crooked, unfrequented thoroughfare which joined St. Peter's-lane with Duke-street, —a lonely coffee-house of a faded exterior and retiring habits; so retiring, indeed, that it shrank into the furthest point of the re entering angle of the court, as though in hiding from the race of men instead of advancing any claims upon their custom and patronage. A tablet, framed and glazed, hung in the window and bore the simple legend, "Good Beds." This appeared to the wanderer to be a congenial resting-place. Here he could call only for what he could afford, calculating the expenditure by the printed tariff, and regulating his outlay with the nicest exactitude. The charge for the bed was 1s. per night, and it justified the simple announcement in the window; it was good and clean. This modest little hostelry soon furnished matter for speculation. The proprietor of the establishment was a political refugee who had married a buxom Englishwoman of business habits, and had by her aid got together not only a comfortable home for himself, but an asylum for his less fortunate compatriots. The *habitués* of the place were mostly Polish gentlemen, of the military caste,— tall, swarthy, somewhat Pistol-like, with fierce moustachios, brigand-looking hats and cloaks, and Hessian boots. Some of them had little bits of ribbon,—"orders,"—on their breasts, and all of them appeared to possess a good deal of what would now be described as "side." They gathered into little knots, and, as they sipped their chocolate and munched their crisp French rolls, discussed in earnest undertones schemes for the regeneration of their country, mingled with curses (not loud, but deep) for the hated Austrian. They were,— politics and war apart,—tame, gentlemanly creatures, and no orgies disturbed the slumbers of the tired youth who had all day long plodded the cheerless streets in search of that employment which he began to think would never come. His fare, though scanty, and much less varied and nourishing than that supplied to the dwellers in her majesty's prisons, was found sufficient. But with even the strictest economy the little stock of ready-money slowly but surely dribbled away, carrying hope along with it. To ask for credit would have been to precipitate his expulsion from the only place where he could lay his head. And yet something must be done. Now the shops in St. Peter's-court are peculiar. There is an umbrella-maker's at one corner with a red umbrella hanging out, as if to dry, over the door; and in the window facing the court there is a collection of walking-canes of amazing lustre and magnificence. There is a boot-maker's, a tobacconist's, a French laundress's, — the prettiest establishment of all,—where you can see the tidy French girls in their muslin aprons and crimped caps laughing and joking as they iron all day long the snow-white linen; there are a picture-frame maker's and a public-house, and there are whole rows of second-hand book shops, curiosity shops, and shops to loiter over generally. Loitering can be done in the seclusion of St. Peter's-court, and it cannot be done in the throng of St. Peter's-lane from which it leads. But, better than all, there stands, or stood, at the corner opposite to the display of gorgeous walking-canes, a diamond merchant's, —for so he is described on the frieze over his brilliant shop-window,—who was so good as to lend the youth at this crisis in his career the sum of two pounds, kindly taking care at the same time of his case of instruments, which might, you see, have been stolen if left about at his lodgings.

With this sudden addition to his capital, he felt almost independent, and began, with renewed energy, his search for work. As the last golden piece melted slowly away, and with the prospect of employment as far off as ever, the jolly Christmas-tide came on. It was the first he had spent in London, and the glitter and bustle of the streets dazzled him, and in the general excitement he almost forgot his own troubles. It seemed impossible that want could be at hand with plenty all around. The Christmas was cold and wet, and he kept indoors. It was not a time to expect an engagement, and he had learned already to shun the "walk that costs a meal." The coffee-house was not licensed for the sale of intoxicating drinks, and the season brought no new customers, who found more suitable entertainment elsewhere; and the increased bustle and traffic in the court outside made the quiet and isolation of the dingy room more depressing. Letters to his previous employer brought at first more promises, and after a time were returned through the Dead Letter Office, and hopes from that quarter were at an end. And so, with the last crown-piece in his pocket, he went early to bed on an ever memorable Christmas Eve. The waiter,—with an eye perhaps to the traditional "box,"—waylaid him on the stairs in the morning, and wished him a *Merry* Christmas,—no doubt in perfect good faith. The picture of that Christmas Day, in the coffee-room in St. Peter's-court, could only be painted by a Rubens or a Vandyck. Everything partook of the same dull brown. The mahogany boxes, sticky with the steam of countless chops, were brown; the walls were papered with that monstrous imitation of blocks of Siena marble, which was once, and is even still, in some quarters thought an appropriate form of decoration, and the varnish had turned a sort of bilious brown. The ceiling was brown with smoke; the floor had a brown oilcloth over it; and a brown fog filled every corner of the apartment. The whole was in perfect harmony, but *not* in a cheerful key. The shutters were not taken down, and only a few sickly rays of daylight straggled in through the glazed sash over the door. The door itself was unbolted, and one by one, or in groups of two or three, the conspirators entered, and, assuming their wonted places, recommenced their endless labours in freedom's cause. The gas was lighted at the further end of the room and was burning dim and yellow through the foggy air, casting strange shadows from the fantastic figures upon which its sickly rays fell. The fireplace had been obliterated to make room for an extra box or stall, and the only source of heat was a little stove which stood in the centre of the gangway. The visitors were too considerate to crowd round this and monopolise its warmth, and so sat cloaked and hatted through the long, long, dismal day. They did not change their fare on account of the season, although the English instincts of the landlady pressed them with appropriate delicacies, and bestowed gratis upon the solitary stranger within her gates a slice of the traditional plum pudding. Silently and by small detachments as they had entered, these strange men departed early, while the bells were still ringing the evening worshippers to St. Peter's Church close by. The gas was partly turned out as being a wasteful excess of illumination for a single customer. The inestimable solace of the pipe was not then so much popularised as now. He tried to read some of the greasy and torn novels upon the shelves, the remnant of some old-world circulating library, but his mind was absent, and he followed the lines without catching their meaning; and so he sought once more forgetfulness in that sweet sleep which waits benignly upon the young.

We know that in the mimic world of the stage it is only when the innocent prisoner has actually mounted the scaffold, and has obligingly adjusted his toilet for the executioner, who stands ready, axe in hand, that the horseman dashes up, breathless and incoherent, with the despaired-of reprieve; and that in polite fiction it is not until the hero's finances are, so to speak, at the last gasp, that the Will is found, or the aunt, relenting, dies, and, regardless of all customary formalities, cash is instantly abundant; or the rich old uncle, with his rug and hat-box, appears unannounced in the drawing-room, in the very nick of time, fresh from the wealth-giving Indies; and we in our innocence suppose that it is only in the realms of fiction that things turn out thus *apropos*. Not at all. The Universe is under governance.

Within a week a letter from a stranger, now a prosperous gentleman,—a F.R.I.B.A. even,— directed the youth to present himself to an architect (who is now the surveyor-general of a distant colony), where work awaited him. He did so, and instantly became rich with the wealth of 30s. a week. Both these Samaritans, if they should read this, will recall the circumstances.

And now, as I sit in my cosy study-chair, my feet slowly toasting on the fender, writing lazily on the pad upon my knee, the lamp burning brightly and the curtains drawn, Mrs. P. busy with her knitting, and the voices of happy children heard from the "hall," which they are decking with holly, I ask myself, incredulously, am I indeed one and the self-same as the youth who spent that gruesome Christmas Day in St. Peter's-court? The Bishop says so, and memory confirms the statement,— but memory has often played me false! There are, however, links in the chain of evidence which seem to point that way. The coffee-house is there still, unaltered, and thither come, as of yore, the scanty remnant of that little band of expatriated warriors,—gaunt now and pale, with bleared eyes and whitened locks,—moaning garrulously over vanished hopes and unfulfilled desires. The diamond merchant is still there, pursuing his charitable mission, and relieving, in a double sense, necessitous youth. And, lastly, there is the case of instruments which has never called any one owner but myself, and would appear to be a substantial witness to my identity with the youth who once at least found them so very useful. I cannot tell, nor does it matter. The story is a true one, and that is enough. It has been written at this Holy Christmas-tide to bring hope to those from whom hope has well-nigh fled;—that "some forlorn and shipwrecked brother, seeing, may take heart again." The curtain never falls upon the tragedy of human life. The streets are still paced by weary feet seeking rest and finding none, and in many a lonely London lodging care still sits eating the life from out young hearts. Let them not despair. For the least hopeful there is room for hope. If it sound like mockery to wish such as these a Merry Christmas, one may, at least, offer them the sympathy of a fellow-sufferer, and pray that the new year may bring them also a happy issue out of all their afflictions. J. P.

## THE ANTECHAMBER, TO-DAY AND YESTERDAY, IN FRENCH AND ENGLISH PLANS.*

I believe it to be generally admitted by editors, publishers, and booksellers that a great many more papers would be written, published, and offered for sale than actually happens to be the case were the supply of subjects for dissertation more plentiful than it is. I am told that there are even gentlemen living,—members of our profession,—who have early in a session undertaken to read nameless papers before societies like ours in the hope that a subject to write about may, as a matter of necessity, occur to them before the day of execution arrives. But in my case, I determined upon a subject, and invented a title, before ascertaining whether there was much or indeed anything to write thereon. That title runs smoothly enough: "The Antechamber, to-day and yesterday, in French and English Plans," and if you hold me to it, without mercy, my task will be soon accomplished, for an antechamber is merely the *amphithalamos* of Vitruvius's Grecian house, and in both the French and English distribution of a dwelling-house is that piece which is *ante* to a bed-chamber. Permit me therefore to play upon my title with just that licence accorded to those earnest expounders of inspired sentences who admonish us twice on Sundays. Let me divide the text into three parts, and put my subject, Cerberus-like, under three heads, in which the ante-room shall be treated literally, colloquially, and then broadly and generally in the architectural sense of *vestibulum* and *atrium*. But before plunging into space, I want a beginning,—a something to connect the subject with current topics,—and I am reminded that the country is at present in the full enjoyment of a centenary; that this day, one hundred years ago, less a few hours, a great English lexicographer was buried in Westminster Abbey amidst the respect and gratitude of the nation; and so, as in writing a paper or a poem, there is "nothing so difficult as a beginning, . . . . . unless perhaps the end," I will begin at once, and with another quotation.

"Seven years, my lord, have now passed since I waited in your outward rooms, or was repulsed from your door." Surely not the very youngest member of this excellent Association ignores the incident which served to put those words into a letter addressed by Dr. Johnson to the fourth Earl of Chesterfield. The scene has been depicted by artists, has been mentally portrayed by thousands of James Boswell's readers, without, perhaps, a thought of the house in which the event happened. Indeed, it was only a few weeks ago that I

* A paper by Mr. William H. White (Secretary of the Royal Institute of British Architects), read before the Architectural Association on the 19th inst.

asked myself whether the house at the end of Stanhope-street, Mayfair, was really that in which Dr. Johnson "did antechamber," or that I doubted whether the outward rooms of a peer in the days of George II. could be other than stately pieces. Have we not all seen pictures of a vast antechamber or vestibule crowded with aspirants more or less motley, with the gloomy Doctor seated uneasily, leaning on a clumsy stick, and frowning at Lord Chesterfield's back, after he had passed with a troop of friends, and paid no heed to clients anxiously searching for a patron. But, gentlemen, on the wall is a plan of Chesterfield House, taken from the "Vitruvius Britannicus" (ed. 1767, vol. iv., plates 67, 68, 69), and there at the door you will see very little room for an assemblage such as I have described. A hall chair and table, two or three flunkeys, and my lord's gracious presence, would have effectually blocked that entrance passage, which merely forms part of the principal staircase to the house itself. There is nothing in that Mayfair residence of an English nobleman which fulfils the idea of an antechamber such as Charles II. brought to Whitehall from France, such as, 200 years ago, Italian and French architects made an important feature in their distribution of rooms, in a house or a palace, or such as, 130 years ago, J F. Blondel discoursed of in Paris to the students of his school of arts, a short time before he became a professor of the Royal Academy of Architecture.

The antechamber is famous in history, and, perhaps, more than any other part of a house, its existence has helped to make history. Mackintosh and Macaulay repeatedly use the term, which to Fielding and Addison was familiar, and Dr. Johnson has warned us that it should be spelt with an *e*,—not an *i*, as the Dictionary of the French Academy still has it. Gibbon has much to tell of the Roman antechambers, and Cicero of the clients who waited in them. The ancient fashion of waiting in the early morning at a great man's door to attend his levee, or, in the vernacular, his getting-up, has survived even to the present day in Paris. In the age of Louis XIV. it formed a part of the stately manner, as it is possible to picture it from the stately phraseology, of the time. If Pliny left home before sunrise to pay his respects to Vespasian, there were historians in the antechamber of Louis hours before the eyes of his most Christian Majesty were opened; and, during the Second Empire, a well-known minister of Napoléon III. received people of business at half-past seven in the morning in his dressing-room, which served as an antechamber. Indeed, the custom of early visiting on matters of business is very general among Parisians, the mass of whom are at work an hour after daybreak. If you had business with Viollet-le-Duc it was necessary to call on him before nine a.m., and I have found his library full of different kinds of visitors at eight o'clock. In this country the levee,* which, as a formal homage to the Sovereign, is identical with classical precedents, takes place in the afternoon, and, therefore, as far as the meaning of the word goes, is a misnomer. In the time of the Louis' there was the great and the petty "getting-up in the morning," and the pictures of such events extant are curiously interesting; for the bedchamber of the last century and of the one previous to it, rather resembled a modern drawing-room than a bedroom as we understand it now, and the antechamber which led into it was usually a luxuriously furnished apartment, preceded often by a smaller room, called the first antechamber, in which the servants waited.

There is nothing supremely elevating in the subject of an antechamber, or of the conversation likely to have taken place there, but those who read French well enough to enjoy the splendid literature with which the architects of the Bourbon dynasty have endowed the noble profession to which it is your privilege, and mine, to belong, will agree with me in admiring the rounded sentences of François Blondel, when he submitted himself to Louis the Great, and those of Desgodetz, when he approached Colbert. Be sure that these men, whom you no doubt regard as old classic fogies,—extinct like the dodo,—did antechamber in the grand fashion, of which we in England have little idea. In this country the spirit of the Renaissance was never imbibed as it was by the French of the sixteenth century, and this was probably due to the disturbed condition of home politics at the time, though the national character may have contributed to render obeissance less facile to Englishmen than it was in France. Indeed, Horace was often less fulsome in his prostrations to Cæsar and Mæcenas than were some of the French philosophers and poets of the great age to princes and nobles. To do antechamber then was the province of persons who aspired to live by literature or art, and it was only towards the close of the last century that emancipation from such unworthy thraldom was effected. It is pleasant to remember that, years before his death, Voltaire held the position of a patron rather than a client, and in England Prior was an ambassador, Addison a Secretary of State, while the most conspicuous figure in English politics, in the reign of our dead but ever gracious idol, Queen Anne,—I mean Lord Bolingbroke,—was friend and jolly good fellow with the three Yahoos of Twickenham,—Swift, Pope, and Gay.

It is pleasant, moreover, to read J. F. Blondel, and the architect, Patte, his editor, when they discourse on the antechamber, especially because both had a great deal to do with the development of home comforts in so far as they depend upon the arrangement of a dwelling-house. In their time the proper position of an antechamber was more important than the direction or turn of a corridor is in ours. J. F. Blondel, in his "Cours," complains of "our young architects," your *confrères*, gentlemen, who competed for the prize of Rome, and took the first place among architects in most of the European capitals and great cities,—those young architects who constantly forgot that a first antechamber was required in good houses to precede the antechamber, which was often used as a dining-room,—and thus got found out for being what it always was: a mere passage-way from one part of the building to another. The fact is that most *châteaux*, at the beginning of the Renaissance, were merely long narrow blocks of building divided crossways into rooms, one of which, selected here and there, was an antechamber. You had to pass, in going over such a building, from or through one room to another; and the antechamber, like the hall of ancient times, was an apartment common to every one, in which most of the servants spent the day and some the night. The doors of several rooms opened into it, and thus it was like the saloon of a ship,—which is used as a breakfast, dining, and tea, room,—surrounded by rows of private cabins.

Herein was the defect that Patte and Blondel stigmatised, visible in all the plans of the last century, and not completely remedied even at the beginning of this. If you want to judge of this defect in its most exaggerated form,—of the sort of confusion engendered by such planning,—you have only to stay a night or so at an inn, say, in the Pyrénées, or some part of the country distant from any of the great centres of French life. In such places you may, by chance, get a bed allotted to you in a spacious though irregular room, which you may find full of doors. Englishman-like, you will try and lock those doors; but it is a dangerous practice, for often every one of them leads into another apartment, and in your haste to be secure from intrusion you may lock up a priest or a bagman,—even a widow or a maid,—to your own regret, and, possibly, their indignation. The careful manner in which we now-a-days plan houses, both for town and country, so as to allow communication between every part of the building without necessarily passing through any of the various rooms is an advance upon the earlier practice; and, further, the very improvements which Voltaire commended, as having been made since the reign of Henry IV.,—which Patte signalised as having been perfected in his own time,—would be regarded now as fatal blots in an ordinary residence. The stride of this century in that, quite as much as in other more remarkable things, has been gigantic, and it would be affectation in any one who appreciates what he reads, and who does not lose his head in the contemplation of the picturesque, to doubt or deny our manifest progress in the arrangement of dwelling-houses. But in our successful efforts to improve, we have improved the antechamber from off the face of our world altogether. In place of it we get a narrow corridor, with here and there a lobby, and, content with such improvement which has economy in its favour, the uses and advantages of an antechamber have become obsolete,—at least, in England. Yet it served a great purpose in the old *châteaux* of Europe, and may still be seen in many that have not undergone alteration. To quote from a paper of my own, written a few years ago, an enormous antechamber often formed the sole entrance to a set of private apartments; it was a lofty room with a fireplace and large windows. The door to my lord's rooms was on one side, the door to those of my lady was on another. The bedrooms were used as living-rooms on ordinary occasions; only on extraordinary occasions were the great reception-rooms and the great dining-rooms used. In the descriptions extant of Versailles and Whitehall it is the antechamber in which courtiers met, and of which the most frequent mention is made; and I cannot refrain from urging those who are planning the now fashionable houses-in-flats to study some of these old French buildings, for there is a great deal in them which may be advantageously applied to the horizontal principle of house distribution, both as regards practical requirement and as regards artistic effect.

Take, for instance, a famous plan of a private house, designed and erected by J. F. Blondel, and published in his "Cours" for the purpose of showing students how to plan profitably upon a narrow and irregular site. Here is to be seen the antechamber as it was understood at the beginning of the last century, and the care with which he has managed to give an architectural shape to the room, in spite of more than one acute angle, is worthy of notice. Here, again, is a cheap block of flats built some years ago in Paris as a speculation, intended to pay its proprietor a good annual income. The block contains shops at the street level, and five residences on each story, reached by three staircases; they are arranged for very ordinary people belonging to the middle class, and who are content to live, so to speak, on the Surrey side of the river, at a considerable distance from the Place de la Concorde. Every attention has been given to make the private entrance to each flat useful and agreeable. An entrance like that shown on the plan bears the name of "antichambre," and I venture to think that such a well-considered arrangement as the plan before you, the work of M. Bonenfant, for a mere middle-class block of residences of comparatively low rentals, forms a pleasing contrast to the higgledy-piggledy jumble of shapeless rooms which is now known to Londoners, and joyfully accepted by them, as an orthodox flat. I need not stop to reflect upon the kind of bonfire many of these London blocks would make were it kindled in the basement; for that is rather an affair for statesmen and speculators to treat of, after a catastrophe; my purpose is to point to the uncomfortable and inartistic character of these new-fashioned residences, no portion of which is uglier or more carelessly treated than the hall or antechamber. I live in a flat myself, and appeal to our young architects, with some degree of personal feeling, against the kind of thing to which I have to submit. My door, opening inwards, is 3 ft. wide. Observe that the person opening the door from the inside must take refuge behind it, while the visitor entering from the outside strikes his nose against the wall in front of him. Flats with entrances like this, and containing, seven, nine, and even eleven rooms, are letting easily for 120*l.*, 140*l.*, and 160*l.* per annum, in neighbourhoods distant half an hour's walk from Piccadilly-circus.

Perhaps I may be allowed to refer to the fact of my having, in 1875, described to this Association "How the Parisians build a House-in-Flats." The paper was a fancy picture sketched at different times and from several examples. I made a further communication in 1878 to the Institute on "Middle-class Houses in Paris and London," and had I dared to say then that houses such as I portrayed,—not altogether similar to those erected twenty years ago in Victoria-street,—were almost immediately to cover whole streets in London and New York, the statement would have been regarded as the dream of an enthusiast. But the thing has happened, and I have a sequel to add which may be called a further dream. I want to see flat residences planned for central London, with three antechambers in each. If you will look

* Macaulay, writing of the "State of England in 1685," says:—"Hardly any gentleman had any difficulty in making his way to the royal presence. The levee was exactly what the word imports. Some men of quality came every morning to stand round their master, to chat with him while his wig was combed, and his cravat tied, and to accompany him in his early walk through the park."

in the *Builder*, of the 29th of June, 1878, you will see an article entitled "Shops and Houses for Central London," with an illustration at page 672. The article contains twenty-four rules for planning and erecting such buildings. In the eighteenth rule it is laid down that "Each residence be subdivided into three parts: one for day habitation, one for night habitation, and the third for the service." Mr. Godwin was good enough to approve of those rules which I had formulated, and contributed to his journal, and I would now go further, and add that "each subdivision have an antechamber proper to it." Thus, the antechamber to the day division would be the entrance-hall, and perhaps during the dinner-hour the serving-room; the antechamber to the bedroom division might contain a linen-press, a female servant might sit there at work, and it would be common to the womankind of the household; the ante-chamber to the service division might be the servants' hall, and form a salubrious break between kitchen, scullery, &c., and the other portions of the residence. Of course, I am not thinking of blocks of building like the French example I have shown, for so elaborate a scheme of distribution as that combining three ante-chambers; but I am convinced that if young architects who are working out the plans of flat residences will banish from their minds the modern idea of a passage, and try to realise the idea of two centuries ago,—namely, that of the ante-chamber,—they will attain to a principle of distribution more in harmony with the character of the problem to be solved than has yet been adopted by even experts in our art. By such a subdivision as that I have advocated, families may be properly accommodated in horizontal houses; but if the present mode of arranging these monuments of successful speculation be permitted to develop, the fashionable house-in-flats may become as fruitful a botbed of disease, consequent upon overcrowding and want of air, as the worst slums of Marylebone or Soho.

Now, having treated the subject of the ante-chamber in a literal and in a colloquial sense, I will proceed, with your permission, to take an extended view of it, for we are now in the third and last phase of illumination as regards the text of this discourse.

Come back, then, for an instant to a state of primitive existence, and I feel sure that my friend Mr. Lawrence Harvey will afterwards assist me in unravelling the by-no-means tangled web of evolution. Horace sang of a simple enclosure containing a hearth or fire, around which lay the inmates, — men, women, children, and slaves,—while the smoke ascended through an issue in a roof of turf. That was the atrium, indeed the dwelling-house of Romans in the good old times, and it had a door but no windows. The client who waited upon his patron waited outside the door, and probably squatted there as natives of India do now in the verandah or the compound (*campagna*). But, as the community developed, the atrium increased in size and character; the open area or vestibulum outside the atrium door got a roof put to it, and horse, cart, and chariot were protected from the weather. The hole in the roof of the old atrium developed also, and, as the *cavum ædium* took architectural shape, a receptacle was provided for the falling rain, which no longer served to damp the open hearth, but fell only to replenish a piece of water cunningly contrived in the midst of an antechamber common to all the members of a household, to the stranger within its gates, and to the slaves, though rarely entered by the Roman matron and her spinsters, who occupied a reserved part of the improved dwelling-house. All this becomes easy to realise when you have once visited a Pompeian house; and, depend upon it, the great mass of Grecian and Roman houses of the Augustan period were not very different from those that still exist, thanks to Vesuvius, on the Neapolitan shore.

In similar progression the Mediæval hall ultimately took the shape discovered by archæologists. The hall of the twelfth century was a covered enclosure, strewn with rushes; dogs and horses, as well as men, women, and children, were sheltered within it. A fire was kindled in the centre for cooking purposes, rather than for warmth; and if there be no absolute evidence of a hole having existed in the roof of such a hall, you may be sure that the lantern of a later period was only a logical refinement of it. Further, as manners improved, a part of the hall was reserved for the master and his family. Hence the dais or raised platform of wood, which afterwards got boarded in, and developed into the private chamber, the retreat of the lady of the household, the thalamos of Mediæval purity. Just as the vestibulum and peristylium developed in front and back of the primitive atrium, so chamber and antechamber grew naturally within the Mediæval aula or hall, and, to realise the process you have only to live on ship-board for a short time. When you have watched, say in the Red Sea, a sailcloth rigged up across a portion of a vessel's deck, to shelter a group of ladies or some sick passenger, you can at once comprehend the slow method of development that culminated before the sixteenth century in the *châteaux*, palaces, and houses with which our young architects of to-day are fatally familiar.

But to the people that read Dr. Perrault's translation of Vitruvius, to the great noblemen and great scholars who contributed to the magnificence of Louis XIV., the domestic works of the ancients were so many enchanted palaces, about which any extravagance would be believed possible, and to which any scale might be fearlessly applied. Perrault, with the mangled text of Vitruvius before him, designed a Roman dwelling-house of colossal dimensions, with area, vestibula, atria, cavædia, forming the, so to speak, public part of the house, with peristylia, and a host of rooms of every description forming the private portion. The Grecian house, devised in the same fashion, measures 350 ft. in depth by 275 ft. in frontage, that being, as you probably know, about 150 ft. longer and 175 ft. wider than the Parthenon measured at its topmost step. In the "Travels of the young Anarcharsis," written by the Abbé Barthelemi, more than a hundred years afterwards, the plan of a Grecian house shows a thalamos measuring 32 ft. by 25 ft., and an amphithalamos of similar shape and size, and the whole conception of the building is much more extensive than that of Perrault. Nearer our own time, Dézobry, who wrote a novel called "Rome in the Age of Augustus," and Mazois, who wrote another novel in which he described the Palace of Scaurus, imagined colossal edifices covering vast spaces sufficient to contain a Paris *place* or a London square. No wonder, then, that if scholars and experts lost their heads and continued losing them until nearly the middle of the present century, the princes and seigneurs of the Great Age took an exalted view of the images which the spirit of the time had set up, and accepted every estimate of Classical magnificence provided only that it was big enough. Hence the Château de Richelieu rose like a small town, and all over France the great landowners reared quadrangles of constructions, with outer and inner courtyards and annexes; erected chapels, sometimes theatres, and combined within their own walls all the refinements, and, indeed, all the civilisation, of their time. This went on in France all through the seventeenth century, but the fashion was not general in England until the eighteenth century. On the wall is a rough plan of Blenheim Palace, which was designed by Sir John Vanbrugh, and erected at the beginning of the eighteenth century; but the drawing shows only the principal buildings. Half a mile off on every side the country was mapped out to lead up to the palace. Avenues of trees, lakes and waterfalls, parterres, terraces one above another, perrons and flights of steps, astonished and confounded the spectator from any one of the hundred windows of the palace fronts. To misinterpret Pope, it was the architect's ambition of that day,—

> "Jones and Palladio to themselves restore,
> And be whate'er Vitruvius was before."

Of all the marvels produced either in France or England in the last century perhaps the most beautiful, as far as plan goes, was the Château de Marly, which was pulled down by order of the first French Republic. On the table is a monography of this great and almost last work of J. H. Mansard, in which you will find many beautiful points to observe, but also very much to avoid. The sole excuse for these extravagances lay in the assumption that the glories of Athens and Rome were being successfully emulated in the architectural monuments of the day. Pope, however, saw the absurd aspect of this kind of bombastic revival, and satirised it in his epistle to the Earl of Burlington, wherein Cannons, the estate of Lord Chandos, is alluded to as Timon's villa:—

> "Greatness with Timon dwells in such a draught
> As brings all Brobdingnag before your thought.
> * * * * *
> Who but must laugh, the master when he sees,
> A puny insect, shivering at a breeze!
> * * * * *
> My lord advances with majestic mien,
> Smit with the mighty pleasure to be seen;
> But soft,—by regular approach,—not yet,—
> First through the length of yon hot terrace sweat;
> And when up ten steep slopes you've dragg'd your thighs,
> Just at his study-door he'll bless your eyes."

Before this was written Swift had caricatured with equal force the fashion of the day in literature. As terraces, vestibules, and ante-chambers had to be traversed before reaching my lord's presence, so books had their dedications, introductions, and prefaces. In "The Tale of a Tub," Swift begins with the author's apology, followed by a postscript; then comes a dedication to the Lord Somers, with a word from the bookseller to the reader; after which a dedication to Prince Posterity precedes the preface, while the matter of the book itself is almost lost in an introduction and conclusion of considerable length. The satire was deserved, and the commencement of the end of the grand epoch was thus announced. How the minds of men were affected by the "grand" and the "stately" in an age of courtesy and compliment, how they were guided in their appreciation of the works which served as its models, and ignored the Mediæval architecture of Western Europe, may be seen in Addison's description of the different effect produced by the contemplation of an ancient and a Mediæval building. "Let any one reflect," he wrote in the *Spectator* (No. 415), "on the disposition of mind he finds in himself at his first entrance into the Pantheon at Rome, and how his imagination is filled with something great and amazing, and at the same time consider how little, in proportion, he is affected with the inside of a Gothic cathedral, though it be five times larger than the other, which can arise from nothing else but the greatness of the manner in the one and the meanness in the other."

But we have changed all that, and more than one British student of architecture has asked himself, when outside the Pantheon, whether the precious time of a tourist in search of the picturesque might be profitably wasted by stepping inside. This same tourist, in his passage through French and Italian cities, may yet regard the great *portes cochères* of ordinary houses, the spacious courtyards of private residences, as so much space to be built upon, which his own more acute compatriots would long ago have converted into a solid mass of offices or dwellings. He may yet wonder why palaces of justice, Government and municipal offices, possess vast halls or *salles des pas perdus*, always open to the public, and often full of people, seeing that in his own more favoured country, the birthplace of popular liberty and common sense, the home of practical men, there are none of such things; and year after year it becomes more and more patent that such things can be dispensed with, and, indeed, are the mere vagaries of an exploded theory or the outcome of affectation, which is profitable solely to the architect, as the one person interested in making what we call a fine building. But neither in France nor Belgium, neither in Germany nor in Italy, do Governments think or act thus. There, no portions of a public work are more carefully considered, or more spacious, than the portions open to the people, and devoted to their use. How such works are understood in France, what the character of ideas which guide the architects who devise them is, may be seen in some of the selected designs for the Prize of Rome, photographs of which are hanging on the wall. There is actually a palace of justice among them, the architect of which has conceived not only the desirability of a magnificent vestibule, but also a public hall giving access, on each of its three sides, to a court of law. Nor are these designs the chimeras of irresponsible youth. Many of them, matured and, perhaps, reduced in dimensions, are afterwards worked into practical shape; they form parts of monumental buildings, paid for by the nation, and worthy of it,—the very antithesis of that British notion of compactness which may yet culminate in placing the hall-porter of our proposed new Government offices in a box on the street pavement, when it shall be seen, too late, that the spirit of false economy and speculative adventure which inspires the action of modern Ministers has added a fresh architectural calamity to the list of their irretrievable disasters.

Now, what have we got in the place of the

"grand" method of our fathers? In lieu of a courtyard we have a low doorway opening upon the public street; in lieu of a vestibule, of an ante-chamber, we get a vaulted corridor, which, in more than one instance I can name, has an entrance-door at one extremity and a darkened window at the other. Let us, then, inquire how this change has come about?—how men's minds have been led to accept the present haphazard fashion of planning new buildings, and the utter absence of any wish or attempt to compose them?

That the course of revival during the present century has been largely affected by literature of the romantic sort, it is unnecessary to do more than note. That it entered upon a new phase after the attacks of Pope, and the wits that he inspired, has been explained over and over again. The Gothic cathedral, the fortress converted into a signorial residence, the bishop's palace, the manse, the grange, or what not of Mediæval origin and descent, when they first attracted the archæologist, were made up of the work of different and successive epochs. A hall erected in one century had its window openings doubled in size in the next; fifty years afterwards a clearstory may have been added. The low porch, or the low arches of a cloister erected in the thirteenth century, may have been partly pulled down and rebuilt in the fourteenth century with more sharply-pointed arches, and filled in with tracery. What met men's eyes when they first began to see the beauty, and perhaps the grandeur, in Gothic work to which Addison was blind, was a something eminently picturesque,—a something that retained its beauty under grey skies, could do without sunshine, enjoyed a monopoly of gloom which served for shadow, and possessed, in its dilapidated, ivy-clad condition, all the charming properties of a sketch and few of the prosaic, necessary fittings or fixtures of the finished building. All over the country were to be found works of this kind; in many notable instances they were the heritage of noble families, of squires, and county people, whose reigning head might have pleaded, though he rarely did so, that the dilapidations of his ancestral home were typical of long descent and early connexion with the soil. Then inquiry bred inquiry, archæologists mustered, architects learned to reproduce such houses. Rich men who were not proud of their ancestors, and even had reasons for not alluding to them, jumped to find that money could purchase and architects could provide country seats as varied in age and as old in appearance as any ancestral home in the island. If the plan was irregular, if portions of the new erection had a tumble-down look, if the principal entrance was low and a little out of the centre, if it led to the back instead of the front part of the house, the illusion was all the more agreeable and complete. Architecture thus conferred gentility, and no complication of hall or passage was too irregular, no grouping of parts too illogical to subdue the owner's proud reflection that his new house was of the very oldest and most historical in style. So, after all, the immediate outcome of archæological science, whether it revive the ancient works of Athens and Rome or the Mediæval creations of Western Europe, is affectation, and not very dissimilar to-day from that of the great epoch of Louis XIV. and his successor. The Timon of Pope was pleased to create, often on a barren soil, something entirely new; the Timon of to-day aspires equally to create, but in fertile glades, something supremely old; and, as we are now considerate enough to deprecate with a smile the affectation of a Bathurst or a Boyle, so may posterity review kindly our present triumphs of architectural skill, which will, I fear, baffle, ere the next century be finished, all the wit of Birmingham, all the learning of Leeds.

Frankly, I feel that too much of the old grand manner,—not to be confounded with the "grand old" manner,—of the stately method of composition in architectural planning has been discarded, and that a too great regard for the picturesque at any price now tends to deprive a public building erected in this country of the oneness and harmonious disposition of parts which belong to the monumental erections of Paris, Vienna, and Berlin. I am not so Quixotic as to suppose that every building can be made to tell its proper tale, but I do most certainly think that our present method of grouping a congeries of buildings, with innumerable entrances, small and confined vestibules, all to do duty as parts of a public office, a town-hall, or a palace of justice, is fatal to popular convenience and destructive of private comfort. In all such buildings there should be not only an entrance, well and conspicuously marked, but a central hall in which the stranger or the visitor may obtain information to guide him in his search for a particular office or a particular court. The architect can only by such an arrangement afford the means of making his building intelligible and facile to those who use it. But whether by the fault of others who pretend to instruct him, or from his own desire to be quaint and picturesque, many of the newest public buildings in this country fail in just those points,—in the arrangement of those parts of a great building which should be common to the public,—upon which the architects of the two last centuries lavished their skill, displaying therein a by-no-means contemptible acquaintance with ancient learning, which they used to the profit of the arts and manners of their time.

For some notes of the discussion which ensued, see p. 873.

## THE COURTENAY MANTELPIECE IN THE BISHOP'S PALACE, EXETER.

WHATEVER may be the case in other climes, the centre of attraction in an English living-room during nine months of the year is unquestionably the fire-place. It is right, therefore, that the object upon which the eye rests most frequently,—and, may we not say, most fondly?—should be one designed not merely to fulfil its special purpose, but to give artistic pleasure. This principle was kept in view by mediæval architects, and some grand examples of mantelpieces in marble, stone, and wood may occasionally be found in old English mansions and manor-houses. One of more than ordinary beauty is to be seen in the episcopal palace at Exeter, where it occupies the position in the hall assigned to it by Bishop Phillpotts in 1845. Previously it had stood in the dining-room, and, when there, borrowed tone and colour from the light which fell upon it through the richly-blazoned windows. This consideration may, perhaps, account for the absence of any traces of gilding or colouring even upon the armorial bearings and heraldic devices which are the chief features of the mantelpiece.

The mantelpiece forms the subject of a dainty volume, printed, unfortunately, for private circulation only, at Torquay,* and rendered attractive by the skilful pencil of Mr. Roscoe Gibbs, and the no less skilful pen of Mrs. Maria Halliday. The history of the mantelpiece is told by itself in the language of heraldry. The centre finial, which rises to a height of 12 ft., consists of the arms of France and England within the garter, surmounted by the arched diadem of Henry VII., and supported by the greyhounds of his consort, Elizabeth of York. Beneath the royal escutcheon occurs the portcullis, the cognizance of the Beauforts, which is repeated in the decorated soffit below, and serves for a capital to the dexter column flanking the mantelpiece, as the double rose does to the sinister one. In this arrangement there is an obvious allusion made to the union of the houses of York and Lancaster in the person of Henry VII. Below the royal arms is a beautifully-carved mitre, to which are attached two pendants richly fringed. The position of the mitre may, perhaps, indicate that in Tudor times the supremacy of the Crown was recognised even by

> "Sir Edward Courtney and the haughty prelate,
> Bishop of Exeter, his elder brother,"
> ("Richard III.," act iv., sc. 4.)

to whom Henry of Richmond was largely indebted for his throne. But the great glory of the mantelpiece is the entablature, which is divided into three equal compartments, each occupied by heraldic shields and other devices. Scrolls bearing appropriate mottoes are introduced with great skill, and the disposition of the dolphins round the centre escutcheon (the arms of the see of Exeter impaling those of Courtenay) is singularly felicitous. In the mouldings, horizontal and perpendicular, the bishop's initials and family badges give distinctive character to the work, even in its smallest details. It should be mentioned that all the carving is executed in low relief, and in its present position is seen to much less advantage than in that for which it was originally designed. On the other hand, it is in exceptionally perfect preservation, and is one of the best specimens we have of genuine heraldry applied with taste and meaning to internal decoration.

Mr. Gibbs has added much to the value of his monograph by his researches into the heraldic bearings of the sees of Exeter and Winchester; and his delineation of their differences, as seen in the monuments and stained glass yet extant in Exeter Cathedral, is exceedingly curious. He also draws attention to the remarkable figure carved on the east end of Bishop Stapledon's monument at Exeter, which, from its position, escapes general observation. It is evidently that of King Edward II., whose cruel murder at Berkeley Castle preceded that of the bishop by a few weeks only. The expression of the face is rendered with great power, and five centuries have not sufficed to destroy the original colouring of the figure.

* At the office of the "Torquay Directory," 1884.

## HATCHETT'S HOTEL AND "WHITE HORSE CELLARS," PICCADILLY.

WE have had an opportunity of going over these premises, now just completed and on the eve of opening. They occupy the site of the old buildings bearing the same designations,—so well known in the past and at the present day in connexion with coaching business and four-in-hand clubs,—and the result is a notable addition to the architecture of Piccadilly. The style adopted by the architects, Messrs. W. S. Weatherley and F. E. Jones, of 20, Cockspur-street, is English Renaissance of about the period of John Thorpe's Kirby Hall, the first stone of which was laid in 1570. The materials used externally are red bricks (supplied by Mr. Thomas Lawrence, of Bracknell) and Ancaster stone. The building is lofty and picturesque, and by means of bays and oriels a great variety of prospect has been obtained, the situation at the corner of Dover-street being very advantageous in this respect. The "White Horse Cellars" are perpetuated in the form of a new and lofty chamber in the basement, vaulted in Dennett's fireproof construction, and having a high dado of panelled deal. Although the floor of this apartment (which is paved with Lowe's wood-block flooring) is 17 ft. 6 in. below the pavement level, there will generally be abundance of light, daylight being supplemented when necessary by incandescent electric lights, of which Messrs. B. Verity & Sons, of King-street, Covent-garden, have provided an installation, worked by one of Otto's 12-h.p. gas-engines setting in motion one of Edison's T dynamos. The engine and dynamo are provided in duplicate, in order to provide against breakdowns, repairs, or other contingencies. So far the electric light is only provided in the basement and on the ground-floors, and to the principal staircase. The distribution and mode of treatment of the fittings for the incandescent lights have been specially arranged by the architects, and exhibit a welcome departure from the tentative expedient of utilising the forms of gasfittings. In the "Cellars," the incandescent lights are inclosed in small lanterns suspended from coronæ; in some of the apartments on the ground-floor the lanterns inclosing the lights are suspended near the ceiling by silk cords; and in one case they are very happily combined with the pendants which form part of the design of the ceiling. The effect in each case is very satisfactory, and the fittings are well carried out by Messrs. B. Verity & Sons. The large and lofty vaulted chamber already referred to as forming part of the basement is to be used as a luncheon-room, it being approached by a broad marble-lined staircase from Piccadilly. In this apartment there will be a grill for chops and steaks. The ground-floor will be appropriated to a buffet and luncheon rooms, and on this floor also there will be the Coaching Coffee-room. The public and private dining-rooms are on the first floor. The woodwork of some of these rooms is of ammoniated wainscot, that of the large dining-room and of other rooms being of American walnut. The external doors are of teak. The fireproof construction is by Messrs. Dennett & Ingle. All the ornamental ceilings have been made from the architects' designs, by Messrs. George Jackson & Sons, in their fibrous plaster. The furniture and decoration is by Messrs. Shoolbred & Co. "Tynecastle Tapestry," very richly decorated, is used in some of the principal rooms and on the staircase, as a wall covering, while in the bedrooms

flowered silk damask is employed for the same purpose. The ceilings of all the principal apartments are richly decorated, gold being plentifully though not too lavishly employed, the effect being rich without any approach to garishness. The fittings, including the chimney-pieces, have been specially designed by the architects. The kitchen is at the top of the building, but completely cut off from the main staircase. The kitchen fittings are by Messrs. J. & F. May, of Holborn, and are very complete. The vestibule of the hotel proper (to which the entrance is in Dover-street), is provided with a telephone lobby, and with another lobby containing electric-bell indicators and communicators. The wrought iron balustrade, richly gilt, to principal staircase, is by Mr. J. Stone. The locks and the fanlight apparatus (patented for this building) are by Charles Smith & Co., of Birmingham, who also executed the external wrought-iron railing and gates. The stoves in bed and sitting rooms are by Longden, of Sheffield, the dog-grates in the larger rooms being supplied by Messrs. Shoolbred. The whole of the marble-work, including chimney-pieces, has been executed by Messrs. Farmer & Brindley, and is noteworthy for excellence of workmanship as well as for beauty of material. The hall and staircase have white marble steps and strings, the walls up to handrail level being a "brescia," and above that height "Pavonazzo." The columns and pilasters in the large dining-room are of "Brescia Africano," the chimney-pieces in the same apartment being of "Giallezza statuary," the coupled columns of the same being beautiful specimens of "Isola." The counter-top in the buffet is of "Giallo Antico," from the ancient quarries near Carthage. Other marbles used are "Orange Verona," "Yellow Verona," "Polcevera," "Pavonazzo," and a choice Spanish marble from Catalonia. The bed and sitting rooms, while combining a general unity of style with great cosiness, are pleasingly varied as to size and shape, decoration and furniture, and the service arrangements are excellent. The sanitary arrangements are mainly by Messrs. Jennings. The lavatories are by Messrs. Bolding. The fire hydrants, &c., are by Messrs. Merryweather. The electric bells were supplied by Mr. Dale; and the lightning-conductor is by Messrs. Gray & Co. The contractor for the erection of the building was Mr. John Grover, of New North-road.

**A New Floating Fire Engine.**—On the 19th instant a trial took place with a new self-propelling floating steam fire-engine, constructed by Shand, Mason, & Co., to the order of the Bristol Corporation, for the protection of the docks and water-side property in that city. The hull and propelling engines have been constructed to the specification and under the superintendence of Mr. J. W. Girdlestone, engineer to the Bristol and Avonmouth Docks, while the fire-engine is similar to one supplied in the early part of this year to the Metropolitan Fire Brigade, which, we are informed, has proved so successful at several water-side fires that two others are now in course of construction by the same makers. The experiments were conducted in the presence of Captain Shaw, C.B., Chief of the Metropolitan Fire Brigade, and Mr. Wingfield, superintendent of the Bristol Fire Brigade, and were carried out in a satisfactory manner. At a previous trial a few days since at the measured mile a mean speed of 8·9 knots per hour was obtained, which, considering the size and special construction of the boat, proved very satisfactory. The boat is of steel, 53 ft. long and 13 ft. 6 in. beam, built in four water-tight compartments, the screw propeller being driven by a pair of high-pressure engines supplied with steam from the fire-engine boiler. The fire-engine is Shand, Mason, & Co.'s equilibrium, discharging 1,100 gallons per minute through a 2 in. jet, reaching, under favourable circumstances, a height of 200 ft. There was no opportunity of testing the height on this occasion, but a water-pressure of 140 lb. per square inch was obtained, the steam-pressure being 110 lb. The boiler is of Shand, Mason, & Co.'s patent inclined water-tube construction, which has been successfully in use for fire-engine and other purposes for fifteen years. The boat will be taken through the canal to Bristol in a few days and finally tested there in the presence of Mr. Girdlestone and the Bristol authorities.

## Illustrations.

### DESIGN FOR WAR AND ADMIRALTY OFFICES.

BY MR. E. R. ROBSON.

We gave Mr. Robson's design for the War and Admiralty Offices in the form in which it was submitted for the first competition (see *Builder* for August 16 last), but we think that the fine qualities of the design render it well worth being shown to more advantage than in the small scale-line elevations of the first competition series. Mr. Robson has had two points in the design, at our suggestion, worked out in detail in perspective views; viz., part of the Whitehall Front and an angle of the Park Front. The method in which the old Admiralty screen is worked on the Whitehall Front, with the main building carried round in a semi-circular sweep behind it, is very effective. The Park Front shows some happy adaptation of Classic detail with considerable originality and refinement.

Few of the designs exhibited seem to us to have so well combined the idea of a War Office, in the stern solidity of style and simplicity of grouping which characterise the building, with the merit at once of originality and coherence in architectural treatment.

### DESIGN FOR INFECTIOUS DISEASES HOSPITAL, NEWCASTLE-ON-TYNE.

The design which we illustrate was prepared in conformity with the instructions issued. The administrative block is in a central position, and near the road. The medical officers' rooms are *en suite* on the ground-floor. The matron's sitting-room and store-rooms, nurses' dining-room, kitchen, and offices, are on this floor. The dispensary adjoins the nurses' room. On the first floor are bedrooms for the matron and nurses, and on the second floor bedrooms for the servants.

All the ward blocks are placed almost due north and south. Each block accommodates fourteen patients: ten in general ward, two in small ward, and one each in two single bed wards. For each patient in the general ward there are allowed 11 lineal feet of wall space, 143 superficial feet of floor space, and over 2,000 cubic feet of air space. Excessive window area has been avoided. At the south end is a "sun-room," with open fireplace for convalescents. The windows are so arranged that they can be folded back, and an open verandah formed for use when the weather permits. An alternative arrangement shows terrace, as the "sun-room" was not mentioned in the instructions. Disconnected from the ward block by the main corridor are dressing and bath rooms, with entrance-lobby, where patients are treated and clothes changed preparatory to entering or being discharged. The connecting corridor is 10 ft. wide. The upper parts of the windows are filled with glass louvres, the lower parts hung so as to fold against the wall, and form into an open corridor.

*Ventilation.*—Inlets for fresh air behind each fireplace, under each bed, and in corners, warmed when required. Top part of windows swing inwardly; lower part, double-hung sashes, with bottom bead the depth of the rail, so as to admit air at meeting-rail without draught. Above the ceiling is formed a ventilating chamber, in which are hot-water coils, with louvres at the ends, and two large air-pump ventilators on the ridge. In the ceiling of the general ward, to each pair of beds, is an opening for outlet, fitted with exhaust and draught-preventer box, in which a gas jet, on the Bunsen burner principle, would be continuously burning. Each chimney has an exhaust ventilating-flue, and each gaslight has its separate vent.

### ST. OSWALD'S COLLEGE, ELLESMERE.

This Lower Middle-class School is to be for 500 boys, to be boarded and educated at 18*l.* 18s. a year as at Ardingly, and is for the sons of the lower middle classes and upper artisan class. This amount is proved at Ardingly to give a profit, and, therefore, there is power at Ellesmere to reduce the annual fees when practicable. At present there is accommodation for 200 boys, and the numbers will be gradually increased as the buildings are completed.

The general form of the plan is that of the letter H, giving two open quadrangles facing west and east, with extensions to the south and north. At present there are erected the cross building of three stories, the ante-hall and hall, a two-storied building running west, and the offices on the north. Both hall and offices are for the complete number of boys. The dormitories face west on both the upper floors of the cross building, with a cloister 8 ft. wide on their east side, arched with brickwork. There are masters' rooms on these floors, and on the ground-floor, together with Provosts and other rooms, and staircases at each end, one of which is private, for the servants only. The principal entrance is in the centre of this block, and forms the connexion between the two quadrangles. The western quadrangle opens on a magnificent view over the Welsh mountains, from the Llangollen Valley to the Breidden hills, near Welshpool.

The eastern quadrangle is reached by a new road from the Ellesmere-road. Ellesmere is about a mile away. The new road winds round a curious artificial hill called "Spy-bank," supposed to have been a look-out place in British times.

The hall occupies the north side of the western quadrangle, and is 120 ft. long and 36 ft. wide. The lower story has flat-headed mullioned windows; it is now used as the chapel, but will be converted into a gymnasium when the permanent chapel is erected. The hall is reached by a flight of steps from the ante-hall. The ceiling is of flat timber construction and carried on two central stone columns; the angles of the plan are filled with oriel mullioned windows.

The cloisters of the wing enter on the south, and the archway is formed on the east for the chapel. On the north the offices open out. The offices have large kitchen, bakery, and laundry arrangements, and large dormitories and bedrooms for servants and servitors, and also bath-rooms, &c., for the boys' use.

Foundations are put in for the dormitories and master's rooms and great school-room on the south side of the eastern quadrangle.

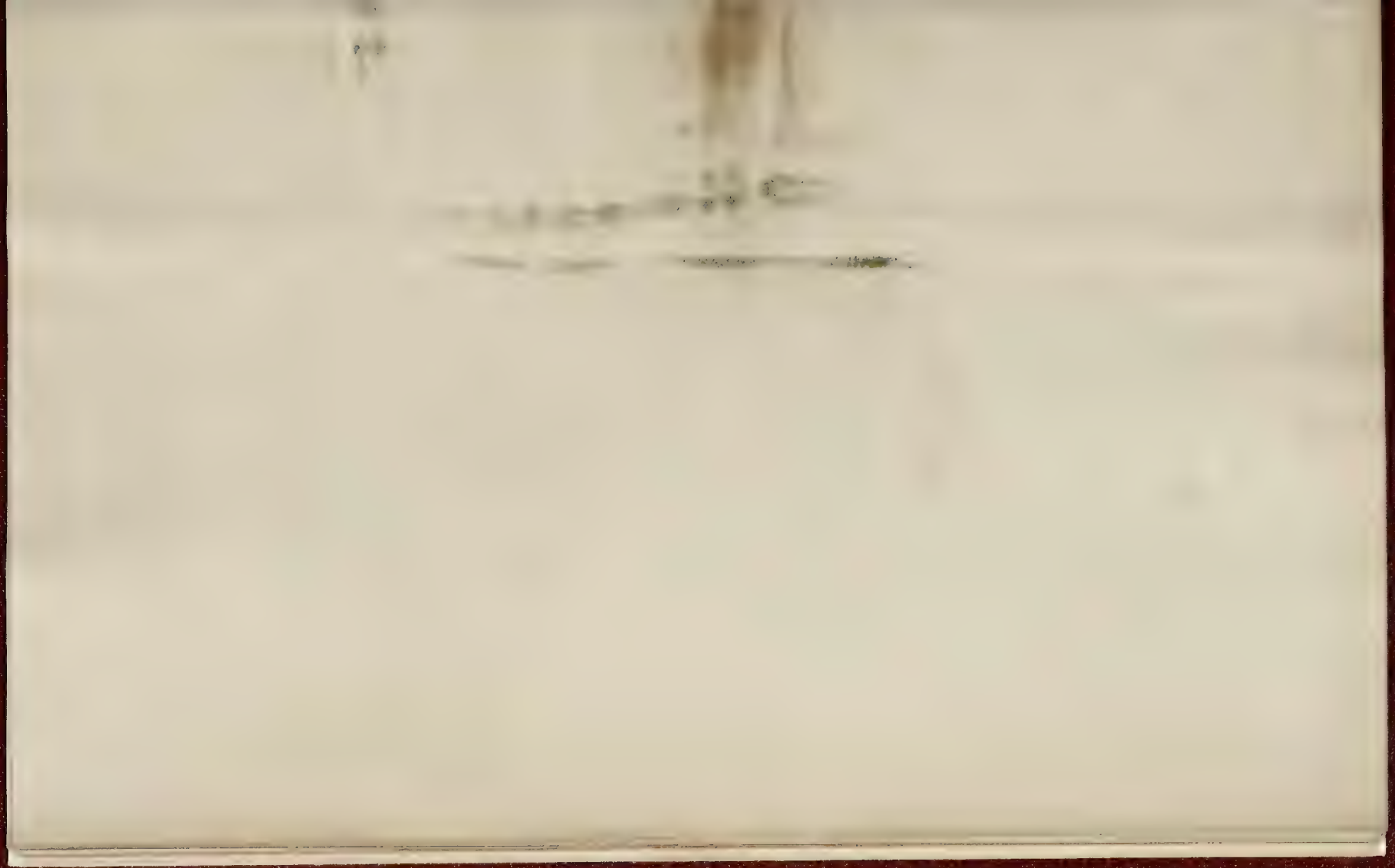
The corner-stone was laid by the Earl and Countess Brownlow, on August 5th, 1879, and since then the buildings have been steadily carried out. Mr. Bowdler, of Shrewsbury, executed the foundations, and Mr. Collins, of Tewkesbury, the superstructure. The finishings and fittings have been done by tradesmen employed by the committee, under Mr. Garland, the clerk of works. The heating is by Messrs. Haden, and the laundry fittings by Messrs. Bradford. About 27,000*l.* has been at present expended.

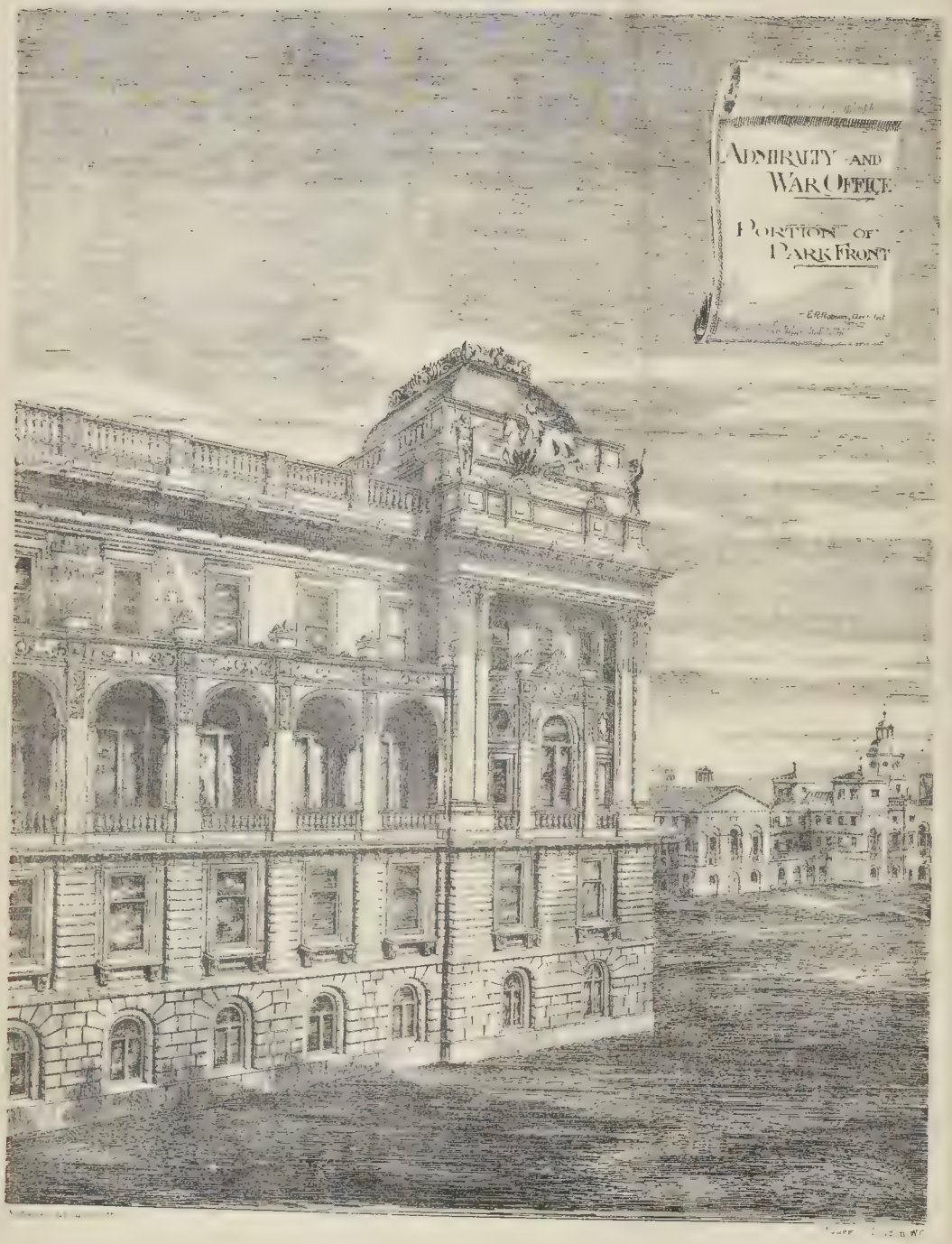
The architects are Mr. R. Herbert Carpenter & Mr. B. Ingelow, of London, the college architects. The style of the buildings is a simple variety of Late Gothic, the hall windows alone having tracery, others having square Cefn stone heads and mullions. The facing and walls are of red Ruabon brick, as are the strings, plinths, window and arch jambs, &c. The roofs are covered with Portmadoc slates; paving bricks from Ruabon are used extensively for the cloisters and offices, stair landings, &c. The ultimate cost will be about 50,000*l.*

### BEDSTONE COURT, SHROPSHIRE.

We gave the description of this house in our last. We add this week the plan and another view of the house.

**Trade Calendars.**—A calendar for 1885, which will be very useful to plumbers, painters, and glaziers, has been issued by Messrs. Farmiloe & Sons, of 34, St. John-street, West Smithfield. It contains tables giving weights of lead pipe; weights, gauges, and sizes of sheet zinc; glass measurement table, giving superficies from 24 in. by 40 in. to 60 in. by 40 in.; a calculator for the oil-trade, for reducing the cost per ton to the cost per gallon; and much other handy information for the trades mentioned. It is mounted on stiff cardboard so as to hang on the wall of office or workshop, and may be had for sixpence.——Another handy trade calendar for the wall has been issued by Mr. A. J. Hall, of Barrington-road, Brixton. This includes a table showing the number of feet of different scantlings (from 2 in. by 4 in. to 4 in. by 12 in.) in a Petersburg standard; a table showing price per standard at so much per foot run; and other useful information.






PERSPECTIVE VIEW OF PORTION OF DESIGN FOR ADMIRALTY AND WAR OFFICES.
BY MR. E. R. ROBSON.



FIRST FLOOR PLAN




GROUND PLAN

REDSTONE COURT, SALOP.

THE RESIDENCE OF THE LATE SIR HENRY W. RIPLEY, Bart.

Mr. Thos. Harris, F.R.I.B.A., Architect.

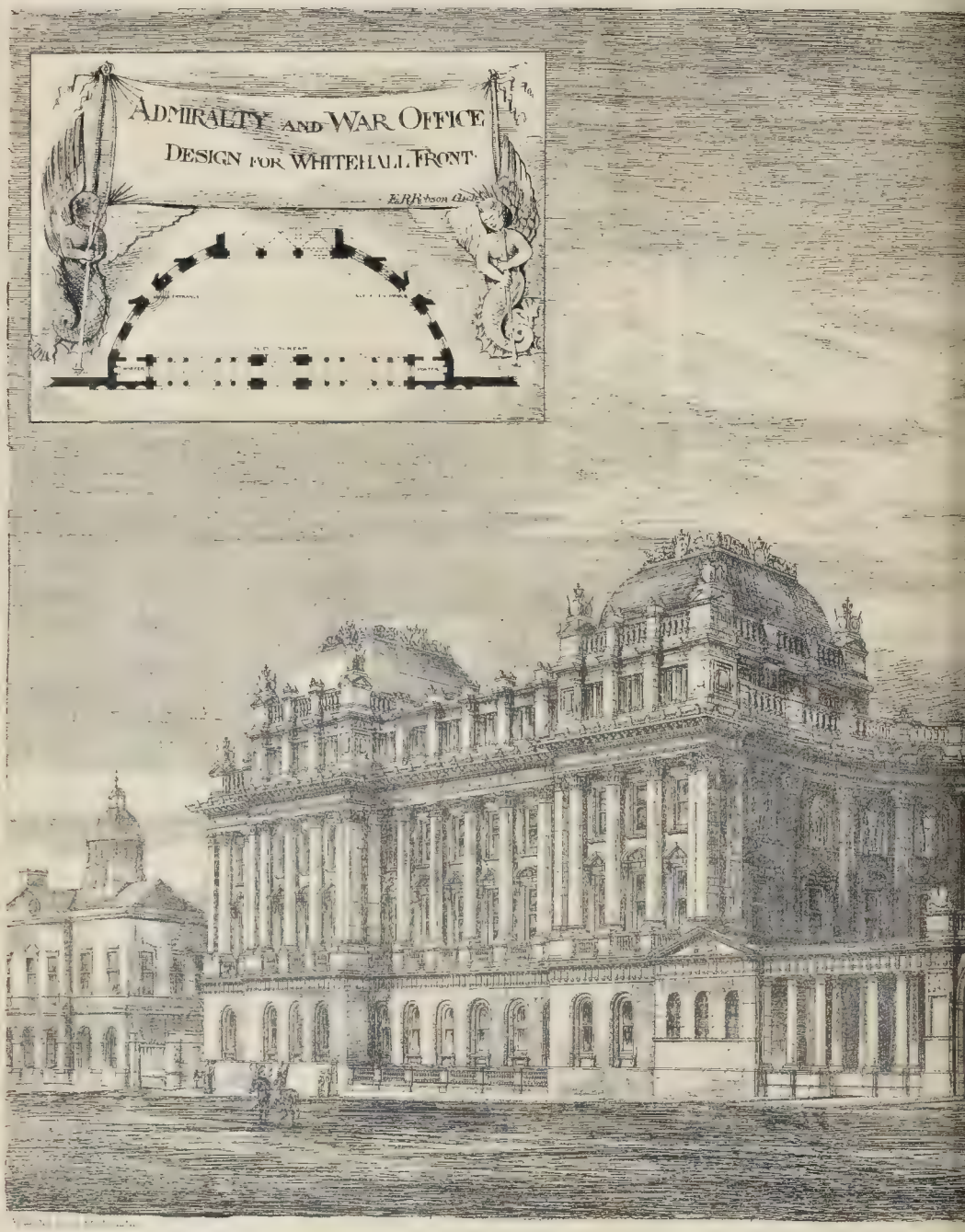


BEDSTONE COURT, SALOP.

The residence of the late SIR HENRY W. RIPLEY, Bart.

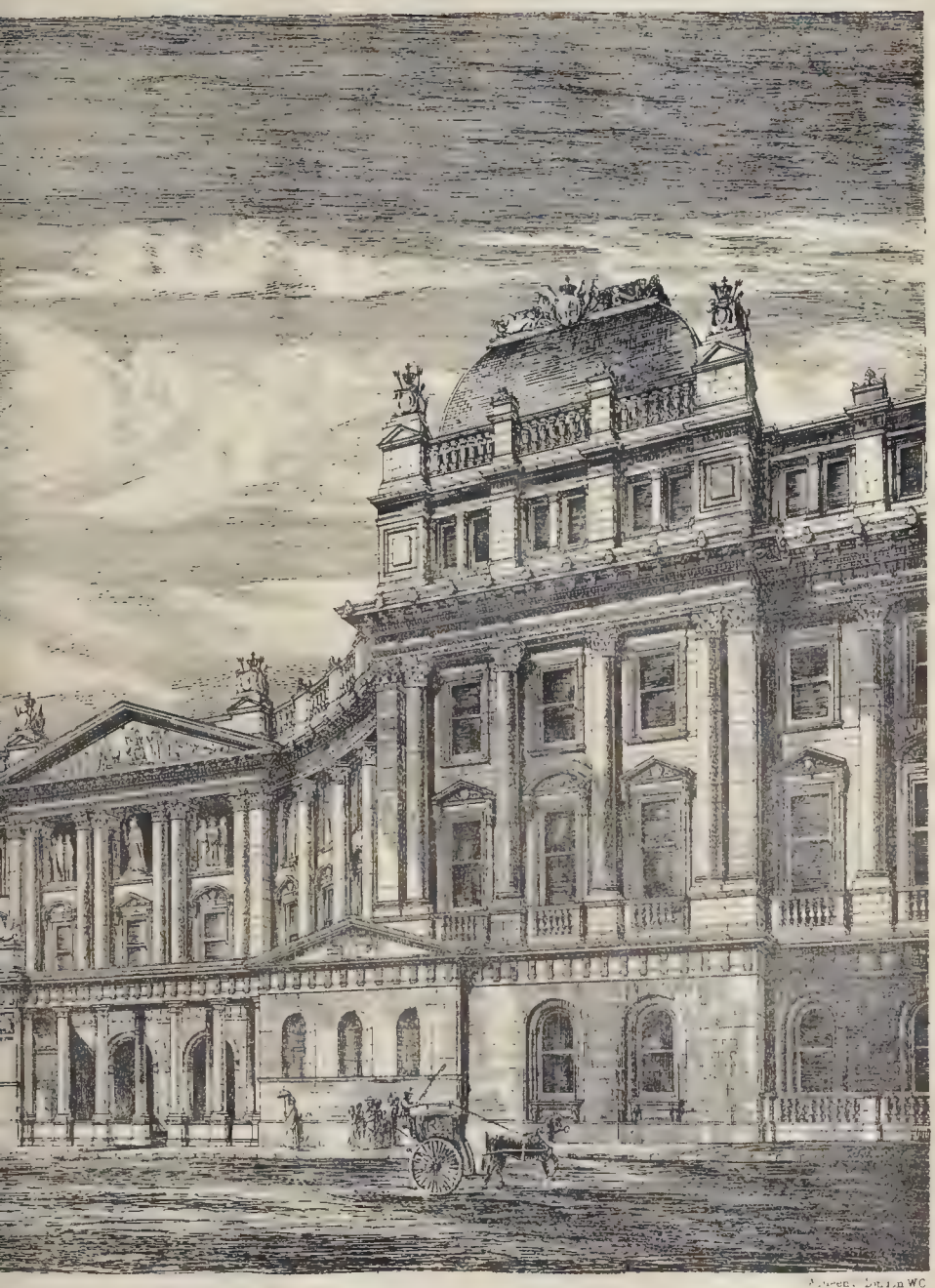
Mr. Thomas Harris, F.R.I.B.A., Archt.






PERSPECTIVE VIEW OF PORTION OF DESIGN FOR A

*Showing Whitehall Front and Old*



LTY AND WAR OFFICES BY MR. E. R. ROBSON,

*y Screen in new Position.*

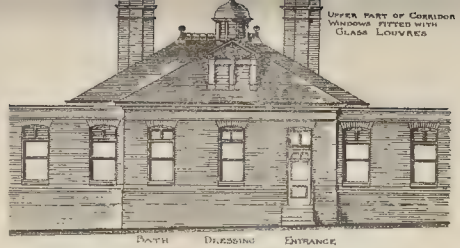


S. OSWALD'S COLLEGE, ELLESMERE. Messrs R. H Carpenter & B Ingelow, Architects.

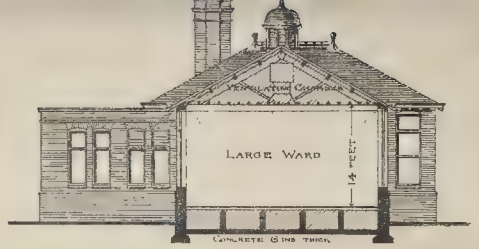


SOUTH END shewing SUN ROOM

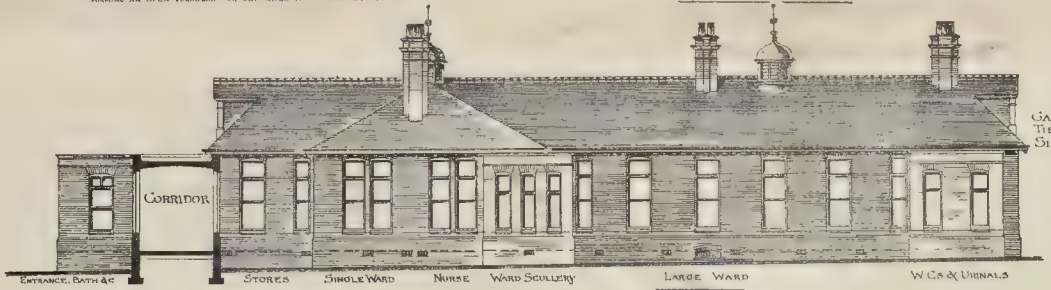
NOTE. THE WHOLE OF WINDOWS AT END OF SUN ROOM CAN BE FOLDED BACK LEAVING THE OPENINGS QUITE CLEAR, THUS FORMING AN OPEN VERANDAH FOR USE WHEN THE WEATHER PERMITS




NORTH END

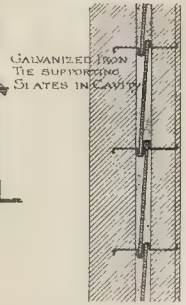


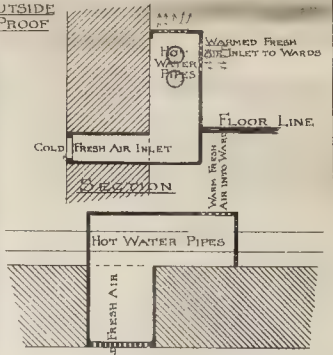

SECTION




SIDE

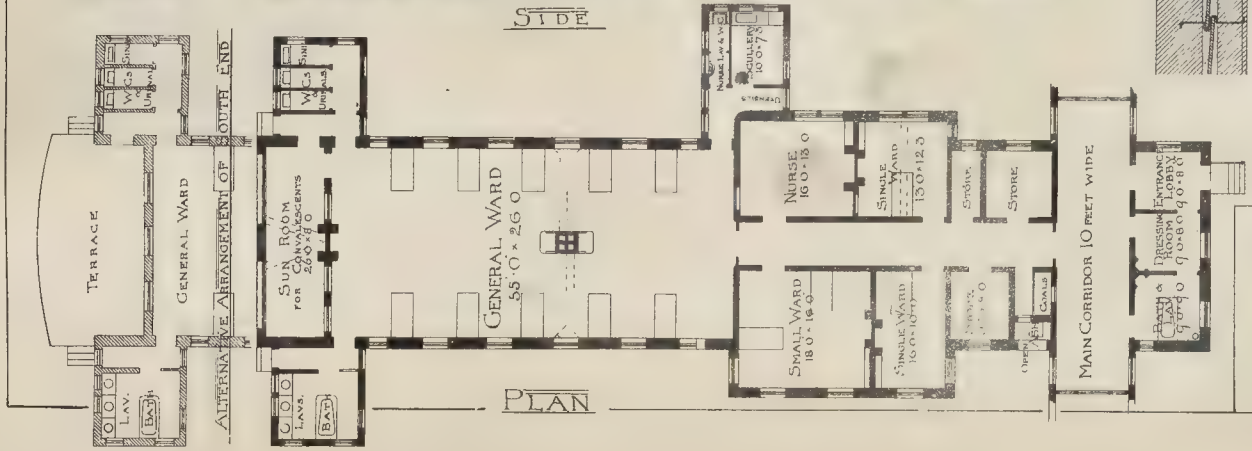
SECTION OF OUTSIDE WALL : DAMP PROOF




PLAN

DETAIL SHEWING HOW FRESH AIR IS WARMED BEFORE COMING INTO WARD UNDER EACH BED.
SEE DESCRIPTION AS TO VENTILATION




# Newcastle Infectious Hospital.

THIRD PREMIATED DESIGN

MR. J. BRADSHAW GASS, ARCHITECT.

Wyman & Sons Photo Litho

## ARCHITECTURAL ASSOCIATION.

THE fifth ordinary meeting was held on Friday, the 19th inst., Mr. Cole A. Adams, President, in the chair.

The Chairman drew attention to the report of Mr. George Aitchison, A.R.A., on the work submitted in competition for the Prize in the Class of Colour Decoration, 1884. In this report Mr. Aitchison gave Mr. Hennings the first place, Mr. Lewis being put second.

Mr. W. H. White then read a paper entitled, "The Ante-chamber, To-day and Yesterday, in French and English Plans," which we print in another part of this number.

The Chairman, in opening the discussion, remarked that looking at the question simply as treating of the ante-room, it would appear, at first sight, that little could be said. Those, however, who had followed Mr. White's paper might deduce from it that the tendency of the Gothic revival had been, perhaps, too much in the direction of studying picturesque effect, and neglecting that balance of parts which distinguished the Classic era of architecture. In modern houses the hall had become an important feature, and in many cases in his own experience great stress had been laid upon its being a sort of ante-room, with staircase leading out from it, and the other rooms grouping around it. No doubt the ante-room had disappeared in many houses simply from questions of cost. In the Albert Hall Mansions, planned by Mr. Norman Shaw, the visitor, after ascending the great staircase and knocking at the door, is at once shown into a square chamber, from which the rooms lead out; and a very pleasant arrangement it is.

Mr. Lawrence Harvey said that Duban termed architecture, *décoration construite*, and the architect of Blenheim had apparently the idea of immense decorations acting as a frame for the proprietor. The idea of decoration should not be allowed to run counter to that of practicability; but Vanbrugh's idea was that a quarry of stones should be used to produce effect. Although not a Gothic architect himself, he considered that the Gothic people took a much more correct view of architecture than the Classics did in works of this kind.

Mr. J. A. Gotch proposed a vote of thanks to Mr. White, and expressed his admiration for the ingenuity displayed in making the subject of the ante-chamber so amusing and instructive. As a matter of fact, huge wandering plans were in existence before the last century, one notable instance being Audley End in Cambridgeshire. This house, although now too large for the occupier, only covers one-fourth of the space it originally did. The house consisted of a block and two large courtyards, one being simply a series of little rooms or lodgings, which in the course of time were found to be useless, and were taken away. So that about the time when Blenheim was being erected, with its superfluous and unmeaning grandeur, Audley End was being denuded of what had been weighed in the balance and found wanting. Lord Bacon, in his description of what a palace should be, mentioned the "*Ante-camera*" as a necessity for a noble suite of rooms. The idea of making the hall into a sort of sitting-room seemed to be a very admirable one where it could be done, because at present a great deal of space in the shape of passages and corridors was thrown away.

Mr. G. H. Blagrove remarked that it was only in the case of large mansions that they had the opportunity of planning the hall. Mr. White might have said whether he preferred having a staircase separate from the hall, or having it worked in and made an important feature of the one hall. Sometimes a very fine effect was produced in old mansions, such as that at Gatton, near Reigate, by the hall being carried up two or three stories. Some excuse might be pleaded for the defects pointed out in Blenheim, as it was distinctly a monumental building. It was allowed to be a great work of genius.

Mr. W. H. Nash said that Vanbrugh had the virtue of using good materials, whereas in Italy Palladio's palaces were frequently built of stucco and plaster. The ante-chamber might be very well utilised in modern plans. The wretched passages called halls were a disgrace to any country.

Mr. F. R. Farrow (holder of the Godwin Bursary), referred to the houses in Vienna, which were built in flats with plenty of ante-chambers. One great drawback, from a London point of view, to the plan of the Continental house, was the great expense of having ante-rooms. It would have the effect of raising the rents of the flats, which were already too high. In Vienna a man had to pay away one-third of his income in the rent of his suite of rooms, and this was accounted for by the fact of their being planned on a grand style and having so many rooms which were not strictly necessary.

The vote of thanks having been cordially received,

Mr. White, in replying, said that Mr. Gotch was correct in saying that grand planning came over from France in the latter part of the seventeenth century. As to the excessive cost which would arise in the case of houses with three ante-chambers, the present speculative owners of houses were making 7 or 8 per cent., but, if they would be content with less, the occupiers might have their ante-chambers, and he believed this would be the case ere long.

## COMPRESSED AIR

### AS A TRANSMITTER OF POWER AND AS A SANITARY AID.

A PUBLIC meeting of manufacturers and others was held in the Old Lecture Theatre of the Midland Institute, Birmingham, on the 17th inst., to receive explanations of the scheme of the Birmingham Compressed-Air Power Company, who propose to supply to power-users from a common centre compressed air for the driving of machinery, &c., upon terms and conditions which, it is claimed, will compare advantageously with the cost and practical requirements of steam. Having obtained Parliamentary powers and the consent of the Corporation, the company propose to erect works and lay down mains for the supply, in the first instance, of the central wards of St. Bartholomew, Deritend, and St. Martin, whence it can be extended, as the demand arises, to other parts of the town, where manufacturers or customers are found in sufficient numbe s to make the undertaking remunerative. Under this system air-power will be laid on in the same way as gas or water, and may be turned on or off at will at any period of the day; and as users will only pay for what they consume, which will be measured by meter, there will be none of the waste inseparable from the use of steam.

Some interesting and important considerations in favour of the project (assuming the possibility of its practical success) were laid before the meeting.

The Chairman (Mr. Arthur Chamberlain) pointed out that the carrying out of the scheme would save a large outlay on capital account to each manufacturer, inasmuch as steam boilers and chimney-shafts would not be needed. Moreover, users of compressed air as a motor would be able to "average" their consumption of power. At all times some manufacturers were busy and some were not, but whether busy or slack, if they used steam power they had to keep at the works the same plant for the production of the full amount of power that they might at any time require. By the adoption of compressed air as a motor they could use much or little, as their requirements varied. Moreover, no change of plant was involved, for engines which were now driven by steam could be driven by compressed air, and the abolition of steam boilers in workshops would take from employers a great deal of anxiety.

Professor Henry Robinson, of King's College, said that a meter had been devised which would not only register the volume of air which passed through, but its pressure, the Company being required by their Act to supply air at a certain pressure. There need be no appreciable loss of power through leakage and friction.

Mr. Wilfrid Airy made some interesting observations with regard to possible off-shoots of the main scheme, firstly, the driving of clocks and keeping them going in true time by means of compressed air. There were in Paris something like 8,000 clocks so worked, and the system was rapidly being extended there. Mr. Airy exhibited one of the clocks, and explained how, by means of a puff of air inflating a small bellows once every minute, the minute-hand was moved forward, the supply of air being admitted and cut-off by mechanism connected with a central clock, which was regulated by time-signals from an observatory. He also showed how a striking apparatus when required was attached to the clock, and kept wound up by means of the compressed air. The mechanism of clocks consisted simply of the tiny bellows and two or three spur-wheels, and scarcely ever got out of order. In Paris the clock was supplied, driven, and kept in order for a small yearly tariff,—a very much smaller sum than most people paid nowadays for keeping their clocks going. The modern clock was an abominable instrument. It cost a good deal of money in the first place, a great deal to repair and keep it clean, and in many establishments there was an annual sum paid to keep the clocks wound up. All these expenses would be included in the small tariff charged for the compressed-air clock. The company in Paris also supplied a large number of clocks to the municipality. These were placed at crossings of streets, in squares, and in other public places. The contract stipulated that the company should pay a certain fine for every minute that the clocks were not going, but up to the present time not a single fine had been incurred. The system was in use over an area about one mile and a half long by three-quarters of a mile wide, and twenty or thirty miles of pipes were used. The air-pipes in Paris, like all the other pipes in the city, were laid in the sewers, but they might just as well be laid in the streets. Another possible offshoot of the main scheme was an improved gas-light, an incandescent gas-light. This also was already in operation in Paris,* and had given very great satisfaction, for it was a very beautiful light. Coal gas and air were introduced simultaneously, but by separate pipes, into the interior of a burner consisting of a globe of steatite surrounded by a thin thimble of platinum. The steatite and platinum were pierced with a large number of small holes, through which the mingled gas and air issued and were burned. The steatite and the platinum became incandescent, and gave a light as good as the electric light for selecting fabrics in shops, and purposes of that kind. The light was also an extremely good one for street lamps, because, being an incandescent light, it was perfectly steady.

Mr. Arnold Lupton, speaking as one who had had considerable experience with compressed air, said he had no doubt that by its means power could be transmitted to every part of the district of two square miles and a half proposed to be served by the company, with the loss of, comparatively, a very few inches of water pressure. He certainly had heard of such a thing as a burst pipe, but it simply meant that there was a pipe gone, and no other harm resulted from it, the compressed air being a most harmless thing. Moreover, compressed air could be used as a means for ventilating rooms. He thought the only scientific mode of ventilating a room was to produce a *plenum* of pressure in the room, air being introduced through the proper openings in such quantities as to cause all the draught to be outward instead of inward, and therefore such as would not do any harm. Compressed air, too, had been applied to locomotives in mines with great success, and was equally suitable for tramways in streets, all that would be required being appliances resembling hydrants, at distances of a mile or half a mile, through which the engines could be supplied with fresh stores of air from the mains. The operation of re-charging the engine occupied about twenty-five seconds. The great advantage of compressed air was that there was no condensation in the pipes. They got their power at the other end, however long the supply-pipe might be.

Colonel Jones explained how compressed air had been used with great success at Eastbourne to force the sewage of the town out into the sea. He also suggested that it would be very useful in Birmingham for pumping chemicals, where metal pumps could not be used. In fact, an endless number of applications would be found for this power if they once got the mains laid in the streets.

Mr. Lawson Tait thought that the scheme was well worthy of attention from a sanitary point of view. The great difficulty of the Health Committee in dealing with the smoke nuisance was in connexion with the small manufacturers, who could not keep a man solely as a stoker, and whom to fine continually would be to ruin them.

On the motion of Mr. Jaffray, seconded by Alderman White, it was unanimously resolved, "That, having heard the explanation offered, this meeting is of opinion that the Birmingham

* It has been exhibited in London.

Compressed Air Company's scheme is likely to prove a great advantage to power users in Birmingham, by offering them facilities which they do not now possess, and is worthy of public support.

## RESPONSIBILITY IN SANITARY MATTERS.

Dr. Sieveking presided on Wednesday evening, December 17th, at the last of the lectures which the Sanitary Assurance Association have arranged this year at the Parkes Museum of Hygiene. The lecturer was Mr. Mark H. Judge, A.R.I.B.A., who delivered an address on "Public and Private Responsibility in Sanitary Matters." Mr. Judge began his remarks by asking his audience to consider whether there was any real cause for serious attention to the conditions under which we live; whether sanitary reformers, from Moses and Mahomed to Edmund Parkes and Florence Nightingale, had been right in the importance they had attached to man's environment. The answer to this must come from the physician, from whom the architect must be content to learn what conditions are essential to health, that he might be able to design dwellings so as to secure such conditions. The authority of Professor De Chaumont and Mr. Eric Erichsen was given to show that good sanitary conditions were not only essential to the maintenance of health, but often to the existence of life itself. Reference was made to the defects common to houses in all parts of the country. Speaking of main sewers, Mr. Judge said that they were specially within the province of the engineer, and that the best-constructed and ventilated main sewer was a piece of engineering with which the sanitary architect desired to have no direct connexion. Across the outfall drain he constructs a sanitary moat with iron draw-bridge for easy access in case of invasion from without or mutiny from within. Mr. Judge criticised the powers conferred on Local Boards and their surveyors, and said that they did not possess the qualifications which would warrant the Legislature in handing over to them the right to regulate the internal sanitary arrangements of our houses. He would strengthen the law by minimising its demands to essentials, and by insisting on its absolute enforcement. The responsibility of the individual owner or occupier should be increased, but in so far as the public authority pretended to interfere, he would make it a real interference, and in every case where the law was not complied with there should be some punishment meted out to those responsible for the breaches. Mr. Judge concluded by suggesting eight points, which, if embodied in the law, would define the duties of the public authority, and of the householder, in such a way as to improve the health of the public, and preserve the liberty of the individual. Of these suggestions the one to which most importance was attached was the second, viz., "Every house-drain to have between the house and the public sewer or common drain an air-chamber and disconnecting syphon trap, or an air-inlet disconnecting syphon trap, in a position where it can be readily inspected by the officer of the sanitary authority."

**House Areas.**—Some of the small areas upon which inhabited rooms in town dwellings are dependent for light and air are often productive of conditions prejudicial to health, and the limit, prescribed by legislation, of 100 ft. superficial, is subject to no restriction as to proportion, which is certainly to be regretted, since 10 ft. by 10 ft. is a very different thing from 20 ft. by 5 ft. Besides this, such areas are often carried to heights which render the access of a proper amount of light and air impossible. There is always a tendency, in these areas, for the air to become stagnant, especially in its lower strata. To remedy this, a device has been employed which we commend to the notice of all who are desirous of securing sufficient ventilation in confined areas. It is exceedingly simple and inexpensive, and it deserves mention from the fact of its being so frequently omitted in the construction of town dwellings. It consists in connecting one open area with another by means of a pipe or channel passing under the floors of the basement rooms. If it pass under a kitchen so much the better, for the heat of the fire will increase the draught, and promote a free circulation of air. —*Sanitary Record.*

## THE ARCHITECT'S DEPARTMENT OF THE LONDON SCHOOL BOARD.

At the meeting of the School Board for London on the 18th inst., the Works Committee presented a report, from which we make the following extracts:—

"On the 20th of November the Board referred to the committee a letter from Mr. E. R. Robson, resigning his appointment as Architect of the Board. The committee have since carefully considered the question as to the appointment of Mr. Robson's successor. They are of opinion that the large experience which Mr. Bailey, the Assistant Architect, has had in connexion with the work of the Board since its commencement, renders him specially qualified to succeed Mr. Robson, and they have no hesitation in recommending that he be appointed as Architect to the Board. Mr. Robson, however, is prepared to complete the schools which have been planned by him, and the committee think it would be an advantage to retain his services for this purpose only, for which they recommend that he be paid as remuneration at the rate of 500*l.* per annum, for a period not exceeding two years. They propose that the salary of Mr. Bailey (which is at present 435*l.* per annum, and would have been 457*l.* on the 1st of January) should, on his appointment as Architect, commence at 600*l.* per annum, rising by increments of 100*l.* per annum to 900*l.*; and that he should be required to give the whole of his time to the Board. The committee do not propose to fill up the appointment of Assistant Architect, vacated by the promotion of Mr. Bailey, but they recommend that one of the existing officers in the Architect's department be promoted to the position of chief draughtsman, with a commencing salary of 250*l.*, rising by 12*l.* 10*s.* per annum to 300*l.* per annum. As Mr. Robson held the appointment of Surveyor as well as Architect to the Board, the committee propose that Mr. Young, the Assistant Surveyor, be now appointed Surveyor to the Board, and that his present salary of 435*l.* be increased to his maximum salary under the scale, viz., 500*l.* per annum. It is understood Mr. Young retains his private practice, which the Board, by their resolution of the 10th of November, 1881, permitted him to carry on. They accordingly recommend,

That the resignation of Mr. E. R. Robson, the Architect of the Board, take effect on the 1st of January, 1885.

That Mr. T. J. Bailey be appointed Architect of the Board, from the 1st of January, 1885, at a salary of 600*l.* per annum, rising, by increments of 100*l.* per annum, to a maximum of 900*l.* per annum; and that he be required to give the whole of his time to the Board.

That Mr. E. R. Robson be employed to finish the schools which he has planned, a list of which has been submitted; and that he be paid as remuneration at the rate of 500*l.* per annum, for a period not exceeding two years from the 1st of January, 1885.

That one of the officers in the Architect's department be promoted to the position of chief draughtsman, with a salary commencing at 250*l.* per annum and rising by 12*l.* 10*s.* per annum to 300*l.* per annum.

That Mr. A. Young be appointed Surveyor to the Board, from the 1st of January, 1885, at his maximum salary of 500*l.* per annum."

In the course of the discussion which followed, Mr Urlin moved, and Miss Hastings seconded, an amendment to the effect that the annual increments of 100*l.* in Mr. Bailey's salary should be reduced to 50*l.* This was supported by Miss Helen Taylor, who said she was in favour of introducing entirely new blood into the Architect's department, and new ideas and practices into the building of the schools. The construction of many of the schools was radically deficient and faulty. Mr. Spicer, on the other hand, said there had been some very substantial improvements introduced into the schools of late years; and Mr. Heller said he could bear his testimony to the fact that the method of building the schools was in no way a crystallised system. The progressive character of the work of the Architect's department was a striking fact in connexion with the Board's history. That department had been engaged in gradually absorbing into their system ideas from all kinds of practical sources, and had striven to render the schools the best possible places for the masters and mistresses to work in. Mr. Bruce and the Rev. T. W. Webber expressed their opinion that the salary proposed to be paid to Mr. Bailey was too low, Mr. Webber saying that he was sure there was no other public body which employed an architect, demanded his whole time, and gave him such great responsibilities and so small a salary as did the Board in this case. Mr. Ross did not think the Board needed a specially-appointed architect. A gentleman could be called in whenever his services were required. The amendment was rejected by 21 to 16. Another amendment that the increments should be 60*l.* instead of 100*l.* was lost by 21 to 13, and the second resolution was agreed to, subject to an amendment (accepted by the Chairman of the Committee) binding Mr. Bailey not to undertake any other professional work. On the proposal of the Committee that Mr. Robson should be employed for two years at 500*l.* per annum to finish the uncompleted schools he has planned (sixty-two in number), an amendment to reduce the salary to 400*l.* per annum was negatived by 23 to 6, and the recommendation of the Committee was adopted, as was the remainder of the report.

## SLATE DÉBRIS AND ITS UTILISATION.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

An ordinary meeting of this Society was held on Wednesday evening, the 17th of December, the President, Mr. Thomas Cole, A.M.I.C.E., in the chair, when a paper, illustrated with experiments, was delivered by Dr. G. Selkirk Jones, F.C.S., upon "Slate Débris and its Utilisation." The author, after describing the composition and geological formation of clay slate, called attention to the various substances which in the laboratory he had obtained from waste slate (or *débris*), such as crystallised alum, so much in demand as a mordant in calico-printing and other processes; secondly, a new filtering agent for sugar refining and water purification, this substance containing a large percentage of carbon; thirdly, a substance which he named "Argilline," to be used in conjunction with lime for the chemical precipitation of lime. The author then showed an aluminate of peculiar composition, possessing good detergent properties, and which, he said, had already found much favour among wool and silk scourers, its efficacy as a detergent being due, firstly, to its powers as a remover of grease, &c.; and, secondly, on account of its harmless action upon those delicate fabrics, the curl of the wool being uninjured, and the silk freed from the so-called gum without damaging the fibre. The slate *débris* was next shown in its prepared condition for the manufacture of French chalk, pigments, fullers' earth, earthenware, cement, and concrete. Another feature of slate *débris* utilisation was also pointed out, viz., the manufacture of good and substantial bricks, sanitary and other tubes, tiles, &c. The author showed by experiment the cleansing of dirty wool, selecting the worst specimen he could obtain. He also precipitated the solid matter from a gallon of very offensive sewage-water, leaving the effluent bright and comparatively pure. In speaking upon the question of sewage purification, and of our possible visitor, the cholera, the author remarked that this was not a question so much of cost as of national importance. From a sanitary and hygienic point of view, what, he argued, was 5,000*l.* or even 10,000*l.* a year outlay compared with the incalculable advantages of pure drinking-water and the prevention of zymctic diseases among the community?

The exclusive rights in respect to the foregoing have been secured at home and abroad.

## AN ART GALLERY, MUSEUM, AND SCHOOL OF SCIENCE FOR ABERDEEN.

The new Art Gallery has been erected on a site in the Schoolhill, from plans prepared by Messrs. Matthews & Mackenzie, architects, Aberdeen, whose plans were selected in competition. It is in the style of the Italian Renaissance, and has a frontage of 130 ft., with a depth of 90 ft., while its height towards Schoolhill is 42 ft. It is wholly built of granite, the lower part of the wall, to the height of 9 ft., being of rough stone, of a pink colour, from Correnie; the general wall-face is of light-grey granite, from Kenmay; while the more ornamental features of the design are worked out in dressed pink stone, which has a lighter colour than the same material in its unhewn state. The prominent feature of the front elevation is a portico, with two Corinthian columns, fluted at the lower end, and having the capitals carved out of the solid granite. The outer pilasters, two in number, have massive base-pieces and capitals. The doorway is arched, and has for keystone a head of Minerva, from a model presented by Sir John Steell, R.S.A., to his native city, and which has been reproduced in granite by Mr. G. L. Jamieson, of the Crown Granite Works. Over the doorway, in the centre of the portico, is an oblong recess, in which it is intended to place a figure group representing the fine arts. This piece of sculpture, which is the gift of Mr. Macdonald, of Kepplestone, is from a design by Mr. Lawson, London, and will also be in granite. On each side of the porch is a range of four square-headed windows, placed high in the wall, so as to secure for the interior a top light. These are finished with moulded architraves and cornices, and are each surmounted by a circular medallion, which may afterwards be sculptured. The main cornice, of dignified proportions, is carried over the entrance porch in the form of a large enriched pediment. The work has, for the most part, been done by local tradesmen.

The new School of Science and Art is to be presented to the city by Mr. Robert Gray, of the firm of Mackinnon & Co., engineers, a member of the Town Council, and a director of the Mechanics' Institute, in which vigorous science and art classes have been conducted in the evenings for many years. The building is at present in course of erection on the east side of the entrance to Robert Gordon's College. It has been designed by the same architect, and in its general features is almost a duplicate of the Art Gallery and Museum. Its frontage to the School hill is shorter, being 92 ft., as compared with 160 ft., and its porch, which projects further, and is more ornate, has four Corinthian columns, instead of two in the Art Gallery. The entrance-hall of the school is 27 ft. by 22 ft., and from it a similar staircase as in the Art Gallery leads to the second floor. The retiring and attendants' rooms are extended on the left of the entrance-hall, while to the back is the model-drawing and elementary room, 66 ft. long, 28 ft. wide, and 18 ft. high, well lighted from the north by a range of high-set windows. On the west end of this large hall is a modelling studio, 20 ft. square, and on the right of the entrance-hall a lecture-room, 29 ft. by 21 ft. On the upper floor is a ladies' studio, 29 ft. by 21 ft.; the antique room, 49 ft. by 28 ft.; a painting studio, 28 ft. by 17 ft.; a room for the life class, 28 ft. by 20 ft.; an apartment for the master, and suitable cloak-rooms and lavatories. All the rooms of the upper floor have top lights It is intended to unite the art gallery and the museum with the School of Science and Art by means of a handsome gateway thrown across the entrance to Robert Gordon's College, which, as those who are acquainted with Aberdeen know, is set far back from the street in the middle of extensive grounds. The design shows a triple archway, 50 ft. in length, the central archway 21 ft. across, and 19 ft. high, the flanking archways being about half that width. Above the archway a corridor, 9 ft. wide, is introduced, with a small apartment in the centre, in which pictures might be hung. This archway would cost about 1,000*l.*, of which (according to the *Scotsman*) the Art Gallery Committee have offered to pay one-half.

## APPOINTMENTS NOT UNDER SEAL.

SCOTT *v.* THE GREAT AND LITTLE CLIFTON SCHOOL BOARD.

THE plaintiff in this case (upon which judgment was pronounced by Mr. Justice Mathew, sitting in the Queen's Bench Division of the High Court of Justice on the 20th inst.) was an architect, who sought to recover from the defendants, the School Board of the Great and Little Clifton District, a sum of about 90*l.* for services rendered in preparing plans for and superintending the erection of a school for the defendants.

The case was tried before Mr. Justice Mathew, without a jury, at the July Assizes at Carlisle, when it was conceded by the defendants that the plaintiff had, in fact, executed the work, orders for which had been given him by the Board, and had been agreed to by a resolution of the Board duly entered on their minutes. The defendants, however, refused to pay the plaintiff, on the sole ground that his appointment was not under the seal of the Board, and, inasmuch as it related to work of above the value of 50*l.*, was not binding upon the Board.

The case came on upon further consideration on the 22nd of November, and was argued at some length, the defendants' counsel resting their case mainly upon the cases on the subjects of contracts by Corporations from "Clark *v.* The Guardians of Cuckfield Union," reported in 21 *Law Journal*, Queen's Bench, p. 349, down to "Young *v.* The Corporation of Leamington," reported in "Law Reports," 8, Appeal Cases, p. 518, in which it had been decided that Corporations could avail themselves of a defence similar to that set up in the present case.

His lordship now gave judgment in favour of the plaintiff, and said that although it was true that by sec. 30 of 33 & 34 Vic., c. 73, a School Board was made a body corporate, with perpetual successors and a common seal, yet the same statute contained further provisions with reference to its proceedings, and these would seem to render the cases relied on by the defendants inapplicable; and his lordship said that if it were necessary for the decision in this case he should hesitate to look upon those cases as a safe guide in cases like the present, where the contract was for a purpose incidental to the performance of the duties of the corporate body, such necessity having been evidenced by proof that the corporation had, with full knowledge of its terms and of all the facts, acted upon it, and taken the benefit of the performance. His lordship, however, held that the plaintiff was entitled to recover upon another ground, namely, that afforded by sub-sec. 6 of sec. 30 and rule seven in the third schedule. By these it was provided that the appointment of any officer of the Board might be made by a minute of the Board signed by the chairman and countersigned by the clerk of the Board, and that any appointment so made should be as valid as if it were made under the seal of the Board. The plaintiff had been so appointed architect to the Board, and the subsequent orders for the execution of the plans were given by the minutes of the Board, properly signed, and his lordship was of opinion the plaintiff's appointment was within the meaning of that section,—that of an officer of the Board.—*Times.*

## MARCH'S PATENT STREET-SWEEPER AND ELEVATOR.

ON Friday, the 19th inst., a trial was made in Grosvenor-place and in some adjacent roadways of this ingenious machine, which is the outcome of much patient thought and experiment on the part of its inventor. The machine, as its name implies, not only sweeps the road, but lifts the mud or slop into the cart or wagon to which it may be attached. The machine is made in two forms, known as Nos. 1 and 2. The machine known as No. 1

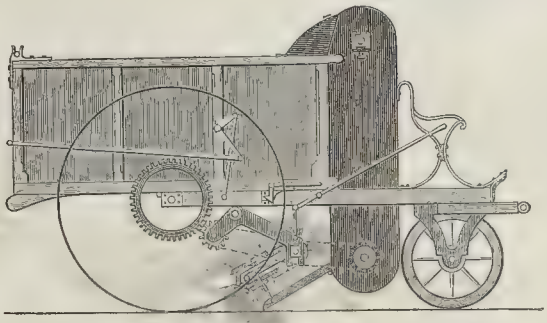


Fig. 1.

is shown in fig. 1. This is the form in which the machine is placed in front of the cart, and permanently combined with it, the elevator in this case coming between the driver's [illegible] and the cart. Machine No. 2 is shown in fig. 2.

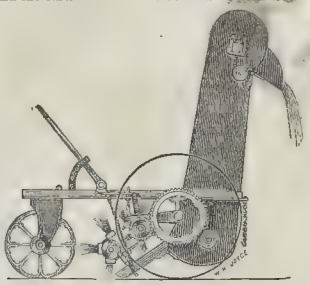


Fig. 2.

This is made to couple on to the back of a cart or wagon, and is instantly attached or detached. Machine No. 1 would have advantages in some circumstances, as, *e.g.*, in keeping clean the streets of crowded cities where the traffic might be slightly interfered with by having to connect and disconnect the machine as often as the cart or wagon became full, as would be necessary with Machine No. 2; but this advantage would be dearly bought if the "tip" or depôt for the contents of the carts were at any great distance, seeing that to empty the cart the machine would have to be dragged with it. In both machines the working parts are essentially the same. A chain of revolving brushes sweeps the mud, dust, or slop up an inclined pan into the elevator case, the buckets of which, mounted on endless chains, discharge their contents on to the shoot projecting over the cart. On lowering the hand lever, the small spur wheel which is keyed on to the front shaft of the chain of brushes is withdrawn from the spur ring attached to the off road-wheel. Further depression of this lever raises the brush-pan and brushes. In starting to work, the lever is raised, and the different parts resume their former position in the reverse order. A pair of right-and-left threaded screws, with elongated nut, connects the hind shaft of brushes to the pan, and enables the brushes to be brought down to their work as they wear away. The front shaft of brushes is also lowered by a screw which passes through the angle frame of the machine, and supports the small end of a horizontal lever, centred on the collar of the axle. The small upright lever which holds the front shaft of brushes works upon a pivot running through the horizontal lever. The brush-pan being hinged to the elevator case is free to rise and fall, also the rear shaft of brushes connected thereto. The elevator is driven by another spur ring. A long upright lever is centred at the lower end upon the lower shaft of the elevator. Upon this shaft is keyed a small spur-wheel which gears in an upper spur-wheel keyed to a short shaft which revolves in a boss of the lever itself. The two small spur-wheels are, therefore, always in gear, and the upper one is moved in or out of gear with the spur-ring by the long upright lever. At the top of this lever there is a pin which slides in a slot at the end of the shoot lever, whereby the shoot is raised or lowered simultaneously with the movement of the gearing below.

The trials made on Friday morning were, on the whole, very successful, and we trust that Mr. March's perseverance may be rewarded, and the comfort and health of the public promoted, by the wide adoption of his machine in London and other large towns. Of course, an extra horse is required to draw the wagon and No. 2 machine, but the spare horse should be abreast of the shaft horse, the shafts being made purposely to slide instantly from the middle to the "off" side, and *vice versâ*, for that purpose, the spare horse being attached by a leading-bar or whipple-tree to a hook on the fore-carriage. It is also required with this machine to work the lever for throwing the machinery into or out of gear. It is claimed for the machine that, going at the rate of three miles an hour, it will sweep thoroughly 1,200 square feet a minute of any road; that any worn or broken part can be replaced in a few minutes, duplicates being kept; that macadam roads swept by the machine will last longer than those swept by hand or by the one-revolving-brush machine; that varying brush pressure can be applied, according to the nature and quality of the road, or of the material to be swept; and that the machine sweeps and elevates other refuse, besides mud and dust, such as cabbage leaves, straw, &c.,—a qualification which should commend the machine to the Duke of Bedford for use at Covent Garden. Obviously the employment of the machine would dispense with those offensive heaps of mud which, in many parts of London, sometimes wait a day or two at the roadside for the leisurely collecting cart or wagon to come round, becoming more or less dispersed over the roadway and pavement, or on the clothing of wayfarers, in the meantime.

The inventor has not yet had an opportunity of testing his machine as a means for clearing the streets of snow; but he says that if the snow were dealt with, as it is in Berlin and other large Continental cities, directly it begins to fall, his machine would pick it up. The patent provides for scrapers in lieu of brushes, if needed, to deal with deep or partially hardened snow, and though a few experiments may be necessary before the machine is brought to deal with snow efficiently, we understand that its adaptation to such a purpose has throughout formed a prominent feature of the machine in the mind of its inventor.

**A Builder's Mausoleum.**—A costly mausoleum is at present in course of erection in the cemetery at Wimbledon, by the family of Mr. B. Cooke, builder and contractor, of Battersea, who died a short time ago. The mausoleum, which measures 9 ft. by 7 ft. externally, is faced with Portland stone and red and grey polished granite. Above a base in Portland stone the frontages are faced with columns and panels in red granite, up to a height of about 8 ft. above the ground-level. These are surmounted by a cornice in stone. Above the panels there are double arched windows. The structure is surmounted by a dome. The entrance is on the north side, leading by a flight of steps down into the vault beneath, 10 ft. in depth. The mansoleum was designed by Mr. J. T. Armstrong, architect.

## PAINT ON FRONT DOOR.

Sir,—I have a front door that after being made and hung ten years still exudes resin, or whatever the thick liquid is that warmth frequently brings out of red deal and similar woods. The door when new was treated in the usual way,—knotted and painted four coats, and five or six years afterwards was re-painted, the parts exuding this moisture being scraped bare and again knotted; but this did no good. Two or three years afterwards, all the paint was burned off the door, and the door again re-painted, and still the same oozing takes place. Now how to remedy this I really cannot tell. It is not caused by knots in the wood, but comes from the grain. Would any of those paints do that are made to stand tropical heat? If they would, are they made fine enough for a front door, or only fit for rougher purposes? It takes but little heat to draw out this moisture. Soon after it was painted the last time (in the month of April), a little afternoon sun in that month was able to bring up blisters and show the moisture behind them. If any of your experienced readers could and would give their advice on this, I should feel obliged. H. G.

## THE OMNIBUS AND TRAMWAY MEN'S BENEVOLENT SOCIETY.

Sir,—With reference to your notice of this Society in your last issue of the *Builder* [p. 839], will you allow me to state that, as the Society is yet in course of formation, we shall be glad to welcome the co-operation and aid of any gentlemen who are willing to give their support to so worthy a project, as I feel sure your readers will at once recognise this to be?

Communications should be addressed to the hon. secretary, from whom all information can be obtained.

Heron B. Verity, Hon. Sec. *pro tem.*
182, *Strand.*

## A QUESTION.

Sir,—I want a small atmospheric engine for churning. Will any one tell me the best maker?
A. P.

## PROVINCIAL NEWS.

*Leeds.*—An important extension of the building known as the St. James's Hall Coffee Palace, Leeds, has lately been completed, the building now being one of the largest of its kind in the kingdom. Although Mr. W. J. Armitage, of the Farnley Ironworks, had expended upwards of 13,000*l.* on the hall as it stood up till recently, such success has attended the work carried on here that he has found it advisable to carry out considerable extensions, the cost of which, including land, will be about 10,000*l.* more, making the cost of the whole block about 23,000*l.* The new wing comprises the following accommodation, namely, on the basement, large provision stores; on the ground-floor, new first-class dining-room, 34 ft. by 20 ft., with an additional bay or alcove, 13 ft. by 7 ft. 6 in. This room is fitted up in a superior manner for better-class customers. The walls have a dado of ornamental glazed faïence, and the ceiling is handsomely panelled with moulded ribs, with ornamental cornice and deep frieze. Adjoining this hall is a new entrance from York-street, from which a handsome stone staircase ascends to the top of the building. A further entrance is provided from the cross street between York-street and the Market, with stone stairs giving access to the basement and the upper regions of the edifice. The present dining-room in the existing building having been found too small, it has been materially enlarged by the addition of the two small rooms adjoining. Ascending from York-street, on the first floor, is a ladies' coffee-room, 17 ft. by 15 ft. 6 in. On the second and third floors bedroom accommodation is provided, whilst the topmost floor is used as a kitchen. The principal rooms of the building are warmed by hot-water pipes. In carrying out the new wing it has been the aim of the architect to let it harmonise with the existing structure so far as the leading lines are concerned; but he has chosen a later phase of Gothic, tinged with some Flemish characteristics. The building has been erected from the designs and under the superintendence of Mr. William H. Thorp, of Leeds. The original contract, amounting to a little over 5,000*l.*, was let to Messrs. Franks & Evans, of Skinner-lane, Leeds, but some additions have been made.

*Exeter.*—A bookcase and cabinet combined made in oak and walnut from the designs of Mr. Octavius Ralling, architect, together with a gold watch and illuminated address, has been presented to Mr. Casley, of this city, as a token of appreciation by many friends, of his work in the cause of temperance and thrift among the working classes. Mr. J. R. Gibbard, builder, was the maker.

*West Bromwich.*—The new infirmary and laundry which have been erected in connexion with the West Bromwich Union were formally opened on the 18th inst. The buildings have been erected on land which was purchased in 1880 at a cost of 1,542*l.* Eight sets of designs were received for the buildings and reported upon by Mr. Thomason, of Birmingham. The plans accepted were those of Mr. William Henman, of Birmingham, and these plans were sanctioned by the Local Government Board after various minor alterations, and they are those which have been carried out. Twenty-two tenders were received for the infirmary work, and the lowest, that of Messrs. Stockton & Son, of Oldbury, for 10,800*l.*, was accepted. The contract for the boundary walling, railing, and gates was let to Mr. W. Bennett, of Sedgley, at 958*l.*; and that for the erection of the laundry was let to Mr. William Robinson, of Birmingham, at 3,570*l.* The actual cost of the infirmary, certified by the architect, is 12,447*l.* 3s. 2d. Accommodation is provided for 224 patients of three classes, viz., 170 ordinary, 44 contagious, and 10 infectious. The arrangement of the wards is upon the "pavilion" system, and they are placed north and south, so that the sun's rays may fall on each side during some portion of the day. The East Pavilion is for women, the West for men. Each contains, in addition to four large and two small wards, two nurses' rooms or ward sculleries, and two large day-rooms; also, baths and other conveniences. In the centre of the main block are the administrative offices, providing sitting and bed rooms for the nurses, the dispensary, the house-surgeon's rooms, the kitchen, and store-rooms. The contagious and infectious wards are separate from the buildings, and so arranged that each ward may be entirely isolated. None of the buildings exceed two steries in height, the staircases are all of stone, and numerous hydrants have been placed in convenient positions around the premises.

## CHURCH-BUILDING NEWS.

*Westminster.*—St. John's Church, Smith-square, Westminster, is about to undergo a series of important alterations, the present rector, the Rev. Canon Furze, having obtained the consent of the Vestry to certain changes, which will have the effect of bringing the interior of the church more in accordance with modern ideas. The old-fashioned high-backed pews are to be removed, and replaced with open sittings, while the arrangement of the seats is to be considerably modified. The result will be a slight loss in accommodation so far as numbers are concerned, but a great gain in comfort. The old method of heating by means of pipes beneath the pews is to be superseded, and the floor of the seats will be level with the floor of the church, instead of being, as now, raised some inches above it. The pulpit, which now stands immediately in front of the altar, will be removed to one side of the church, and the reading-desk will occupy a position immediately opposite. A faculty has been applied for, and when it is obtained the church will be closed for some three months. The cost of the work is estimated at 800*l.*, and the plans have been prepared by Mr. Butterfield, who will superintend the carrying out of the alterations.

*Govan.*—The foundation-stone of the new Govan Parish Church was laid on the 6th inst. The new building, which has been designed by Mr. R. Rowand Anderson, LL.D., of Edinburgh, stands in the northern end of the churchyard, and on the site of the former parish church, which has been pulled down and re-erected on another site in Govan. The new church is a much larger building than the one it replaces. It consists of a vestibule, over which is a gallery; then a nave with narrow side aisles, used only as passages; a transept on one side; a choir with side aisles, one of which is for the organ; a hall or chapel capable of holding 250 people; and a tower and spire on the north side, isolated from the church, but connected with it by a corridor. Advantage is taken of a fall in the ground to provide vestries, session-house, and beadle's apartments under the choir. The bulk of the congregation will be seated in the nave, the remainder in the transept and choir aisle. The nave is 98 ft. long and 41 ft. broad, and the aisles are 5 ft. wide. The choir is 30 ft. long and 22 ft. broad. The hall is 40 ft. long and 20 ft. broad. The total height of the tower and spire is 258 ft., and the width at the base is 35 ft. The architecture is of an early type, such as is seen at Pluscardien Abbey. The cost of the new church will be 17,000*l.*, but this does not include the tower and spire, for the erection of which there are at present no funds. The contractors are:—Mason and joiner work, Messrs. J. & D. Meikle, Ayr; slater's work, Mr. A. D. M'Kay, Glasgow; plumber's work, Mr. John M'Feat, Govan; plaster-work, Mr. R. A. M'Gilvray, Glasgow; gas-fitting, Messrs. R. M. Eastdale & Co., Glasgow; measurer, Mr. W. H. Dinamore, Bath-street, Glasgow; and clerk of the works, Mr. George Kermack, Glasgow.

*Wilton.*—Some improvements have lately been made in Wilton Church. The vestry, which was built some fifty years ago, has been pulled down, and an ancient window of the north aisle, which was partially blocked by the vestry, and two buttresses, have been restored. A new and more commodious vestry has been erected to the north of the chancel, with Ham stone doorways and windows and an open-timbered roof. Underneath it has been formed a chamber for a warming apparatus, the church having been recently fitted by Messrs. John King & Co. with their patent small tubes at a cost of about 80*l.* The three windows at the east end of the nave, over the chancel arch, have been filled with painted glass by Messrs. Clayton & Bell, the late Mrs. Acton (*née* Kinglake) having made a donation for this purpose. The central subject is the Sermon on the Mount, with the Virgin and Child and St. Mary Magdalene in the two side windows. The vestry has been built by Mr. John Pearse, of Minehead, builder, from the plans and under the superintendence of Mr. Houghton Spencer, architect.

*Tytherington.*—Several alterations have recently been made in the picturesquely-situated parish church of St. James, Tytherington. The church, both inside and out, has been in a dilapidated condition for some years past. About twelve months ago the project of arranging for the restoration of the church was seriously entertained, and the task of preparing the plans for the alterations and seeing them carried into effect was entrusted to Messrs. Pope & Paul, architects, of Bristol, while the building contract was given to Messrs. Roach & Son, of Charfield. The work was commenced some six months ago, and the work is now completed. Previously to the alteration, the nave was covered in with a flat ceiling, but this has been removed, and the original oak rafters of the church left exposed, which not only gives a more lofty appearance, but is more in keeping with the general character of things. Considerable alterations, including a new arch, have been made in the chancel. The old-fashioned heavy-looking pew boxes have been removed, and their places supplied with light open seats of pitch-pine. The chancel roof is entirely new. In the chancel new clergy seats and choir stalls have been fixed. These are of massive English oak, and are the work of Mr. Harry Hems, of Exeter. Mr. Hems has also executed the carving on the chancel roof, and has carved a reredos in Caen stone, which occupies the entire width of the eastern end of the chancel. The tower screen, the lectern, the font cover, and altar-rails are also all new, and of oak. The church has been heated throughout by hot-water apparatus, supplied by Mr. Weech, Maudlin-street, Bristol. The entire cost of the alterations is estimated at about 1,500*l.*

## ROMAN CATHOLIC CHURCH-BUILDING NEWS.

*Nottingham.*—During the past twelve years a school and chancel have been added to St. Norbert's Church, which has now been further embellished and decorated by M. Modeste Van Aerschodt, a Belgian artist, and lately a pupil at the Academy of Painting at Antwerp.

*Deptford.*—The Church of the Assumption, built some years ago, has just had the high altar enlarged and completed, from the design of Mr. Fredk. A. Walters. An elaborate terra-cotta diaper, let into panelled stonework, extends upwards to a height of 6 ft., above which are a series of seven niches, with richly crocketed canopies surmounted by a carved and embattled cornice. Each niche is filled with an angel bearing the emblems of the Passion, the Blessed Virgin occupying the centre. The

reredos is flanked at each end with traceried and canopied buttresses, finished with the "Pelican" and "Agnus Dei" respectively. The work has been executed by Messrs. Earp, Son, & Hobbs, of London and Manchester.

## STAINED GLASS.

*West Kensington.*—Four Munich windows have just been inserted in the Church of St. Mary, West Kensington, three in the chancel and one in the transept. The chancel windows represent Christ and the Syro-Phœnician woman, the Marriage Feast of Cana, and Christ healing the Sick; while in the transept the subject of our Lord blessing little children is introduced. The windows are by Messrs. Mayer & Co.

*Endon.*—A four-light stained-glass window, depicting Scriptural scenes, and including tracery, has, during the last few weeks, been erected in St. Luke's Church, Endon, by Messrs. Jones & Willis, of Birmingham and London.

*Wilmslow.*—A three-light Munich window has been lately inserted in the Parish Church of Wilmslow. It represents Martha calling Mary to the Master, John xi. 28, and is carried out in accordance with the architecture of the church, thirteenth century style. The architects are Messrs. Mayer & Co.

*Hunslet.*—Stained glass has now been inserted in one of the large north transept windows of Hunslet parish church, Leeds, by way of memorial to the late Richard and Ann Dobson, of Middleton Grange, Messrs. Powell Bros., of Leeds, were the artists entrusted with the work.

*Zanzibar.*—In connexion with the Universities Mission to Central Africa, a three-light stained-glass window, to be erected in Zanzibar Cathedral, in memory of the late Mr. Keith Johnston, by his mother and sisters, has been executed in Rust's varied antique glass, by Messrs. S. Belham & Co., 155, Buckingham Palace-road.

*Shadwell.*—A small Munich window, by Messrs. Mayer & Co., representing St. John the Evangelist, has just been placed in St. Peter's Church, London Docks, in memory of the late Mr. H. Rome Barton, eight years churchwarden of the parish.

# The Student's Column.

THIS is a week in which most of us are not bent on very serious study, and as our next subject for the Student's Column constitutes, like most of the previous ones, a series of articles on a special branch of study, we do not care to break it by commencing in the last number of the year. Instead of that, we will take the opportunity of saying a word as to this corner of the paper, and what we hope to do with it,—a word for ourselves and for our student friends at the same time.

It has never been intended that the *Builder* should be in its main scope, or in regard to the bulk of its matter, a paper for students or draughtsmen. It is rather intended to be addressed to the most educated section of the profession, and also to those persons (a large number) outside the profession of architecture who take an intelligent interest in architectural subjects. But we have wished to set apart a portion of our space in which to address those who are entering on the study of architecture as learners, and who may find it useful to have practical and artistic subjects treated of from their commencement, in plain language, and without assuming any knowledge on the part of the reader beyond just that general knowledge of what architecture is and what a building is, and what are the things to be chiefly thought of in carrying it out, of which every youth who has been for a few weeks, even, in an architect's office has some general notion. Having undertaken this, we have accepted it, however, as a serious responsibility, claiming, perhaps, in some respects more serious care than most other portions of the paper. It has been our effort and intention that everything set down here, in however plain and simple a manner, should be absolutely trustworthy, and that student readers may feel assured that in studying this column they are getting the best and soundest available information in regard to the subject treated of.

We commenced with some articles giving the outline of architectural history, as the background of the whole matter; and our proposal then was to take up in turn various practical subjects in connexion with building; for it is in these practical subjects that plain and trustworthy information is most difficult to get, and it is in practical knowledge that the young architect of this generation is most frequently found wanting. We are becoming too much of draughtsmen, too little of builders. We do not by any means intend to imply that the artistic side is not to be treated in this column, so far as it can be made a matter for instruction; but we hold that it is the practical and scientific side of the profession which it will be most useful for us to deal with at present. We have already given some articles on practical subjects, which, we believe, have been found valuable. These will be followed next by others of a similar class on very important subjects, in one or two cases on portions of architectural education which are mostly overlooked in England, and in regard to which the work of an architect affords in this country no instruction whatever. As time proceeds other subjects will come forward for treatment; those which have already been treated of in a general way will afford room for further consideration in a more detailed manner. There can be no limit to subjects, for we are always learning in architecture, or always ought to be, and new processes and materials are constantly springing up, and new wants crying out for attention, and too often not receiving it.

Let us point out also to our student readers that we are desirous to make this part of our paper a medium for giving direct answers to questions asking for definite information on points in regard to architectural history, or design, or construction. We do not wish to turn it into a correspondence column, which would take away what we believe to be its best use, but we wish our younger readers to understand that whoever wishes for special information is encouraged to ask for it here, and that no pains will be spared to give him a reply, not in a mere perfunctory way, but to give the best information that can be had on the subject, whatever it may be, provided that it be within the proper and recognised province of an architectural journal.

Let us add that we are very glad also to receive any suggestions from our younger readers as to subjects which they would think it specially useful to them to see treated in this column. It may not always be possible to comply at once with such suggestions, but they will always be duly considered and acted on where possible. There is one proposition, however, which has been made to us more than once, and to which we will take the opportunity of here replying, viz.: that these students' articles should be printed entirely on one page, or on a separate slip, for the purpose of being cut out and bound up by the possessor at the end of the year. There are some practical reasons against both suggestions, having reference to the convenience of printing and making-up a paper; but we may be allowed to add that the *Builder* is not published with the view of having one part cut out and the rest thrown away, and that we are afraid we cannot see our way to enter into special arrangements to facilitate that process.

That, we hope, however, will be regarded by our student friends as a minor grievance, which they will not think it worth while to quarrel with us about. We are doing the best we can for them according to our lights, and, expressing our hope to be able to be useful to them and to succeeding generations of architectural students, we take our leave of them for this year with the best wishes for their prosperity in the future before them, as well as the more immediate and seasonable wish of "A Happy Christmas to all."

# Books.

*Men of Invention and Industry.* By Samuel Smiles. London: Murray. 1884.

A NEW work from the pen of Dr. Smiles is sure to attract the attention of a large circle of readers. Those who may wish to hear from him something more of the biographies of men of invention and industry will not be disappointed by the perusal of his new volume. In the biography of Phineas Pett, who became assistant master-shipwright at Chatham in 1601, we are told of the beginnings of English shipbuilding. In that of Francis Petitt Smith, who was raised to the honour of knighthood in 1871, and who died three years later, we have an account of the practical introduction of the screw propeller, now the chief appliance of steam navigation. And we have a glance at the later development of iron and steel shipbuilding in a very interesting autobiographical sketch of E. J. Harland, to whose energy is chiefly due the prosperity of the shipbuilding industry of Belfast. No human industry that has preserved any continuous history has shown such an evolution as that of the shipbuilder. Henry VIII., Dr. Smiles remarks, was the first to establish royal dockyards, first at Woolwich, then at Portsmouth, and thirdly at Deptford. The *Great Harry*, launched for this monarch in 1515, was a vessel "the like of which had never before been seen in England." She was rated at 1,000 tons. In 1815 the first steamboat was launched on the Thames, by Maudslay. In 1846 the steam navy of Great Britain consisted of 360 vessels, with a total capacity of 74,000 tons. In 1883 the number of steam vessels registered as belonging to the United Kingdom was 6,260, with a tonnage of 3,728,268 tons; the sailing vessels at the same time being 18,415, with a tonnage of 3,513,948 tons. The men employed, exclusive of masters, in this year, were 200,727, or one to every 35 tons of shipping. In 1872 they were 203,720, or one to every 28 tons of shipping. Such has been the economy of human labour effected by the steam-engine, in this department of industry, in eleven years.

The life of John Harrison gives occasion for an account of the invention of the marine chronometer, one of the greatest gifts ever bestowed on the navigator. In the life of John Lombe we have an account of the introduction into England of the silk industry, or, rather, of that fundamental portion of the manufacture which consists in the production, from the cocoon, of organzine or thrown silk. Machinery for this purpose existed in Savoy, where its construction was regarded as a state secret, to be kept on penalty of death. John Lombe obtained employment in a silk-mill in Piedmont, found means to see the engine, fled the country at the risk of his life, and took out a patent in London for the organzining of raw silk in 1718. With the aid of his brother Thomas, who was afterwards knighted, and received a grant from Parliament of 14,000*l.* as "a reward for his eminent services done to the nation in discovering, with the greatest hazard and difficulty, the capital Italian engines, and introducing and bringing the same into operation in this kingdom," he erected silk-mills at Derby about 1720. Nearly 64,000 persons are returned in the census of 1881 as engaged in the silk industry. Dr. Smiles, however, says that "in 1850 the number employed in the silk manufacture exceeded a million persons." He does not give his authority for the statement. There has been a decline in the number of persons employed in the decade 1871-81, from 82,053 to the number before given, but the whole number of "persons working and dealing in textile fabrics" in 1881 is only given on the census returns at 1,053,648.

William Murdoch was born in 1754, in Ayrshire, where his father was a millwright. In 1777 he obtained employment at Soho Works, under Boulton and Watt, and became the right-hand man of the great inventor of the steam engine. He was the practical inventor of gas-lighting; and his biography is one of no little interest.

The invention and introduction of steam printing occupies three of Dr. Smiles's chapters; the inventors chiefly mentioned by him being Frederic Kœnig, "the Walters of the *Times*," and William Clowes. There is an interesting chapter on that almost if not wholly unique incident in the last century of the history of Ireland, the establishment of the admirable system of cross-country cars, by the Italian, Charles Bianconi. The above, with a final chapter on some less known astronomers and students in humble life, make up the contents of this very readable book.

*Sketches in Spain, from Nature, Art, and Life.* By John Lomas. Edinburgh: Adam & Chas. Black. 1884.

The writer of this book has divided his matter conveniently into routes, which are, moreover, clearly shown on a very good map affixed to the book: with this exception the work is sadly wanting in method. Scraps of history, of archæology, criticisms of art, and descriptions of nature are thrown together pell-mell, not

arranged as a mosaic, but tumbled promiscuously into a sort of loose incoherent conglomerate. He has, moreover, the unfortunate habit of wandering from subject to subject and back again, visiting and revisiting the same spot and mixing up his remarks in a manner which is most perplexing to the attentive reader. It is often difficult to understand what particular church, cathedral, or other subject he is referring to, and sometimes almost impossible to make out what his real feelings are respecting them.

As an instance we may cite his remarks upon the cathedral at Burgos. The subject is taken up on p. 32, but, after a few lines, the writer passes to San Sebastian, and follows with ten or a dozen discursive pages about many things. On p. 44 he returns to the cathedral, picking up the forsaken thread of his description. Collecting his remarks thereon we learn that at first sight the cathedral is disappointing,—even vexing; that one's artistic sensibilities are outraged by the poor west front, the damning *Coro*, the mixture of architectural styles, and the all-pervading overdecoration of the interior; that, nevertheless, its beauty is glorious, its defects comparatively small; and that it is, after all, "one of the noblest specimens of Gothic work upon the face of the earth!"

The west front is only poor in its lower or modernised part, where the Palladian doorways are thrust under the old pointed arches; above it is singularly elaborate. Nor is it "at first sight" that this and so many other Spanish buildings are "disappointing and vexing." Their *ensemble* is almost always captivating. Disappointment comes with scrutiny and the discovery how little thought has gone to the production of such an efflorescence of mechanical ornamentation.

The really interesting facts about Burgos Cathedral the writer has left out of sight,—that its late external architecture conceals an early church of great simplicity and beauty; that it is a reproduction of a French type; and that its founder, Bishop Maurice (1213-1238), was almost certainly an Englishman. It is quite certain that he travelled on important embassies in France, and it is credible that he brought thence,—as tradition affirms,—a French architect, who designed the cathedral, which the good bishop commenced to build within a few years of his consecration.

The writer succeeds best in dealing with natural scenery, having a keen sympathy with nature, and considerable facility in expressing effects of colour; but even here it is difficult to account for his selection of subjects. The Bay of Algesiras,—certainly one of the loveliest in the world, if not quite the most lovely,—is dismissed with a single epithet; and the writer "drops" provokingly into some commonplace reflections on the "strategic value" of the Rock of Gibraltar, and the inexpediency of surrendering it to Spain,—made, as it is, for the "arbitrage" of the Mediterranean,—a vile phrase; "arbitrage" is a vile phrase.

Every one who cares for the architecture of Spain will find something to interest him in this book. And every one who peruses it will feel with us, in some way or other, a sense of disappointment. It is perhaps too much to expect an adequate treatment of the subject without the aid of pictorial illustrations; but something more could have been accomplished than the author has given us. His sketches fail in the first requisite of a sketch, for they leave no definite impression upon the mind. He cautions the tourist against endeavouring to cover too much ground, and so run the risk of seeing nothing as it should be seen. The caution is a wise one. But a similar danger besets the author, and we would willingly exchange the book he has given us for a smaller number of really careful sketches by the same hand.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

2,528, Ventilators and Cowls. J. M. Lamb.

This improvement consists in fitting a taper or cone-shaped piece, with an open top on to the shaft. A hood and cover surmount the cowl, and an outer large inverted cone surrounds the inner one. Divisions are fixed so as to divide the cylindrical shaft into four separate parts, and deflect the currents of air. For chimney-cowls, some modifications are effected by leaving out or re-arranging the cones and divisions. This arrangement whereby deflecting currents of air are induced so as to exhaust the air from the shaft, is the novelty in the patent.

2,686, Preventing the Rattling of Window-sashes. A. B. Johnson.

Two small levers are secured to the beads on each side of the sash, in such a manner that the short end of the lever acts as an eccentric, and when the long end of the lever is moved away from the sash, the short end presses the sash against the parting bead, and, pressing the meeting bars together, also prevents rattling. It also prevents tampering with from the outside, and gives an additional security.

350, New Method of Inlaying Wood, Henry Forrester.

A composition for wood or ivory is substituted on the material to be inlaid. The pattern is engraved, sawn, or etched in the usual way, and any composition is poured and rammed into the design, which composition will afterwards harden and resemble ivory or wood inlaid.

1,029, Parquet Floors, F. F. Brown.

The tiles for these floors are constructed of a number of squares of end wood arranged that no two adjacent ones shall have their grain in the same direction. The squares are united by glue, and are held in some convenient frame when setting.

2,365, Cupola Furnace, W. Glaze.

In cupola for smelting iron and steel the tuyeres are placed nearer the bottom than usual. It is also made widened out at bottom.

4,635, Concrete Building, W. J. E. and E. J. E. Henley.

In the apparatus for building, uprights are fixed at intervals, and between these are arranged boards fixed at their ends to plates, which, in turn, are bolted to the uprights by two sets of bolts,—an upper and lower. The two sides of the boards are identical, so that when a layer of concrete has been laid and set, by unloosening the lower bolts the boards can be swung round the upper ones as centres, and so be in place for another layer. There are distance pieces to regulate the thickness of the wall. The cores for flues are of metal, capable of a slight collapse, so that they may be withdrawn when the work is finished.

### APPLICATIONS FOR LETTERS PATENT.

*Dec.* 12.—16,388, H. Agar, Improved Hook for Hanging Pictures.—16,339, J. Thomas, Fire and [illegible] Guard.—16,348, D. J. Jones, Improvement [illegible] Frames.—16,378, J. C. Murphy, Combined Case and Bedstead.

[illegible]JATIONS.—16,398, W. H. Baraclough, Venetian [illegible]TRACTOR Cord Holders.—16,409, J. McIntyre [illegible] Six lines for improvements in Cooking Ranges.—16,431, [illegible] additional Grates and Stoves.—16,432, F. Knott, [illegible]ments for Drawing Ellipses.

*Dec.* 15.—16,444, R. Holt, J. Holt, and J. Yates, Preventing Smoky Chimneys and Ventilating Rooms.—16,452, B. C. Budham, Combined Manhole Covers and Ventilators for Sewers.—16,462, C. Holme, Folding Window Blinds.—16,479, C. Osman, Fixing Door-knobs on their Spindles.—16,480.—W. J. Reynolds, Lock-action Window Sash Fastener.—16,486, A. J. Boult, Alarums for Shop Doors, &c.

*Dec.* 16.—16,523, R. Holmes, Improvements in Fire Grates.—16,530, W. J. Gwynn, Improvements in Folding Steps.—16,538, A. F. Zimmerling, J. Knoeppel, and A. Pauly, Improvements in Soldering Irons.—16,540, A. J. Boult, Heating Apparatus.

*Dec.* 17.—16,577, H. Sutcliffe, Improvements in Ball Taps.—16,579, J. Oddy, Folding-up Kneeling Forms, Side Counters, Seats, &c.—16,602, G. H. Jennings, S. Jennings, and E. G. Brewer, Electric Bell Indicating Apparatus.

*Dec.* 18.—16,624, T. McLean, Improvements in Cleaning Sinks.—16,630, F. H. Trier, Machinery for Dressing, Shaping, and Moulding Stone.—16,643, A. J. Boult, Construction of Combination Furniture.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

12,081, H. M. Robinson, Manufacture of Pottery.—13,728, W. Morris, Improvements in Bridges.—13,738, J. Carruthers, Shop-window Folding Shutters.—14,362, G. Redlich, Manufacture of Parquet Flooring.—14,744, A. Brenker, Fret Saws.—14,793, T. Batty, Strainers for Paints, &c.—15,019, W. Stewart, Stone-cutting Apparatus.—15,032, J. Wolstenholme, Slow-combustion Stoves.—15,070, S. S. Phillips and H. F. Green, Improvements in Water-closets.—15,414, S. B. Thomas, Window-sash Fastenings.—15,628, G. Marie, Colouring Stone, Marble, &c.—15,622, P. E. Ayton, Door Chains.—15,805, G. S. Buchanan, Ventilators.—13,712, R. G. Medland, Syphon Water Waste-preventer.—14,778, H. C. Webb, Door Knobs and Spindles,—14,392, J. Winfield, H. Evered, and H. W. Underhill, Combination Oven and Boiler, with Mantel Register Stoves.—14,989, R. L. Lowe, Cement or Composition for Laying Floors, &c.—15,071, D. Tennant, Drain-pipe Trap.—15,124, T. Pickles and B. Blakey, New Process for Treating Timber.—15,157, A. H. Kendall, Disconnecting Soil-pipes from Sewers, Ventilating same, and Trapping Waste Pipes thereto.—15,335, T. S. Ellis, Domestic Ventilators.—16,057, J. Rhodes, Cupboard-door Turns.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to opposition for two months.*

1,588, J. Hummerston, Locking Catch for Bolts, Window Fasteners, &c.—2,538, J. H. Key, Machinery for Preparing Potters' and other Clay.—3,754, H. Conolly, Attaching Water-closet Basins to their Traps.—5,396, T. Thornton, Flooring Cramps.—6,014, W. Cowell, Improved Ventilator.—12,868, J. Linkleter and T. Linkleter, Ladders.—13,783, J. A. McDonald, Roller Bearings for Bridges and other Structures.—15,042, A. Waters, Hot-water Pipes for Heating Buildings.—2,301, J. Coulong, Water Closets, &c.—2,338, J. Sherrin, Ornamenting Glass for Windows.—2,435, W. Macvitie, Sash and Casement Fastenings.—3,052, J. Newton, Flushing Water-closets.—4,147, J. J. Day and J. Day, Flushing Apparatus for Water-closets, &c.—9,322, A. M. Clarke, Apparatus for Striking Moulds for Handrails.—10,268, E. Midgley, Ventilating Drains, Tunnels, &c.—15,068, A. Emanuel, Cleansing Pipe to Overflow of Water-closet Basins.

## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

DECEMBER 18.

By WILKINSON & SON.

Plumpton, Sussex—Sedgebrook Farm, 200 acres, freehold ..... £2,420

By WORSFOLD & HAYWARD.

Dover—54, 56, and 58, Clarendon-street, freehold ... 600

## Miscellanea.

**The Sanitary Condition of Whitechapel.** Reporting upon certain charges lately made by the members of the Sanitary Committee of the Jewish Board of Guardians, recently referred to in the *Builder*, the Whitechapel District Board of Works have just issued a long and elaborate statement embodying the investigations of a special sanitary committee. With reference to the more important complaint, that a large number of houses are unfit for human habitation, the committee state that the whole (87 in all) have been specially visited, and the charges made are not warranted by the facts. That many of the houses in the district have been subjected to very hard wear and to much ill-usage is perfectly true. There is hardly a house in the occupation of the poorer inhabitants which is not tenanted by more than one family, and the consequence is that every house so held has to be continually watched by the sanitary officers. As to the remedy suggested by the Jewish Guardians,—that whole areas might, little by little, be improved, and the buildings thereon removed without the costly processes involved by the Artisans' Dwellings Act,—the local authorities state that acres upon acres of houses have just been demolished there under the Artisans' and Labourers' Dwellings Acts and for railway purposes; many thousands of the residents have been turned out of their dwellings; acres more of houses are about to be pulled down, under the scheme known as Bell-lane scheme, by the Metropolitan Board of Works; and in the Pearl-street scheme it is proposed that a further area shall be cleared. It is self-evident that under the schemes promoted by the Metropolitan Board of Works for the improvement of the district and by the absorption of property by railway companies, a great number of houses have been destroyed, and it is estimated that about 12,000 people have been displaced, while accommodation has at present been provided for only about one-fourth part of the number of those disturbed. In addition to the destruction of the houses of the poor above referred to, the Whitechapel Board recall the fact that they have expended 35,000*l.* in improving Baker's-row and 38,000*l.* in widening Royal Mint-street, by which many dwellings of the poorer classes were destroyed. The Whitechapel Board therefore submit that great overcrowding of the houses which remain must of necessity take place.

**New Insurance Buildings in Fleet-street.**—A very extensive block of new buildings is as present in course of erection in Fleet-street for the Law and General Assurance Company. The new premises will replace the old buildings of the company, which have just been taken down, but they will be on a greatly enlarged scale, the adjoining premises on the west side, near the site of Temple Bar, having been demolished for the purpose of enlarging the site. The premises now in progress will have a frontage to Fleet-street about 50 ft. in length, and will be carried to a depth of 200 ft., extending to the north side of Hare-court, in the Temple. They will thus cover a ground area of something like 10,000 ft. Mr. R. W. Edis, of Fitzroy-square, is the architect; and Messrs. Holland & Hannen are the contractors.

**New Dwellings for Artisans in Petticoat-square.**—The large blocks of dwellings for the working classes which have been erected by the Commissioners of Sewers in Petticoat-square are so far completed that they are expected to be opened about the commencement of the new year, or within about twelve months from the time when the foundation-stone was laid. The main face of the several elevations is in yellow brick, but the south-west frontage, and also that on the north-east side, facing Petticoat-lane, are of a more artistic character. The lower portions of these frontages are in red moulded brick, pilasters of similar material being carried up to a height of upwards of 40 ft. Each block is surmounted by a pediment, with panels on each side, the pediments having in the centre the arms of the Corporation. This portion of the work, together with the whole of the surrounding enrichments, is in red terra-cotta. All the blocks are surmounted by open arches and parapets, with flat roofs enclosed and protected by ornamental railings. The buildings, which are upwards of 70 ft. in height, contain five floors, the ground-floor of the blocks at the south-east and north-east ends respectively consisting of shops about fifty in number. The buildings contain about 300 suites of apartments, varying from one to three rooms each. They are estimated to contain a population of about 1,200 persons. Mr. Mark Gentry, of Stratford, is the contractor for the buildings, the cost of which has been about 65,000*l.*

**New Bank Buildings at Beckenham.**—The London and County Banking Company have just opened spacious new banking premises at Beckenham, which have been erected from the designs of Mr. W. G. Bartleet, architect, of New Broad-street. The bank occupies a position in Church Hill, nearly opposite the old Parish Church (which is about to be rebuilt from designs also furnished by Mr. Bartleet). The building is in the Italian style, and faced with red brick and moulded brick dressings and cornices, the entablature and panels to the arched ground-floor windows being in Bath stone. The building has a frontage of 30 ft. to Church Hill, with a return frontage in Church Hill-road about 90 ft. in length. In the basement, the roof of which consists of iron and concrete, is the strong-room, lined with white glazed brick, also the book-room, the doors and fittings of these apartments having been furnished by Messrs. Chubb & Sons. The banking-room on the ground-floor is 36 ft. square. Immediately adjoining is the manager's room. At the rear of this floor, with a private entrance from Church Hill-road, is the dining-room, kitchens, and other domestic offices in connexion with the manager's residence. The two upper floors contain the drawing-room, bath-room, and several bedrooms. The contractor is Mr. Cox, of Beckenham, the cost of the buildings being 3,300*l.*

**Strong Rooms in Chancery-lane.**—A large block of chambers and offices, having a frontage of upwards of 240 ft., with a depth of over 100 ft., are now on the point of completion on the east side of Chancery-lane. They are designated New Stone Buildings, and are in continuation of Victoria and New Court Chambers, buildings of the same class recently erected. The several floors contain altogether upwards of 300 offices. The basement of the building is about to be appropriated to safe deposit purposes by the Chancery-lane Safe Deposit Company, and the works in connexion with this portion of the building are now in progress. The strong rooms and safes are being constructed by Milner's Safe Manufacturing Company, of Finsbury-pavement and Liverpool. There will be three strong rooms, composed of iron and steel, fire-proof and thief-proof. One of these strong-rooms will, it is stated, be the largest in the world, and will contain 5,000 safes. The other two rooms are being specially constructed for the safe keeping of cash-boxes, jewel-cases, and plate.

**Society for the Encouragement of the Fine Arts.**—The programme of this Society, which holds its annual *conversazione* on Jan. 15 of next year, includes several lectures of interest; among them are one by Mr. G. Aitchison, on "Architecture in the Nineteenth Century" (April 16); Mr. Cave Thomas, on "The New Æsthetics" (April 30); Dr. Campbell, on "Physiology in Art" (March 12); and Mr. G. C. Haité, on "Wall-papers and their Manufacture" (Feb. 12).

**New Public Hall, Forres.**—The new public hall at Forres, N.B., has been opened for use. The hall is built attached to the buildings of the Mechanics' Institute, to which the old hall of the Institute forms a spacious approach and ante-room. There is accommodation provided for seating an audience of 800 people comfortably. A gallery is continued round three sides of the hall, and the platform is at the north end. Above the platform an organ-loft is provided. The committee appointed as their architect Mr. John Rhind, Inverness, and he has designed the new hall in the Greek style, in harmony with the Classic character of the old building. The tradesmen employed were Jas. Macdonald, mason, Kingussie; Alex. Laing, carpenter; Alexander Forbes, slater; Adam Ross, plasterer; John Taylor, plumber; and Archibald Macdonald, painter and glazier,—all of Forres. Messrs. Falconer Brothers, Inverness, supplied the cast-iron work; and Messrs. King & Son, Glasgow, the ornamental castings.

**Test of Glue.**—The following is an excellent method of testing glue. Carefully weigh a piece and suspend it in water during twenty-four hours at a temperature not exceeding 50° Fahr. The colouring matter is thus precipitated, and the glue swells in consequence of the absorption of the water. On its removal, the increase in weight will be found to be in proportion to the quality. The weight of the colouring matter can also be ascertained by weighing the glue a second time after it has been thoroughly dried.

**Royal Institute of Painters in Water-Colours, Piccadilly.**—Of the total number of works exhibited at the late Exhibition of the Royal Institute of Painters in Water-Colours, Piccadilly, amounting to 1,083, 365 pictures found purchasers within the galleries, realising the sum of 12,335*l.* 8*s.* The prices of the pictures sold ranged from 5 guineas to 400 guineas.

**Ventilation.**—The Æolus Waterspray and General Ventilating Company, of [illegible] Holborn, have received instructio[ns] Office of Works to apply their co[m]bi[ned] of inlet and outlet ventilation, a[nd] warm or cold fresh purified air, to [the] Room of the G.P.O. (New Bu[ilding] Martin's-le-Grand.

**Smethwick.**—New Higher Grade Schools for the Harborne and Smethwick School Board, from designs by Messrs. J. P. Sharp & Co., architects to the Board, are now being built in Crocketts-road, Smethwick, by Mr. G. H. Marshall, builder, Smethwick.

**Improvement in Cable Railways.**—It is stated that Mr. A. H. Mathesius, the engineer who superintended the construction and erection of the traction machinery of the Brooklyn Bridge, and who has had extended experience in cable propulsion, has worked out a new arrangement for this purpose, for use on surface roads, which he believes will reduce the first cost of construction from 60,000 dollars to not more than 10,000 dollars per mile. At present the trough in which the cable runs is from 30 in. to 48 in. in depth, the gripping apparatus being worked in this trough, which is constantly exposed to being filled with dirt and snow. To get this trough in position requires a general opening up of the road, and the usual obstructions of water, gas, and sewer pipes are met with. Mr. Mathesius proposes to use a 6-in. covered pipe, running along the top of the front cross ties, which is put in place by simply removing the roadway at the centre between the tracks. The gripping apparatus works outside the tube. As the car moves along, it uncovers the tube at the front end of the car and covers it at the rear, leaving only the part of the tube that may be under the car uncovered. Curves of a radius of 45 ft. may be made by this arrangement.—*Iron.*

**Sanger's Amphitheatre.**—The Metropolitan Board of Works have resolved,—"That a letter be addressed to the Lord Chamberlain to the effect that the gangways of the pit of Sanger's Amphitheatre are allowed to be obstructed, contrary to the clear intention of the Board in requiring the formation of such gangways, and suggesting that his Lordship do take such steps as he may think right with a view to preventing such obstructions; and that Mr. G. Sanger, the owner of the theatre, be informed, in reply to his letters complaining of the danger and annoyance caused by the existence of the central gangway in the pit, that, inasmuch as he had disregarded the intimation already given to him by the Board on the subject, they have felt it their duty to communicate with the Lord Chamberlain thereon."

**Diaries.**—Messrs. Hudson & Kearns send us their very well-arranged series of diaries for business men, including also one entitled the "Architect's Diary," though we do not discern the precise applicability of this diary to architects. It certainly cannot lie in the brief table of characteristics of leading styles, which in a book for architects are too absurd, and should be omitted in future. The "date-indicating blotting-pad," with strips of paper at the side for immediate memoranda, we have found very useful.

## COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

### COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| Manufacturing Premises | Not stated | 100 guineas, first<br>30 ,, second<br>20 ,, third | Jan. 7th | i. |

### CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Construction of two Bridges, Lenton | Midland Railway Co. | A. A. Langley | Jan. 2nd | ii. |
| Supply and Erection of Ironwork for Bridges | do. | do. | do. | ii. |
| Alterations to Derby County Court Offices | Commissioners of Works | *Official* | Jan. 5th | i. |
| Construction of Road, Lee-on-the-Solent | J. C. Robinson | .. | do. | ii. |
| Isolation Block, Building Boundary-Walls, &c., to Hospital | Uxbridge Joint Hospital Board | Surveyor | Jan. 7th | ii. |
| Sewerage, &c., Knighton | Blaby R. S. A. | E. L. Miles | Jan. 9th | ii. |
| Re-seating and Improvement, and Enlargement of Holy Trinity Church, Sheerness | Committee | R. Wheeler | do. | i. |
| Supply of Materials | Liverpool Corporation | *Official* | Jan. 10th | xvii. |
| Re-lining Swimming-Bath | Commissionrs of Public Baths, &c., Grenwch | | Jan. 12th | ii. |
| Cleaning out Pond and Works in connexion therewith, Streatham Common | Met. Board of Works | Architect | Jan. 13th | ii. |
| Tar Paved Walks, Peckham Rye Common | do. | do. | do | ii. |
| Works and Materials | Parish of St. Marylebne | *Official* | Jan. 15th | ii. |
| Breeze, Ashes, and Dusting | do. | do. | do. | ii. |
| Carting Slop and Sweepings | do. | do. | do. | ii. |
| Watering Streets and Roads | do. | do. | do. | ii. |
| Broken Stone, Footway Kerb, and Yorkshire and other Footway Paving | do. | do. | do. | ii. |

### PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Civil Engineer or Surveyor | Billesden U. R. S. A. | Not stated | Jan. 2nd | xvi. |
| Borough Surveyor | Corporation of Bolton | Not stated | Jan. 6th | xvi. |
| Instructing Assistant-Warder of Smiths' Work, for Prison Service | Home Office | 100*l.* | Not stated | xvi. |

**Bridging the Susquehanna.**—The magnitude of the undertaking of the Baltimore and Ohio Railroad Company in building a railway to Philadelphia cannot (says *Iron*) be appreciated without a clear understanding of the gigantic work at the Susquehanna. The bridge over that river will be one mile and a quarter in length, including the trestle-work over Garrett Island. This island is about midway in the river. Across the channel to the west of it there will be one span of 520 ft. in length, at an elevation of 90 ft. above mean high tide, and four deck spans of 480 ft. each. Over the east channel there will be a through span of 380 ft., a deck span of the same length, and another deck span of 520 ft. A clear conception of what will be the distance across the bridge may be had by bearing in mind that it will be 6,300 ft. long, and that the bridge of the Philadelphia, Wilmington, and Baltimore Railroad is only 3,300 ft. The approaches and the crossing over the island are of iron trestle-work. The spans constitute the superstructure of the bridge, and will rest upon eleven large piers and two massive abutments of granite masonry. The piers are built upon caissons sunk by the pneumatic process to rock bottom. An engineering feat never attempted before was successfully accomplished at one of the piers. The caisson had sunk to within 2 in. of the bed-rock at one point, when it was discovered that at other points within the area the rock was 12 ft. lower. The whole structure, which weighed 6,600 tons, was held in suspension for two weeks, while the bed-rock was laid bare at every point, and a concrete foundation built up from the rock to the working chamber in the caisson. The highest points of the bed-rock were blasted off inside the caisson so skilfully that not the slightest damage was done. Work is carried on at the bridge night and day, the whole force employed including 700 men.

**Stable, &c., Fittings.**—The Carron Company send us their catalogue of stable and cattle-house fittings. The practical ironwork appears very well designed. There are some well-intended attempts to give ornamental treatment to some of the cast-iron work. Such attempts in trade catalogues are seldom successful, but one or two in the present instances are better than ordinary.

## TENDERS.

For the erection and completion of the Leadenhall Market extension for the Corporation of the City of London. Mr. Horace Jones, architect. Quantities by Messrs. William Reddall & Son :—

| | |
|---|---|
| Nixon | £16,917 0 0 |
| Conder | 16,485 0 0 |
| Hall & Beddall | 16,440 0 0 |
| Greenwood | 16,273 0 0 |
| Hart | 16,266 0 0 |
| Ashby Bros. | 16,134 0 0 |
| Perry & Co. | 15,790 0 0 |
| Holland & Hannen | 15,647 0 0 |
| Webster | 15,580 0 0 |
| Bywaters | 15,540 0 0 |
| Boyce | 14,970 0 0 |
| Chappell | 14,960 0 0 |
| Kilby & Gayford | 14,880 0 0 |
| Morter | 14,565 0 0 |
| Gentry | 14,475 0 0 |
| Mowlem & Co. | 13,490 0 0 |

For new shop-front and fittings at 147, Shoreditch, for Mr. Eaton Buck :—

W. Shurmur (accepted).....£225 0 0

[No competition.]

For repairs, &c., at Aston Grange, Preston Brook, Cheshire. Messrs. Linaker & Davies, architects, Frodsham :—

*General Repairs.*

| | |
|---|---|
| Stelfox & Carter, Northwich | £464 10 1 |
| T. Davies, Frodsham | 425 0 0 |
| Executors of the late John Gleave, Frodsham (accepted) | 326 16 6 |

*Painting, &c.*

| | |
|---|---|
| F. Spencer, Frodsham (accepted) | 59 15 0 |

For the erection of a pair of cottages, East Donyland, Colchester, for Miss M. E. Shave. Mr. J. W. Statt, architect, Colchester :—

A. Gladwell, Colchester (accepted) ...£273 0 0

[No competition.]

For bottling stores, &c., for Messrs. J. A. Alabaster, Kingsland-road. Mr. F. J. Smith, architect. Quantities by Mr. Walter Barnett :—

| | |
|---|---|
| Chessum | £1,542 0 0 |
| S. Hayworth | 1,374 0 0 |
| Allard | 1,300 0 0 |
| R. Forest | 1,287 0 0 |
| Stimpson & Co. | 1,249 0 0 |
| T. Boyce | 1,245 0 0 |
| W. Shurmur (accepted) | 1,179 0 0 |

For alterations, &c., to premises, St. Andrew's-street, Holborn. Mr. F. J. Smith, architect. Quantities by Mr. Walter Barnett :—

| | |
|---|---|
| R. & G. Russell | £4,558 0 0 |
| R. Hindle | 4,473 0 0 |
| W. & D. McGregor | 4,400 0 0 |
| G. Colls & Son | 4,400 0 0 |
| Stimpson & Co. | 4,290 0 0 |
| Burch & Co. | 4,289 0 0 |
| Scharien & Williams | 4,250 0 0 |
| Miller & Brown | 4,129 0 0 |
| T. Boyce | 4,092 0 0 |
| J. O. Richardson | 4,017 0 0 |
| W. Shurmur | 3,978 0 0 |

For alterations at the Bell public-house, Middlesex-street, for Mr. W. Rose. Messrs. Wilson, Son, & Aldwinckle, architects :—

W. Shurmur (accepted).

[No competitor.]

*SPECIAL NOTICE.*—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., *not later than* Five p.m. on THURSDAYS.

## PUBLISHER'S NOTICES.

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DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

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## TO CORRESPONDENTS.

F. (your inquiry was overlooked last week; we are obliged to decline recommending books; see permanent notice to that effect below).—H. G. (next week).—W. C. T.—E. I. B. (next week).—H. H. C. (shall be glad to have it).—F. H. (next week).—A. B. (it is a purely legal question, on which we cannot advise. Correspondents should obtain it).

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